



Has been issued since 2012.
E-ISSN 2305-6746
2021. 10(2). Issued 4 times a year
MIAR ICDS 2021 – 9,5

EDITORIAL BOARD

Dr. Yury Tyunnikov – Sochi State University, Sochi, Russian Federation (Editor-in-Chief)

Dr. Rushan Ziatdinov – Keimyung University, Daegu, Republic of Korea (Deputy Editor-in-Chief)

Dr. Aufenanger Stefan – University of Mainz, Mainz, Germany

Dr. Bendikova Elena – Matej Bel University, Banská Bystrica, Slovakia

Dr. Birova Jana – Comenius University, Bratislava, Slovakia

Dr. Boticki Ivica – University of Zagreb, Croatia

Dr. Jasinskas Edmundas – Lithuanian Sports University, Lithuania

Dr. Esi Marius-Costel – Stefan cel Mare University of Suceava, Romania

Dr. Fedorov Alexander – Anton Chekhov Taganrog State Pedagogical Institute, Taganrog, Russian Federation

Dr. Malisa Mark – College of Saint Rose School of Education, Albany, USA

Dr. Malinauskas Romualdas – Lithuanian Academy of Physical Education, Kaunas, Lithuania

Dr. Ševkušić Slavica – Institute of Educational Research, Belgrade, Serbia

Dr. Simanavičiune Žaneta – Kaunas University of Technology, Lithuania

Journal is indexed by: **Cross Ref** (USA), **EBSCOhost Electronic Journals Service** (USA), **Electronic scientific library** (Russian Federation), **Global Impact Factor** (Australia), **Index Copernicus** (Poland), **Journal Index** (USA), **Open Academic Journals Index** (USA), **Scopus** (Netherlands), **Web of Science** (USA).

All manuscripts are peer reviewed by experts in the respective field. Authors of the manuscripts bear responsibility for their content, credibility and reliability.

Editorial board doesn't expect the manuscripts' authors to always agree with its opinion.

Postal Address: 1367/4, Stara Vajnorska str., Bratislava – Nove Mesto, Slovak Republic, 831 04

Release date 15.06.21

Format 21 × 29,7/4.

Website: <http://aphrsro.net>
E-mail: ejce.aphr@gmail.com

Headset Georgia.

Founder and Editor: Academic Publishing House Researcher s.r.o.

Order № 235.

C O N T E N T S

The Problems of Contemporary Education

The Differential Effects of Dynamic Assessment Versus Coded Focused Feedback on the Process Writing of EFL Learners M. Azizi, M. Pavlikova, K. Slobodová Nováková, J. Baghana	273
Digital Technologies and Artificial Intelligence Technologies in Education E.Y. Barakina, A.V. Popova, S.S. Gorokhova, A.S. Voskovskaya	285
Digital Transformation of Legal Education: Problems, Risks and Prospects M.V. Demchenko, M.E. Gulieva, T.V. Larina, E.P. Simaeva	297
The Development of Fair Play in Physical Education and School Sports: A Systematic Review B. Navarro Domínguez, J. Antonio Cerrada Nogales, M. Tomás Abad Robles, F. Javier Giménez Fuentes-Guerra	308
An Approximation to Mediation from Within. The Case of Secondary Education in Spain L. García-Raga, R. Grau Vidal, R. López Martín	324
Internet Addiction Scale: A Parametric Study through the EFA and Polychoric Correlation Matrices A. García-Santillán, E. Mexicano-Fernández, V.S. Molchanova	338
Using Methods and Means of the Augmented Reality Technology When Training Future Teachers of the Digital School A.V. Grinshkun, M.S. Perevozchikova, E.V. Razova, I.Yu. Khlobystova	358
Development and Implementation of Integrated Curriculum in Management Studies A. Junevicius, O. Juneviciene, G. Cepeliauskaite, R. Daugeliene	375
Preparing Junior School Aged Pupils for a Circle Definition: Teaching Mathematics within Physical Education Class J. Liptak, I. Scholtzova	395
The Potential of Motion Pictures as a Non-Traditional Form of Pedagogical Information Relating to Working with Gifted Children M.A. Maznichenko, N.I. Neskromnykh, A.N. Platonova, A.M. Mamadaliev	409
Methodology of Working with a Textbook Versus Field Activities of Teaching Geography during the Corona Crisis L. Petrikovičová, A. Ďurinková, R. Králik, V. Kurilenko	428
Impact Study of Programme Assessment at Three Universities in Vietnam: Students' Perspectives H. Thi Pham, P. Vu Nguyen	438

The Effects of Using Digital Game Based Learning in Primary Classes with Inclusive Education G.I. Salgarayeva, G.G. Iliysova, A.S. Makhanova, R.T. Abdrayimov	450
Developing Computational Thinking of Specialists of the Future Through Designing Computer Games for Educational Purposes E.V. Soboleva, T.N. Suvorova, S.V. Zenkina, M.I. Bocharov	462
Examining the Relations among Extraversion, Neuroticism, and School Bullying among Lithuanian Adolescents I. Tilindiene, S. Sukys, A. Zuoza, A. Alekrinskis	476
Actual Problems of Students' Education with Disabilities at the University O.L. Voroshilova, O.V. Chernyshova	485
Self-Reflection of Digital Literacy of Primary and Secondary School Teachers: Case Study of Slovakia J. Záhorec, A. Hašková, M. Munk	496

The History of Education

The System of Popular Education in Denmark in the 19th and Early 20th centuries: Some Specific Aspects A.A. Cherkasov, S.N. Bratanovskii, M.A. Ponomareva, L.G. Zimovets	509
Schools for Training Future Clerical Employees in the Russian Empire: Professional Staff and Characteristics of the Learning Process S.I. Degtyarev, M.S. Nazarov, L.G. Polyakova	517
The System of Public Education in Baku Governorate in the Period between the second half of the 19 th century and the early 20 th century. Part 1 T.A. Magsumov, T.E. Zulfugarzade, M.B. Kolotkov, S.B. Zinkovskii	529
The Organization of the Educational Process in Kharkov Imperial University (1835–1863) A.E. Lebid, N.A. Shevchenko	546



Copyright © 2021 by Academic Publishing House Researcher s.r.o.

All rights reserved.

Published in the Slovak Republic

European Journal of Contemporary Education

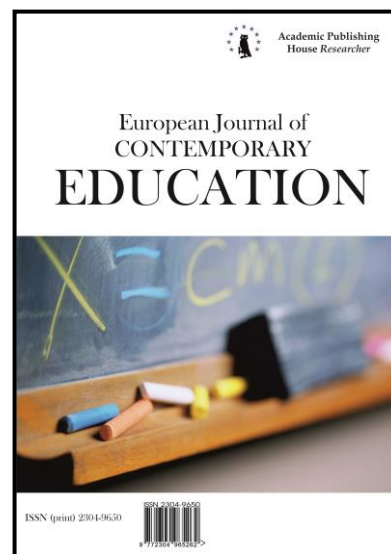
E-ISSN 2305-6746

2021. 10(2): 273-284

DOI: 10.13187/ejced.2021.2.273

www.ejournal1.com

IMPORTANT NOTICE! Any copying, reproduction, distribution, republication (in whole or in part), or otherwise commercial use of this work in violation of the author(s) rights will be prosecuted in accordance with international law. The use of hyperlinks to the work will not be considered copyright infringement.



The Problems of Contemporary Education

The Differential Effects of Dynamic Assessment Versus Coded Focused Feedback on the Process Writing of EFL Learners

Mahmoud Azizi ^a, Martina Pavlikova ^b, Katarína Slobodová Nováková ^{c,*}, Jerome Baghana ^d

^a University of Mazandaran, Babolsar, Mazandaran, Iran

^b Constantine the Philosopher University in Nitra, Nitra, Slovakia

^c University of Ss. Cyril and Methodius in Trnava, Trnava, Slovakia

^d Belgorod State University, Belgorod, Russian Federation

Abstract

The role of corrective feedback in general and focused feedback in particular has been investigated widely in second language (L2) writing over the past several decades. Moreover, Dynamic Assessment (DA) with its roots in socio-cultural theory has been noticed to play a role in fostering language learner development and assessment. However, their differential effects have rarely been investigated. Thus, the present study was an attempt to explore the impact of dynamic assessment (DA) and Coded Focused Feedback (CFF) on the Iranian EFL students' writing performance. To this end, two experimental groups of high intermediate learners were selected to compare the effects of assisted writing instruction through Dynamic Assessment (DA) versus unassisted feedback (CFF) on their process writing. A mixed method analysis was used to answer the research questions. Students' performance on pre-test and post-test were analyzed via paired sample *t*-test and independent *t*-test. Transcripts of the teacher-student interactions in the DA group were also used to analyze the data further qualitatively. Results of the *t*-tests ($p = 0.00025$, $T = -7.415$ and $p = 0.5$, $T = -1.0$) and the descriptive study of the transcripts indicated that the DA group outperformed the CFF group both in the process writing and the revisions of the assigned topics implying that assisted writing instruction through DA helped learners to improve their writing ability. A careful design of the study via the sequential mixed-methods approach enhanced

* Corresponding author

E-mail addresses: katarina.novakova@ucm.sk (K. Slobodová Nováková), mazizijam@umz.ac.ir (M. Azizi), mpavlikova@ukf.sk (M. Pavlikova), baghana@yandex.ru (J. Baghana)

the originality and strength of the present study. It concluded that scaffolded assessment through dialogue would result in improvement in students' process writing performance.

Keywords: dynamic assessment, coded focused feedback, process writing, revision ability, EFL learners.

1. Introduction

One of the main objectives of writing instruction is to enable the students to write well (Berbache, 2007) and to be able to express their points in an accurate and logical manner. However, experiences of writing scholars and teachers as well as the published articles in the field indicate that EFL students do not write as well as we think they should (e.g., Hillocks, 1986; Ping, 2000; Rijaarsdam et al., 2005). There are manifold reasons for students' inability to write well enough to meet teachers' expectations. Some teachers relate it to students' laziness, while most students blame the writing skill for being extremely complex (Berbache, 2007, Gađušová et al., 2020a; Gađušová et al., 2020b). For Smit (1991), the most obvious reason that students do not write well is that they do not receive enough instruction, practice, and feedback in writing. It is necessary, therefore, to consider the fact that improving the writing ability of our students is dependent on teaching writing more often and more effectively, and requiring our students to write more often so that they can get the practice they need (e.g., Hampton, 1995; McCormick, 1989; Kondrla et al., 2020). Moreover, it is only by responding to comments on early drafts and putting them into practice that students can "demonstrate what they have learned and internalize from the advice they have received" (Smit, 1991: 3). However, there is a great deal of evidence that teacher written comments – in and of themselves – have no effect on student writing except when they are focused (e.g., Hillocks, 1986; Leki, 1990). The teachers' little unfocused feedback that students usually receive on their finished papers seems to be neither enough nor effective in improving the various stages of the writing process with which learners need the most help (Berbache, 2007; Aizman et al., 2020; Tvrdoň, 2020).

Over the past two decades, writing has been acknowledged as a process of creating and extending meaning, rather than merely conveying pre-conceived information (Appleby, 2000; Bereiter, Scardamalia, 1987; Chenoweth, Hayes, 2001; Chenoweth, Hayes, 2003; Flower, Hayes, 1981; Hayes, Flower, 1987; Shaughnessy, 1977). The process of writing used to be conceived as a cognitive one, but more recently there has been a tendency to consider a more sociocultural orientation. Recognizing that learning and teaching are essentially social activities, sociocultural theorists (Cole, Engestrom, 1993; Lantolf, 2000; Van Lier, 2000) have attempted to shift the focus of attention from individual cognition towards the sharing and distribution of mental activity among learners. As Pea (1993, p. 47) states "the mind rarely works alone" and writing, as a learning activity, is one that lends itself to the co-construction of texts by students working together or by working with an expert (Roger Barnard, Lucy Campbell, 2002). Thus, collaborative problem solving, brainstorming, shared planning, multiple drafts, peer feedback, revision, have all been suggested as relevant activities within a cycle of process writing (for example, by Keh, 1990; Seow, 2002; Tsui, 1996; Zamel, 1983).

Although research abound in the literature about the effects of different means of providing feedback to students' writing, yet little research is found that has considered what L2 students need to know about their instructors' feedback, how well they understand it, and whether or how they might employ it for revision when writing subsequent essays (e.g., Brice, 1995; Ferris, 1995; Hedgcock, Lefkowitz, 1994; Hedgcock, Lefkowitz, 1996; Leki, 1991; Radecki, Swales, 1988; Saito, 1994). In general, this previous research has shown that teachers have different priorities when they respond to students' writing. Some studies indicate that teachers respond primarily to mechanics, grammar/usage, and vocabulary (Saito, 1994; Zamel, 1985); other studies show that teachers pay more attention to content and organization than to mechanical errors. Teacher correction, error identification, and written commentary appear to be the most widely used techniques when responding to adult L2 students' writing (Saito, 1994).

Given the importance of the depth of analysis that students should be able to demonstrate, regarding their own and each other's writing, this research study decided to use dynamic assessment to see if this would facilitate learners' ability to become better writers. With research indicating improved student learning through active, collaborative settings (e.g., Bruffee, 1984; Slavin, 1989), it was assumed that teacher assistance might be one way to provide students with

specific and immediate feedback that will help them improve problematic areas of their writing, particularly in revising and editing. Dynamic assessment (henceforth DA) seems to be a suitable approach to writing instruction because in DA the teacher acts as an improvement promoter and provides immediate and situated feedback during the whole procedure. More importantly, the focus of DA is on students' future development, not the outcome of the past development (Yan, Xiaoxiao, 2010; Kondrla et al., 2020).

Dialogic-based formative assessment consists of using of active communication between teacher and student and features a positive way for a student how to be able to express their opinions and points in an accurate and logical manner. At addition dialogic-based communication is a contributing factor to many others educational situations as a way of formation competences (Prochazka et al., 2018; Maksaev et al., 2021; Kozharinov et al., 2021), improves interpersonal relationships, student moral formation (Králík, Máhrik, 2019a; Khonamri et al., 2021), atmosphere of acceptance and language growth of student's abilities (Lalinská et al., 2020), and among other things is necessary for increasing ability of critical thinking on the part of students and teachers (Králík, Máhrik, 2019b). Dialogic-based formative assessment can be one of the key ways of writing instruction is to enable the students to write well (Berbache, 2007; Kušník, 2007).

The present study; therefore, focused on both Dynamic Assessment as a teacher-oriented approach and coded focused feedback as a more learner-oriented approach in EFL writing. The purpose of this research study was to make a comparison between two diverse approaches to improving EFL learners' writing through the use of dynamic assessment as a means of a dialogic rather than a purely individual-based formative assessment. The study aimed at shedding more light on the issue to discover which of the two approaches prepared more proficient writers in terms of the process writing.

Significance of the Study

This study intended to offer insights into theory and practice that underlie effective writing instruction. Concerning practice, this research project may benefit three groups of people. First, for those teachers who used or are using collaborative activities in their EFL writing classroom, the study might serve as a stimulus to help them reflect on their own practices in using DA as a regular activity. Second, for those who are or who will be teaching EFL writing courses yet have never incorporated or are not yet planning to use DA in their EFL writing classrooms, the study might serve as a guide to show them what can be done and how. Third, for those who are skeptical about DA, and those who have used it but found their practice ineffective in one way or another, the study provides concrete examples and analyses to show what some of the problems with teacher assistance are and how to solve them. If DA reveals itself successful in improving student writing, it becomes an example of a teaching strategy that has been demonstrated to work in the real classroom. Regarding theory, this research project may contribute to filling a gap in the current research, as it is carried out to examine the actual effects of DA on improving EFL students' writing, a major issue that has not been adequately addressed. As social interaction is such a key element of DA process, it is logical to deem that EFL students – with a common native language and culture—behave and perform differently in the DA setting from ESL students, who usually come from different linguistic and cultural backgrounds. Thus the insights and understandings of collaborative learning and communicative teaching developed in this research can be useful for teacher education and for designing, implementing and evaluating EFL writing curricula. Insights into how these students participate in DA process can also be important to research knowledge because they contribute to an understanding of this instructional technique as experienced by its participants in the real world of the classroom.

Research Questions

In the present study the researcher sought answers to the following research questions:

1. Does assisted writing instruction through Dynamic Assessment (DA) help learners improve their writing ability?
2. Does unassisted writing instruction through coded focused feedback (CFF) help learners improve their writing ability?
3. Does assisted writing instruction through DA help learners better than unassisted coded focused feedback in improving their writing?

The Design of the Study

This study was a descriptive case study. Although researchers have elaborated on a number of models and approaches to DA (Guthke, 1993; Carlson, Wiel; 1992; Brown, 2004) this study followed Budoff's 1987 sandwich format which consist of pre-test, treatment and post-test. This study also followed Feuerstein's Mediated Learning Experience (MLE) approach. Three most relevant Mediated Learning Experience components from Feuerstein et al. (1988) had been considered in this study. The main concepts in this approach are: Intentionality, Reciprocity and Transcendence.

Intentionality: The characteristic of this component is that the mediator (the teacher here) has a clear objective of the activity and adopts the activity level to the learners' ZPD. In this study objectives and activities are planned as below:

Objectives: Make the learners understand the criteria of a good writing and enable them to enrich their drafts in content and improve their organization.

Activity: A sample of good writing was appreciated and analyzed to realize the objective. Sometimes one composition of a more capable learner was chosen.

Reciprocity: The interaction and negotiation of meaning between the learners and the mediator or between peers is the key in this component.

Transcendence: The teacher tries to enable the learners to write independently a well-organized and rich-content composition in the future.

Participants

This study was conducted with two intact classes of Upper-intermediate Iranian EFL learners taking a writing class recruited from Shokouh Language Institute (girls' branch) in Babolsar, located in the north of Iran. The eight female participants, 19-26 years of age, took part in these classes in an effort to master written compositions. DA group (Number of participants – 4) wrote on topics, revised in response to mediation both from teacher and from peers. CCF group (Number of participants – 4) wrote on topics, revised in response to coded feedback, kept edit logs and error tally sheet.

The classes met 9 sessions during 3 weeks. Each session lasted 90 minutes to 150 minutes. Upper-intermediate learners were chosen to participate in the study since learners at this level are generally considered as bearing quite an acceptable amount of language knowledge, and thus, seem to follow their progress more willingly and responsibly than those of lower levels of proficiency. Hence, it seemed that high-intermediate learners would have enough knowledge of grammar and mechanics.

2. Materials

The materials used in this study and the tasks that learners engaged in included:

A TOEFL proficiency test was administered to ensure the homogeneity of the students. For pretest and posttest learners received the topic and were required to write a composition of 250 words in 40 minutes. The writing process was taught based on an e-book (Better writing right now) by Francine D. Galko published in United States in 2001 by Learning Express, LLC, New York. Two expository writing topics were given to the students in both groups one to write in class and another to write as a homework assignment out of class. According to Dornyei, 2001 the rationale for giving students in-class and out-class writing assignment is that, in-class practice is necessary to guide the students to engage in different writing activities such as pre-writing, revising, editing, sharing and presenting each other's work, and acquiring peer response and teacher response as well. However, in-class practice in a limited time is not adequate to achieve the whole process of writing. Therefore, with the students' final product from in-class practice, the teachers needed to encourage and guide the students to read and give feedback to each other. Also, students should be aware of the importance of revising and editing by themselves through out-of-class activities. Frequent writing practice helps students become aware of the importance of writing, which is helpful for their initial motivation to write. All teacher-learner and peer-peer interactions during mediation in DA classroom were recorded. This procedure enabled the researcher to capture the nature of the interaction between the teacher and learners and between peers, either individually or as a whole class. In CFF class focused written corrective feedback was defined operationally as the provision of the correct form in the learners' compositions by

underlining the erroneous form and indicates the correct form through codes below it. Since the learners were at advanced level they were supposed to have enough knowledge of grammar and mechanics of writing, so they only received feedback on macro-level (content and organization) in their compositions. Error logs and error tally sheets were also used in this class. Error logs were used to record the number of times learners revised their writings as well as enabled them to keep track of their errors in terms of type and frequency.

Procedures

All assessment sessions took place within a three-week period. In order to diagnose learners' level of proficiency, the researcher administered TOEFL proficiency test. The test was administered one week before the mediation and treatment of the class began. A few days before the treatment, the researcher gave a writing topic to the subjects in both groups to write as a pretest. They had 40 minutes to complete 250 words composition. In fact, it was conducted without any hint and prompt. Immediately following this stage, the mediation phase started for DA group in order to find out how DA can help promote learners' writing ability. The focus was on rhetorical competence of students i.e. student writing; substance, organization and flow of ideas. The mediation included hints, prompts, questions, suggestions, and explanations. The material selected for classroom practice was an e-book (*Better writing right now*) by Francine D. Galko. Eight units of the e-book were chosen to teach. During the mediation phase the mediator taught them one or two units of the e-book then the learners were asked to write, the assessment procedure was dynamic; i.e., upon the students' failure to write well, the teacher intervened and mediated in the students' production of the essay.

At the outset of the second session the teacher announced the intended topic by writing it on the board. Since the topic was too broad students had to narrow it down as much as they could in order to reach an appropriate topic to write. The teacher asked them to choose a topic in which they could both express themselves and at the same time impress their readers. For doing so, the teacher taught them mind-mapping which was one of the pre-writing strategies according to the textbook. In this stage, learners with the help of the teacher generated lots of sub-topics. Based on teacher's instruction and experience of mind-mapping with the teacher together, learners began to draw their own word-maps. In this process, the teacher, as a mediator, went around the classroom and offered assistance to learners.

In the process of interpreting learners' mind-maps, the teacher concluded several problems and gave instruction to the whole class. Those are 1) students didn't know which idea goes under which twigs. 2) They didn't know whether the idea related to the main topic or not. Then learners exchanged their mind-maps with their peers and helped each other to reach an acceptable topic to write on.

Through this stage, learners improved their abilities of drawing mind-maps, which in turn, as a psychological tool (in Vygotsky's concept) contributes to the transformation of their own thinking. Based on teacher's instruction, the learners started to draw their own mind-mapping. At the end of second session, the teacher gave another broad topic to the learners as an out-class assignment and asked them to use mind-mapping strategies to narrow it down.

On the third session, the teacher reviewed the issues that she had discussed in the previous session. Then the students received mediation both from their teacher and their peers on their assignment.

Then the teacher taught different types of writing and how to write an introductory paragraph. During this session, students wrote the introduction paragraph based on the topic they chose. The teacher walked around, monitored them and gave assistance when needed. After all students finished their first introductory paragraph, the teacher asked them to exchange their papers with their peers. In this way they negotiated their ideas with their peers and revised their papers. At the same time, they received the teacher's mediation too.

Student 1 did better than the others: the teacher read aloud her paper as a good sample in this process and asked her to help her classmates. At the end of the third session, when all students wrote an acceptable introductory paragraph with a good topic, a good topic sentence and a good thesis statements, the teacher asked them to write an introductory paragraph for their out-class assignment. On the fourth session, first students received mediation from their teacher on their assignment. Then the teacher taught them how to write a body paragraph. After that, learners were

asked to write the body paragraphs of their compositions based on their thesis statements. When they started writing, the teacher monitored them and assisted them. When all the learners finished, the teacher asked them to exchanged their papers with their peers and have a peer-review. Before they revised their papers the teacher walked around and did teacher-guided mediation.

These mediation and interaction between the teacher and learners happened several times during the fourth session until all the students improved the content and organization of their compositions. For homework assignment, the teacher told them to write the body paragraphs of the given topic.

On the fifth session, the students received the teacher mediation on their homework. Then the teacher taught them how to write conclusion paragraph and asked them to write their conclusion paragraph. While they were writing the teacher monitored and assisted them when they required. When all students finished their conclusion paragraph, they exchanged their papers with their peers and reviewed each other's papers at the same time received the teachers' mediation. Then they revised their paper based on the mediation they received from both the teacher and their peers.

After that, the teacher taught them how to edit the whole essay, the difference between editing and revising, how to evaluate the content of their papers and how to check the organization of their papers. And then they were asked to edit their papers. Then they received teacher and peer mediation.

On the seventh session, the teacher talked about the criteria of a good writing. Then she illustrated a sample of good composition, explained why the article was good in terms of content and organization.

In the CFF group, the same procedures were used for teaching the process writing but the method of error correction was different. In this class, the teacher explained the error tally sheet on which the feedback codes were defined and error log which was implemented so as to record the number of times students edited and revised each part of their writing in order to reach an acceptable level of fluency. The purpose for using error tally sheet and error logs was 1) learners would be able to keep track of their errors 2) over time, they would become familiar with their most frequent error types and try to master those areas 3) they may be less likely to make a particular error again in the future 4) they would also keep track of their progress. Then she gave them a copy of error tally sheet and an error log and asked them to keep it with themselves during all sessions. At the end of each session, the students handed their paper to the teacher; the teacher provided them with coded focused feedback. The students recorded their errors on their error logs; resubmitted their edited paper to the teacher, the teacher again provided them with coded feedback and returned it to the students; the students edited their papers for the remaining errors if necessary and resubmitted it to the teacher.

Data Analysis

In order to analyze the raw data in the present study SPSS, (version 20) was used for descriptive and inferential statistics. Descriptive statistics, reliability measures, standard deviation and significance were computed. The IELTS band score was used as a criterion for scoring learners writing. The researchers modified the IELTS band score to be limited to aspects of rhetorical competence especially those rhetorical features common to process writing instruction. For analyzing data Independent T-Test and paired samples T-Test were used.

3. Results

First, a test of normality was run to ensure that the data was normal. The results are shown in [Table 1](#).

Table 1. Tests of Normality

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
CFFpretests	.218	4	.	.920	4	.538
CFFposttest	.441	4	.	.630	4	
a. Lilliefors Significance Correction						

According to the results in [Table 1](#), since the results of the Kolmogorov-Smirnov test and the Shapiro-Wilk test were not significant ($p > .05$) for test scores, it was concluded that the distribution of the scores was normal.

The first research question asked whether DA affects student writing performance as an approach that involves teacher and peer assistance. The results show that DA group’s writing performance improved from pre-test to post-test. To verify the first null hypothesis, the data obtained from writing scores of students in DA group were used to run the paired sample *t*-test. The SPSS output for the paired sample *t*-test appears in [Table 2](#).

As the table shows the sig is .011, which is less than 0.05, so the first null hypothesis is rejected. In other words, assisted writing instruction through DA improved students writing performance.

Table 2. DA group’s writing performance during pre-test and post-test

Paired Samples Test									
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95 % Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	DApretest – DAposttest	-1.75	.61	.30	-2.7	-.77	-5.71	3	0.011

The second research question asked whether the CFF approach had any effect on students' writing performance. The results show that CFF group’s writing performance did not improve from pre-test to post-test. The SPSS output for the paired sample *t*-test appears in [Table 3](#).

Table 3. CFF group’s writing performance during pre-test and post-test

Paired Samples Test									
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95 % Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	CFFpretests – CFFposttest	.25	.35.	.20	-1.23	-.55	-3.15	3	0.02

Unassisted writing instruction through CFF does not improve students writing performance because *t* value is negative.

An independent sample *t*-test was run to compare the two groups and decide whether the difference was significant. This was done to answer the third research question. The results (Sig.= .004) indicated that there was a significant difference between students' writing performance in the posttest in the two groups and that the DA group outperformed the CFF group (Table 4).

Table 4. Independent samples t-test

Group Statistics										
		Group	N		Mean	Std. Deviation	Std. Error Mean			
DACFFposttest		dimension1	1.00	4	4.7500	.95743	.47871			
			2.00	4	2.2500	.50000	.25000			
Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95 % Confidence Interval of the Difference	
DACFFposttest	Equal variances assumed	2.455	.168	4.629	6	.004	2.50000	.54006	1.17852	3.82148

4. Conclusion

The purpose of the study was to compare the impacts of Dynamic Assessment and Coded Focused Feedback on Iranian EFL learners' writing performance. Two groups of EFL learners were selected for this study. One group of students was taught through Dynamic Assessment and the other group was taught and given Coded Focused Feedback. The homogeneity of the two groups in terms of English proficiency was checked with a TOEFL proficiency test and their homogeneity regarding their writing ability was checked through an analysis of their first writing sample. The DA method, which is a more teacher-oriented approach was introduced to the main experimental group. In each class hour in DA group they were taught process writing using an interventionist approach, Buddoff' sandwich format, (pre-test, treatment, and post-test) by a near-native speaker. The CFF method, which is a more learner-oriented approach, was introduced to the second experimental group. In each class hour in CFF group, process writing was taught and learners were required to keep edit logs and error tally sheets to keep track of their progress along with receiving focused feedback. Participants in both groups were high intermediate EFL learners. The aim of the two methods was to improve learners' process writing performance. The result of this study indicated that the DA group outperformed the CFF group. It is believed that by engaging in DA activities, teachers may be able to challenge individuals to reach higher levels of functioning (Pohner, 2005; Naeini, Duvail, 2012). DA offers a chance for language teachers to more accurately judge a learner's level of understanding and awareness and thereby determine what may be targeted to promote the level of development of the learner in relation to their current level of independent and assisted performance (Pohner, 2005). According to Feuerstein (1988), human beings are open rather than closed system, meaning that cognitive abilities can be developed in a variety of ways, depending on the presence and quality of appropriate forms of interaction and instruction. In this study, in DA class the teacher used learners' Zone of Proximal Development through the interaction with the tool of dialogue. The findings of the study are consistent with the Vygotskian sociocultural perspective in which knowledge is defined as social in nature and is constructed through a process of collaboration, interaction, and communication among learners in

social settings and as the result of interaction within the ZPD (Vygotsky, 1978, 1986 cited in Nassaji, Swain, 2009). Related to the Truscott-Ferris debate (1999) the results seem to indicate that it is not a question of the teacher correcting language mistakes or not, but a matter of students' understanding of where their formal language structures break down, of the understanding of the consequences for communication, and of helping the students resolve the issues from their own comprehension. Collaborative learning is the condition for learning in a ZPD and it is the capacity to make use of help and the capacity to benefit from give-and take in experiences and conversations with others (Bruner, 1962). In DA, learning is seen as a dynamic process in which learners themselves are actively involved, in which implementing cooperative work promotes discussion and sharing of ideas among students. Therefore, if one accepts the definition of good writing as the writing that meets particular requirements set for a particular readership in a particular context, then it is logical to suggest that DA as a practice of collaborative writing classroom improves learners' writing quality significantly more than traditional practices.

The second research objective was to explore the effect of Coded Focused Feedback on EFL learners' process writing performance. As elaborated before, the researcher utilized written corrective feedback, abbreviated as codes in error tally sheets. Although recent research has provided some evidence for effectiveness of corrective feedback (e.g., Ellis et al., 2008; Sheen, 2007; Jamali, 2010) in this study Coded Focused Feedback has produced somewhat inconclusive results. The findings indicated that focused feedback besides keeping error tally sheets and edit logs are not helpful in improvement of the process writing of Iranian EFL learners. Thus, the study failed to provide definitive evidence that CFF was more conducive to better process writing performance. As to the effectiveness of teacher feedback, the findings of Rinnert & Kobayashi (2001) suggest that students can respond in an appropriate and helpful manner to content, a conclusion found in other studies (Caulk, 1994; Devenny, 1989; Mangelsdorf, 1992). Such content comments have been perceived to be beneficial in improving drafts by many L2 writers (Mangelsdorf, 1992), and empirical evidence has implied that there is a strong connection between content related comments and improvement of L2 writing in content and accuracy (Kepner, 1991).

Implications of the Study

The findings of the present study have implications for learners, teachers, and teacher educators in the area of TEFL in particular and education in general. Teachers can employ DA procedures to reluctant learners so that they can promote their linguistic competence and language proficiency. This study provides further evidence for the benefits of DA approach in writing classes. All the learners now can write and revise their writings well enough. Face to face interaction with teacher and with peers can build the learners confidence in better writing performance in future and shows their progress to themselves. They can also transfer what they have learned in this writing task to the future similar or complicated one. This study indicated that DA was useful for EFL learners in a number of ways. Learners in this research project mentioned that DA provided more ideas, different points of view, clarification and elaboration of ideas, and suggestions of what to include or exclude. In the same vein, Zamel (1985) emphasized the importance of meaning-related feedback as a first consideration for L2 student writers. This means that writers are presented with ideas from which to decide what to incorporate into their evolving texts. Writing as a collaborative activity encourages constant decision-making on the part of the student-writers, allowing them to determine how best to express the meaning they intend. CFF approach also can be useful in writing classes when the focus is on the grammar and accuracy of the texts.

Limitations of the Study

Almost every research project experiences a number of limitations either in its design or in the way it is conducted, which restricts its generalizability in one way or another. This research study is no exception. There are several limitations to this study. First, due to the lack of students, there remind a small number of learners per group. There is a need for this study to be replicated using larger groups to render the findings generalizable. Second, only one language institute was selected as the site of the study. Running the study in other educational contexts may lead to different findings. Another limitation was that the participants of this study were only at the high intermediate level of proficiency, we still do not know what effects can be observed if these instructions are given to students of elementary and advanced proficiency levels.

5. Acknowledgments

This article was published with the support of the Slovak Research and Development Agency under contract No. APVV-17-0158.

References

- Aizman et al., 2020 – Aizman, R.I., Novikova, I.I., Pushkareva, E.A. (2020). Methodological justification of the possibility of participation of teachers in the implementation of school medicine project. *Science for Education Today*. 10(5): 141-159.
- Applebee, 2000 – Applebee, A.N. (2000). Alternative models of writing development. In R. Indrisano & J.R. Squire (Eds.). *Perspectives on writing: Research, theory and practice*. Newark, NJ: International Reading Association, pp. 90-110.
- Barbache, 2007 – Barbache, S. (2007). Improving EFL students' writing through trained peer review. Unpublished PhD dissertation. The Constantine University.
- Barnard, 2002 – Barnard, I. (2002). Whole-class workshops: The transformation of students into writers. *Issues of writing*. 12(2): 124-143.
- Bereiter, Scardamalia, 1987 – Bereiter, C., Scardamalia, M. (1987). The psychology of written composition. Hillsdale, NJ: Erlbaum.
- Brice, 1995 – Brice, C. (1995). ESL writers' reactions to teacher commentary: A case study. Paper presented at the *Annual Meeting of the Teachers of English to Speakers of Other Languages*. (ERIC Document Reproduction Service No. ED 394 312).
- Brown, 1997 – Brown, J.D. (1997). Understanding research in second language learning: a teacher's guide to statistics and research design. Cambridge, UK: Cambridge University Press.
- Bruner, 1985 – Bruner, J.S. (1985). Vygotsky: a historical and conceptual perspective. In Wertsch, J.V., editor, *Culture, communication, and cognition: Vygotskian perspectives*, Cambridge: Cambridge University Press, pp. 21-34.
- Budoff, 1987 – Budoff, M. (1987). Measures for assessing learning potential. In C.S Lidzed. *Dynamic assessment: An Interactive Approach to Evaluating Learning potential*. New York: Guilford.
- Bruffe, 1984 – Bruffee, K.E. (1984). Collaborative learning and the "conversation of mankind". *College English*. 46(7): 635-652.
- Burns, 2001 – Burns, A. (2001). *Collaborative Action Research for English Language Teachers*. Cambridge: Cambridge University Press.
- Chandler, 2003 – Chandler, J. (2003). The efficacy of various kinds of error feedback for improvement in the accuracy and fluency of L2 student writing. *New Journal of Second Language Writing*. 12: 267-296.
- Chenoweth, Hayes, 2001 – Chenoweth, A., Hayes, J.R. (2001). Fluency in writing: Generating text in L1 and L2. *Written Communication*. 18(1): 80-98.
- Chenoweth, Hayes, 2003 – Chenoweth, A., Hayes, J. (2003). The inner voice in writing. *Written Communication*. 20(1): 99-118.
- Cole, Engestrom, 1993 – Cole, M., Engestrom, Y. (1993). A cultural approach to distributed cognition. In G. Salomon (Ed.). *Distributed cognitions: Psychological and educational considerations*. New York: Cambridge University Press, pp. 1-46.
- Ellis et al., 2008 – Ellis, R., Sheen, Y., Murakami, M., Takashima, H. (2008). The effects of focused and unfocused written corrective feedback in English as a foreign language context. *System*. 36: 353-371.
- Ferris, 1999 – Ferris, D. (1999). The Case for Grammar Correction in L2 Writing Classes: A Response to Truscott (1999). *Journal of Second Language Writing*. 8(1): 1-11.
- Feuerstein, 1976 – Feuerstein, R. (1976). Dynamic Assessment of cognitive modifiability in related performers: The learning potential assessment device. In B.B. Wolman ed. *International Encyclopedia of Neurology Psychiatry Psychoanalysis and Psychology Section XII*. New York.
- Flower, Hayes, 1981 – Flower, L., Hayes, J.R. (1981). A cognitive process theory of writing. *College Composition and Communication*. 32(4): 365-387.
- Gadušová et al., 2020a – Gadušová, Z., Predanocyová, E, Malá, E. (2020). Planning Education – Assessment of the Competence: (Case Study). *Ad Alta: Journal of Interdisciplinary Research*. 10(1): 82-86.

[Gadušová et al., 2020b](#) – Gadušová, Z. Hašková, A., Szarszoi, D. (2020). Teachers' competences evaluation: Case study. *Science for Education Today*. 10(3): 164-177.

[Hampton, 1995](#) – Hampton, S. (1995). Strategies for increasing achievement in writing. In R.W. Cole (Ed.). *Educating Everybody's Children: what research and practice say about improving achievement* Alexandria, VA: Association for Supervision and Curriculum development, pp. 293-321.

[Hayes et al., 1987](#) – Hayes, R.J., Flower, L., Schriver, A.K., Stratman, F.J., Carey, L. (1987). Cognitive processes in revision. In Rosemberg, S. (ed.). *Advances in applied psycholinguistics: reading, writing, and language learning*, V.2. Cambridge, UK: Cambridge University Press, pp. 176-240.

[Hedgcock, Lefkowitz, 1994](#) – Hedgcock, J., Lefkowitz, N. (1994). Feedback on feedback: Assessing learning receptivity to teacher response in L2 composing. *Journal of Second Language Writing*. 3(2): 141-63.

[Hillocks, 1986](#) – Hillocks, G. (1986). Synthesis of research on teaching writing. *Educational Relationship*. 44(8): 71-82.

[Keh, 1990](#) – Keh, C.L. (1990). Feedback in the writing process: a model and methods for implementation. *ELT Journal*. 44(4): 294-304.

[Khonamri et al., 2021](#) – Khonamri, F., Králik R., Vítěčková M., Petrikovičová L. (2021). Self-Assessment and EFL Literature Students' Oral Reproduction of Short Stories. *European Journal of Contemporary Education*. 10(1): 77-88.

[Kepner, 1991](#) – Kepner, C.G. (1991). An experiment in the relationship of types of written feedback to the development of second-language writing skills. *The Modern Language Journal*. 75(3): 305-313.

[Kondrla et al., 2020](#) – Kondrla, P., Tkáčová, H., Turdoň, M. (2020). Social work and its impact on alleviating the social exclusion of religious minorities. *ICERI 2020: proceedings of the 13th International Conference of Education, Research and Innovation, 9th-11th November 2020*. Seville: IATED Academy, pp. 3844-3851.

[Kondrla et al., 2020](#) – Kondrla, P., Turdoň, M., Tkáčová, H. (2020). Current challenges for social work: stereotyping as an obstacle to the integration of marginalized groups into society. *ICERI 2020: proceedings of the 13th International Conference of Education, Research and Innovation, 9th-11th November 2020*. Seville: IATED Academy, pp. 3837-3843.

[Kozharinov et al., 2021](#) – Kozharinov, A.V., Kalugina, O.A., Ryabchenko, N.V., Kolobkova, A.A., Kralik, R. (2021). Innovative methods of mastering economic knowledge by learning a foreign language. *Studies in Systems, Decision and Control*. Springer Nature. 316: 615-623.

[Kozulin, 2011](#) – Kozulin A. (2011). Learning potential and cognitive modifiability. Routledge publications, pp. 173-179.

[Králik, Máhrik, 2019a](#) – Králik, R., Máhrik, T. (2019). Interpersonal relationships as the basis of student moral formation. *ICERI 2019: Proceedings of the 12th International Conference of Education, Research and Innovation, 11th-13th November 2019*. Seville: IATED Academy, pp. 8896-8900.

[Králik, Máhrik, 2019b](#) – Králik, R., Máhrik, T. (2019). Metaphysics as a base for improving critical thinking. *ICERI 2019: Proceedings of the 12th International Conference of Education, Research and Innovation, 11th-13th November 2019*. Seville: IATED Academy, pp. 8901-8903.

[Kušnír, 2007](#) – Kušnír, J. (2007). From descriptive to (meta)-metafictional form and meaning in David Foster Wallace's short fiction. *AAA – Arbeiten aus Anglistik und Amerikanistik*, 32(2): 319-331.

[Lalinská et al., 2020](#) – Lalinská, M., Stranovská, E., Gadušová, Z. (2020). Measurement of reading comprehension in second foreign language. *INTED 2020: 14th annual International Technology, Education and Development Conference*. Valencia: IATED Academy, pp. 5018-5026.

[Lantolf, 2000](#) – Lantolf, J.P. (Ed.) (2000). Sociocultural theory and second language learning: Recent advances. Oxford, England: Oxford University Press.

[Lantolf, Poehner, 2008](#) – Lantolf, J.P., Poehner, M.E. (2008). Dynamic assessment. In E. Shohamy (ed.). *The Encyclopedia of language and education* (vol. 7): Language testing and assessment. Cambridge: Cambridge University Press, pp. 273-285.

[Lidz, 1987](#) – Lidz, C.S. (Ed.). (1987). *Dynamic Assessment: An Interactive Approach to Evaluating Learning Potential*. New York: The Guilford Press.

[Maksaev et al., 2021](#) – *Maksaev, A.A., Vasbieva, D.G., Sherbakova, O.Y., Mirzoeva, F.R., Kralik, R.* (2021). Education at a cooperative university in the digital economy. *Studies in Systems, Decision and Control*. Springer Nature. 316: 33-42.

[Naeini, Duvall, 2012](#) – *Naeini, J., Duvall, E.* (2012). Dynamic Assessment and the impact on English Language learners' Reading Comprehension Performance. *Language Testing in Asia*. 22.

[Nassaji, Swain, 2000](#) – *Nassaji, H., Swain, M.* (2000). A Vygotskian perspective towards corrective feedback in L2: the effect of random vs. negotiated help on the acquisition of English articles. *Language Awareness*. 9: 34-51.

[Prochazka et al., 2018](#) – *Prochazka, M., Viteckova, M., Najmonova, M.* (2018). Analysis of educational situations as a way of formation novice teachers' competences. *INTED 2018: 12th International Technology, Education and Development Conference*. Valencia: IATED Academy, 4384-4391.

[Rijlaarsdam et al., 2005](#) – *Rijlaarsdam, G., Berg, H.V.D., Couzijn, M.* (eds.) (2005). Effective learning and teaching of writing: A handbook of writing in education (2nd ed.) Boston, MA: Kluwer Academic Publishers.

[Saito, 1994](#) – *Saito, H.* (1994). Teachers' practices and students' preferences for feedback on second language writing: A case study of adult ESL learners. *TESL Canada Journal*. 11(2): 46-70.

[Shaughnessy, 1977](#) – *Shaughnessy, M.* (1977). Errors and Expectations. New York: Oxford UP.

[Slavin, 1995](#) – *Slavin, R.E.* (1995). Research on cooperative learning and achievement: what we know, what we need to know. Office of Educational Research and Improvement (No. R-117-D40005).

[Smit, 1991](#) – *Smit, D.W.* (1991). Improving student writing. Idea Paper No 25. Kansas: Center for Faculty Evaluation and Development.

[Soles, 2003](#) – *Soles, D.* (2003). An eclectic approach to the teaching of writing. Paper presented at the Annual Meeting of the Conference on College Composition and Communication, NY (ERIC Document Reproduction Service No. ED 474 966).

[Tvrdoň, 2020](#) – *Tvrdoň, M.* (2020). Equal Opportunities – Comparison of Ethical Education and Religious Education Curricula. *INTED 2020: 14th annual International Technology, Education and Development Conference, Valencia, 2nd-4th of March, 2020*. Valencia: IATED Academy, pp. 5517-5523.

[Van Lier, 2000](#) – *Van Lier, L.* (2000). From input to affordance: Social-interactive learning from an ecological perspective. In J.P. Lantolf (Ed.) (2000). *Sociocultural theory and second language learning: Recent advances* (pp. 245-259). Oxford, England: Oxford University Press.

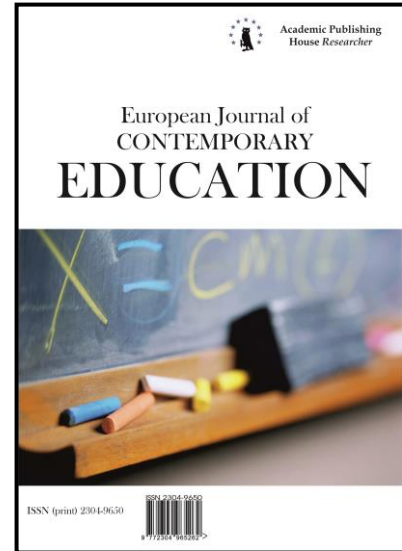
[Yan, Xiaoxiao, 2010](#) – *Yan, L., Xiaoxiao, L.* (2010). A Case Study of Dynamic Assessment in EFL Process Writing. *Chinese Journal of Applied Linguists*. 33(1): 24-40.

[Zamel, 1983](#) – *Zamel, V.* (1983). The composing processes of advanced ESL students: six case studies. *TESOL Quarterly*. 17: 165-187.



Copyright © 2021 by Academic Publishing
House Researcher s.r.o.
All rights reserved.
Published in the Slovak Republic
European Journal of Contemporary Education
E-ISSN 2305-6746
2021. 10(2): 285-296
DOI: 10.13187/ejced.2021.2.285
www.ejournal1.com

IMPORTANT NOTICE! Any copying, reproduction, distribution, republication (in whole or in part), or otherwise commercial use of this work in violation of the author(s) rights will be prosecuted in accordance with international law. The use of hyperlinks to the work will not be considered copyright infringement.



Digital Technologies and Artificial Intelligence Technologies in Education

Elena Y. Barakina ^a, Anna V. Popova ^{a,*}, Svetlana S. Gorokhova ^a, Angela S. Voskovskaya ^a

^a Financial University under the Government of the Russian Federation, Russian Federation

Abstract

The current stage of society development is very closely related to the digitalization of all spheres of public life without exception. Education in this regard should become the starting point or the basis for the competent and conscious application of Artificial Intelligence (AI) technologies, neural networks, and other cyber-physical systems based on AI, as well as robots and robotics objects. Digitalization in education is promoted by economic, social and structural prerequisites. The introduction of these technologies provides new opportunities to improve the educational process, but at the same time the application of these technologies faces some risks, the identification of negative consequences of which is delayed. The aim of the article is to provide the ways for the development of legal regulation of AI, robots and robotics objects in education. The study considers the experience of different countries in the implementation of AI technologies in the educational process, provides the opinions of international UNESCO experts, Russian and foreign researchers. According to the results of the research, three main directions of the relationship between the development of AI technologies and education are identified: 1) training with the help of AI technologies; 2) scientific and practical research of AI and its technologies; 3) training qualified specialists to work with AI in the process of obtaining secondary and higher education. The factors that hinder the implementation of these technologies, as well as the risks of negative consequences of their use in the form of violations of the students' rights are revealed. Findings and proposals for each of the identified areas are formulated.

Keywords: legal regulation, digital technologies, artificial intelligence, education, ICT competencies, aspects of the educational process.

1. Introduction

New technologies, usually described by the general term 'Artificial Intelligence (AI)', are becoming more common in human society. They are developing rapidly and affect almost all aspects of our life: autopilots, telemedicine technologies, chat bots, Big Data, smart cities, smart

* Corresponding author

E-mail addresses: anna0710@yandex.ru (A.V. Popova)

homes, automated surveillance methods, artificial intelligence technologies in weapons, cyber justice, etc. Artificial Intelligence is revolutionizing financial services with applications ranging from fraud detection, tax evasion or money laundering to regulatory technologies that improve regulatory processes such as monitoring, reporting and compliance. Neural networks based on the concept of data analysis allow obtaining a huge amount of information in a short period of time, which is used in the education system.

At the present stage of the development of the global educational environment, the use of national virtual learning university programs for the export is no longer an additional server for the development of a specific institution of higher education, but a separate significant constituent of the content development of the provided educational programs, university management and various aspects of the learning process itself. This makes it possible to combine digitalization of education in various configurations (Bruhn, 2020: 20-21; Frolova et al., 2020, Frolova et al., 2021), information and communication technologies (ICT), including using artificial intelligence technologies (Popova et al., 2021a; Popova et al., 2021b) and online internationalization in universities. ICT is gaining in importance, and as a result, each university offers its own content, which differs in countries conventionally related to the "west" and "east".

2. Materials and methods

The use of AI in various spheres of society is a reality in most advanced economies. The education sector cannot stay away from the use of digital technologies and artificial intelligence technologies in the educational process. The modern scientific literature presents research results of the possibilities and effectiveness of the use of such technologies in certain segments of educational services (Frolova et al., 2021; Gómez-Galán et al., 2021; Sirotova, Michvocikova, 2021; Morozova et al., 2020). The authors of the article conducted scientific research aimed at examining the positive and negative aspects of using AI.

The authors used a complex of general scientific and specific scientific research methods: a comparative legal analysis of scientific literature, legal and other documents on the topic of research to prove the hypothesis proposed in the article about the need for a balanced use of digital technologies and AI technologies, taking into account ethical and legal principles that do not violate the rights of participants in educational process in different states (UNICEF Innovation, 2020).

Particular attention was paid to the sociological methods of conducting scientific research. When writing the article, the results of a research were partially used, in which students and postgraduates of the country's leading universities, studying in various educational programs (jurisprudence, management, economics, finance, law enforcement agencies, applied informatics, etc.) took part. In total, 360 respondents were interviewed, who were asked to answer a number of questions related to the use of online technologies in educational activities. The survey was conducted on the google.com/forms platform in January 2021 wherein a non-random sample was used. The questionnaire was purposefully disseminated through the corporate mail of universities, in social networks among student, postgraduate and teaching associations, and WhatsApp and Telegram messengers were also used. The respondents were asked to take an anonymous survey, which included 23 questions. The processed results of some of them are given in the study. Of the respondents: bachelor students accounted for 64.7 %, specialty students 10 %, masters 8 %, graduate students 17.3 %. The specified sample set, in general, reflects the parameters of the general aggregate of persons receiving higher education, with the exception of the percentage of postgraduate students who expressed a desire to take part in the survey, which may indicate their higher activity and interest in participating in scientific research.

3. Discussion

In the scientific studies by the Russian and foreign researchers there is a significant number of works devoted to AI (Neznamov, Naumov, 2018; Tononi et al., 2016; Chelioudakis, 2019; Akyuz, 2020; Kashive et al., 2020) and the use of its technologies in various spheres of society (Morkhat, 2017; Bortalevich et al., 2019; Acosta, 2019; Rolinson et al., 2018; Barakina, 2021; Gorokhova, 2020; Rashid, 2019; Akinrinola et al., 2019). Researchers in the field of AI identify several areas of its use in education (Nosov, Sokolov, 2016; Purnova, Zaripova, 2019; Paskova, 2019; II v obuchenii, 2021; Gómez-Galán et al., 2021; Mohammed, Watson, 2019; Feng, Law, 2021). The central place in the introduction of AI technologies in education is occupied by teachers, because the correct choice

of training tools and the effectiveness of the use of AI depend on them (Kalinina, 2018; Dendev, 2013: 72; Grishkun, 2018; Bali, 2017; Luckin et al., 2016: 25; Schiff, 2021). In the supranational regulation system of the use of digital technologies and AI technologies, UNESCO documents are of particular importance; this organization monitors the education sector using the education management information system (EMIS, 2021).

At the national level, there is a gradual transformation of the education system taking into account the application of such technologies. The application of neural networks within the educational process is known in China; besides other functions it includes the assessment of tests (essays). Such AI-based neural networks, using deep learning algorithms, evolve at such a rate that it is impossible to predict by what criteria the network provides its checkup and what grade the student will receive as a result (Chen, 2018).

Since 2018, "virtual instruments" in education have been widely used in Latin American states at the level of government initiatives (Sunkel, Trucco, 2012). For example, Uruguay is using an online adaptive learning solution called 'Mathematics Adaptive Platform', which provides personalized feedback based on the analysis of student work according to the level of knowledge of each student (Perera, Aboal, 2019). A similar system called 'MECFlix' operates in Brazil (MECFlix, 2021). The relevant ministry of the government of the United Arab Emirates has developed special machine learning algorithms for the development of strategic research of the educational system of the state (Leading Countries, 2018). Another example of the use of AI technologies in research and forecasting for the sustainable development of the national education system is the experience of Chile (AI in Education, 2021).

The international initiative UNICEF Innovation (UNICEF Innovation, 2020) is studying the potential of deep learning algorithms when used in various countries jointly by academic staff of universities and business communities. Based on the results of various studies in this area, a Memorandum on AI and the Rights of the Child was created (Memorandum on AI, 2019), which summarizes examples of the positive and negative impact of digital technologies and AI technologies on children in the learning process.

4. Results

The development of the information society is based on two main components: information and knowledge (Toffler, 2009). Digital technologies, including artificial intelligence technologies, can significantly help reveal human potential in the new conditions of combining virtual and everyday realities. The transformation of education is not only a consequence of the development of social relations, but also a factor in their change and subsequent impact on society in the era of the 4th scientific and technological revolution. The changes in the paradigm of the social relations development described by Thomas Kuhn (Kuhn, 2012: 78) were illustrated by him precisely by the example of the student's participation in the educational process as a starting point for subsequent transformations.

According to UNESCO experts, AI has the potential to solve some of the biggest challenges in education, in innovative teaching and learning practices, and ultimately in accelerating progress towards Sustainable Development Goal 4 (SDG 4). However, these rapid technological changes inevitably lead to multiple risks and challenges that have so far outstripped political debate and regulatory frameworks (AI in education, 2021).

For example, since 2001 innovative e-learning technologies have been widely used in Malaysian universities, where all students get access (at home, at work or in a computer class) to the university's online resources and an electronic library; to the latest educational digital technologies (in-classroom learning, online distance learning and blended learning). The blended learning methodology of the integrated education strategy combines approaches such as executive coaching; participation in an online class; breakfast with colleagues and classmates; outside reading in nature; participation in seminars, workshops and online communities, implementing social interaction, cognitive development and interpersonal dialogue (Sultanova, 2015: 665). Education in universities takes place online or through a web interface-mode, completely replacing classroom studies, in accordance with the university's strategic plan for the implementation of the "electronic university" project (Sultanova, 2015: 663-664).

This principle is followed by Open University in Great Britain, UNISA (University of South Africa), Korean National Open University, Indira Gandhi National Open University, Hong Kong

Open University, Open University of Malaysia, Multimedia University and CyberCity (Cyberjaya) University Tun Abd Razak (UNITAR) virtual universities in Malaysia, etc.

Today, almost all researchers in the scope of virtual education consider both digitalization and the widespread use of AI technology to be among the most important trends in the development of modern higher education. Thus, the European University Association (EUA) (Gaebel, 2018) defines digital learning as the central strategy of European universities. A special study “Internationalization of Higher Education” commissioned by the European Parliament identifies digital learning among ten key trends in national strategies for internationalization (de Wit et al., 2020: 27).

Scientists and specialists in the scope of higher education agree that profound social changes associated with digitalization and the use of AI in terms of information and communication technologies are transforming higher education, they call this phenomenon a “digital turn” (Bruhn, 2020: 23; Frolova et al., 2021: 49-50). Thus, AI technologies are tools introduced and used for training, which allow analyzing the results obtained, identifying problems and risks in order to spread good practices and to level the negative consequences (Leading Countries, 2018).

The use of digital technologies and AI technologies in the educational process can be conditionally divided into three areas: learning, practical research and training for the AI application (AI in education, 2021). The authors of this scientific article support this point of view and reveal possible ways of developing these technologies in these areas.

I. Learning with the help of AI technologies, which, on the one hand, is a toolkit for a wider use of these technologies by students in various spheres of public life, on the other hand, the result of studying various academic disciplines that consider AI and preparation for interacting with it. The digitalization of the educational process is transforming the model of practical pedagogical activity, and there appear such concepts, as digital didactics, electronic information and educational environment, electronic pedagogy.

The use of AI technologies can represent a special system of pedagogical and methodological tools, with the help of which not only the solution of educational problems is achieved, but also a change in the roles of participants in the educational process, when the student becomes a teacher (i.e., partially independently makes decisions on the organization of an individual educational trajectory). The structure of the entire education system is also changing, the center of which is no longer the teacher, but the student, and the entire educational process depends on the level of his knowledge and competences. In order to create a motivational environment, open educational resources are used not only of universities, but also of scientific and university consortia, electronic libraries, network universities and blended learning (Chankseliani, 2017).

II. Scientific and practical research of AI technologies is, on the one hand, the development of approaches and methods that can serve as a basis for its application in the educational process and other spheres of public life, and, on the other hand, the result of preparation for AI and, accordingly, for the process of learning using these technologies. They can address the challenges of personalizing and improving learning outcomes and analyzing and managing education data.

Increasing the personalization of the educational process is one of the most anticipated innovations in this area. The representatives of Alpha generation will learn almost exclusively with AI technology. This generation has, like other generations, distinctive characteristics that must be taken into account when developing and implementing tools for training. Changes in educational interaction are happening for Z generation and the next generation Alpha in schools, that is, the transition from structured and auditory learning to the attraction of visual, multimodal and practical teaching methods of these new generations (Education, 2021; Eskindarov, 2021). In addition, when studying AI technologies, special attention should be paid to the delayed effect of the psycho-emotional development of the student, as well as possible violations of their rights, since the educational process is not only the achievement of the goals of the program and the teaching of specific skills, but also the process of forming a personality, a member of society.

III. Training qualified specialists to work with AI in the process of obtaining secondary and higher education, within which all individuals are given the opportunity to better understand the impact of digital technologies and AI technologies on human life, is a well-known result of learning with the help of AI and training qualified personnel to interact with it. Preparation for the use of AI begins not just with the process of training students, but with training teachers the skills of applying innovative technologies in the educational process. It is the teacher, his knowledge,

his ability to teach the use of technologies, including AI technologies, will become the basis for providing all citizens with the opportunity to better understand the potential impact of AI on human life. In order to prepare for the use of AI technologies, the teacher must master a set of knowledge and skills. UNESCO specialists have formed a matrix of the structure of teacher's ICT competencies (UNESCO Recommendations, 2011). Three approaches were proposed in the matrix: the use of ICT, the development of knowledge, the production of knowledge, which are actually stages of the development of the teacher's ICT competencies in the future information society, in general, and education, in particular.

The most famous model is the SAMR (Substitution, Augmentation, Modification, Redefinition), which was created by Ruben R. Puentedura at Harvard University for teachers of different levels of education (from elementary school to university) in the choice of information technologies and their integration. They were offered four levels of such integration: (1) "Substitution" – students' choice of new technologies for self-training and work in the format of teachers; (2) "Augmentation" – the use of simulators and other innovative technologies to study academic disciplines; (3) "Modification" – the use of digital technologies and AI technologies to build an individual educational trajectory; (4) "Redefinition" – the use of new technologies for their own project activities, the creation of digital artifacts, online commenting, etc. (Hippasus, 2021). There is also a lot of research on the integration of Bloom's model and taxonomy (including "digital") (Anderson et al., 2020), the meaning of which is that the level of use of information technology should be associated with the achievement of specific educational goals (Figure 1).

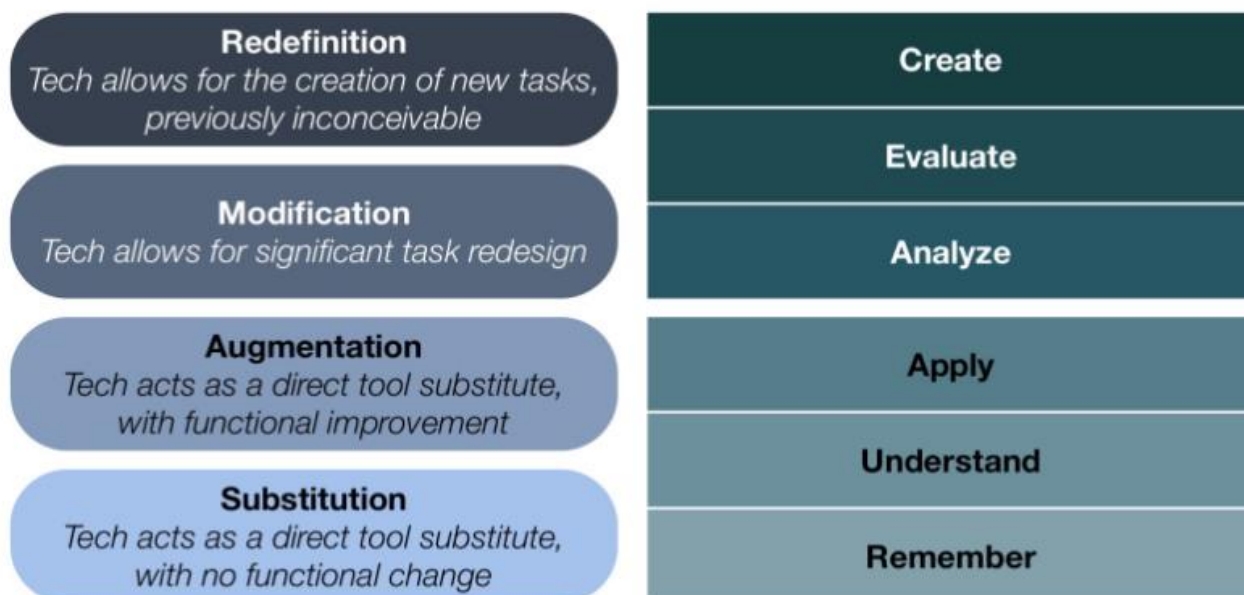


Fig. 1. SMAR and Bloom taxonomy levels (Bugaichuk, 2017)

It should be noted that these areas (learning using AI technologies; scientific and practical research of AI and its technologies; training qualified specialists to work with AI) should be considered only in conjunction, since they indicate both the influence of AI technologies on the education system (not only at the national, but also at the global level of education) and the peculiarities of the ontological perception of AI itself in each country (Popova, 2021a; Popova, 2020; Ruchkina i dr., 2020).

The use of innovative technologies, including digital technologies and AI technologies in the learning process, transforms the role and place of the teacher, changes the goals of the educational process while setting new tasks. The UNESCO recommendations (First ever consensus on AI, 2019) in education not only actually unite all levels of the educational process but also may be considered to be the principles, according to which the concept of introducing and applying AI technologies in the education system of each country should be formulated. These recommendations can become the basis for national strategies for the development of education, and, therefore, will ensure mutual

implementation in the development of approaches and the use of AI technology tools in the educational process in the context of digitalization of public relations.

Despite the development of digital technologies and AI technologies in the educational process, some countries suggest using robots with artificial intelligence (Yaponskie roboty, 2018), so the question arises about the possible replacement of teachers with artificial intelligence. However, the results of numerous studies around the world show that the teacher remains an integral part of the educational process. It is the teacher who decides on the feasibility and necessity of introducing these innovations into the educational process (Dam, 2019). The survey was conducted by the authors of this article to study public opinion regarding educational processes using innovative information technologies. As the data of the survey show, the majority of respondents assign the leading role to the teacher (see Figure 2).

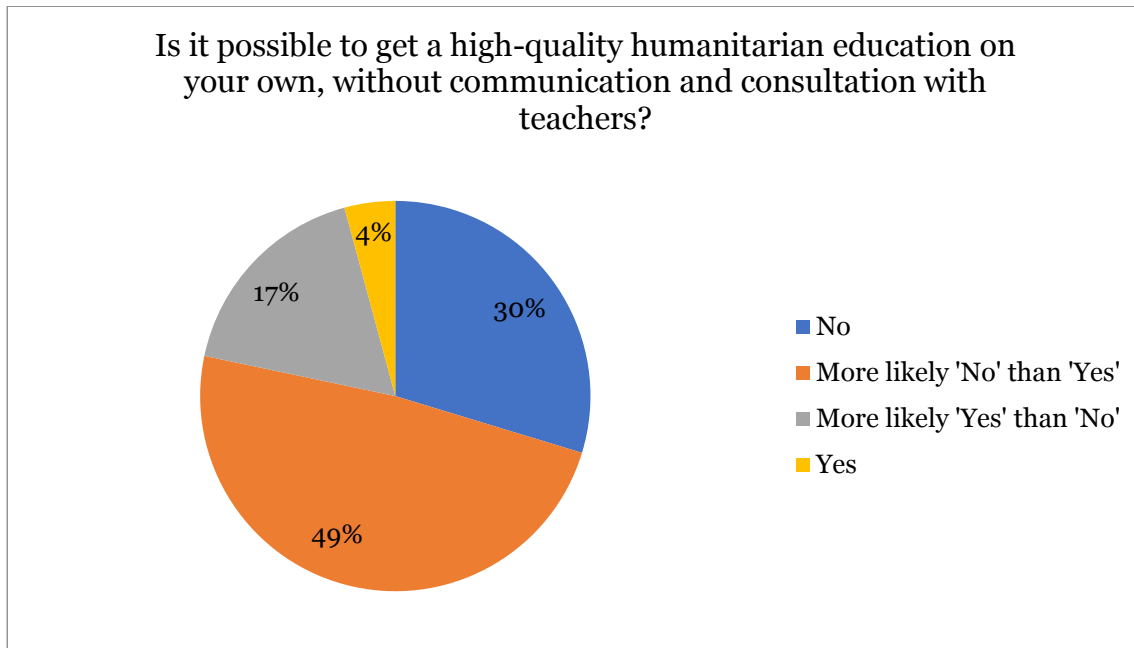


Fig. 2. Distribution of respondents' answers to the question: Is it possible to get a high-quality humanitarian education on your own, without communication and consultation with teachers?

The value of the Pearson's chi-square test is 109.029. At a significance level of $p = 0.01$, the critical value of χ^2 is 22. The relationship between factorial and performance characteristics is statistically significant.

In addition, the use of advanced technologies, including AI technologies, is significantly interconnected with other trends in the modern educational process, including the issues of remote education services, since the digitalization of all spheres of public life today can be called the most discussed trend of modern human development, and somewhere even a "fetish" of state policy in almost all developed countries.

The situation with the establishment and use of remote digital technologies in the educational, economic, managerial and professional spheres has been actualized a hundred times during the COVID-19 pandemic, having turned over the past year from a fashion trend into an urgent need, covering those industries that in the "pre-pandemic" world did not embark on the path of digitalization, or began to take only the first steps along this path. In this regard, the attitude towards the application of these technologies in society is of obvious interest. And it is still far from being unambiguous. In our survey almost half of the respondents prefer full-time learning ("face-to-face format") in getting education in the humanities (Figure 3). Also, we note that at the time of the survey the majority of respondents (78.8 %) were receiving (or had already received) a humanitarian education. But even they had some doubts about the effectiveness of distance learning.

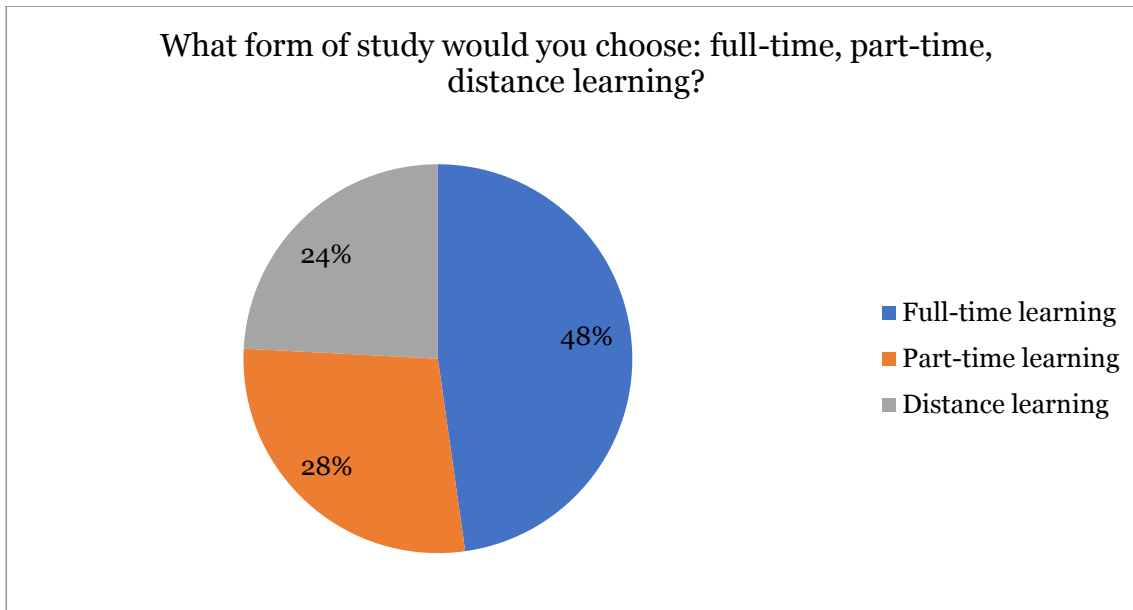


Fig. 3. Distribution of respondents' answers to the question: What form of study would you choose: full-time, part-time, distance learning?

The value of the Pearson's chi-square test is 82.751. At a significance level of $p = 0.01$, the critical value of χ^2 is 17. The relationship between factorial and performance characteristics is statistically significant.

As you can see, face-to-face education is given a clear preference, the distance format, on the contrary, was chosen by the smallest number of respondents. This point suggests that with all the obvious advantages of online learning (the comfort of homeschooling (50.8 % of the respondents, if it is possible to choose several answer options), the ease of combining with other types of activity (38.1 %), the function of additional viewing of the material in the recording (55 %), the availability of education from any region (59,2 %), etc.), which were noted by the respondents themselves, face-to-face, live communication with teachers and peers is still difficult to replace in human consciousness (63.9 % of respondents).

It should be noted that in general, the sociological study, some of the results of which we present here, was aimed at clarifying public opinion on the use of distance technologies in legal education and in legal activity. However, in our opinion, another significant point that is worth mentioning in the context of the materials presented in this article: whether an electronic resource based on artificial intelligence technologies (platforms, neural networks, lawyer bots, etc.) can be replaced by a "living" lawyer (Figure 4).

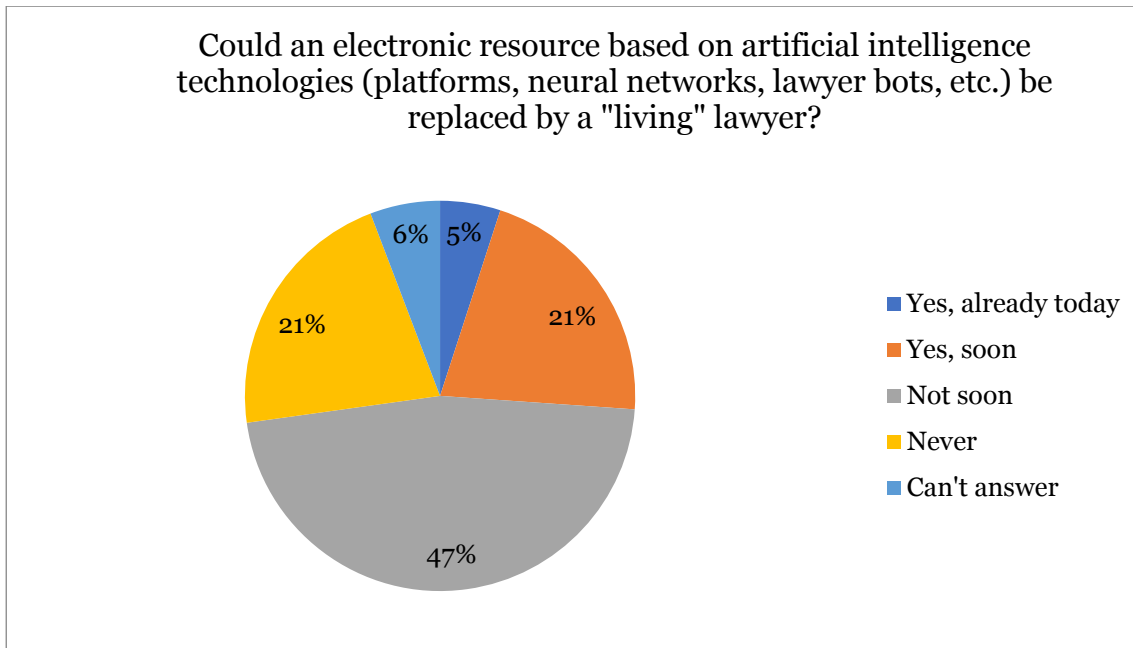


Fig. 4. Distribution of respondents' answers to the question: Could an electronic resource based on artificial intelligence technologies (platforms, neural networks, lawyer bots, etc.) be replaced by a "living" lawyer?

The value of the Pearson's chi-square test is 151.172. At a significance level of $p = 0.01$, the critical value of χ^2 is 26. The relationship between factorial and performance characteristics is statistically significant.

The analysis of the answers presented allows us to conclude that one fifth of the respondents do not imagine replacing a person with artificial intelligence, and in fact, almost half of the respondents believe that if it happens, it will not be soon.

5. Conclusion

In the course of the study, the authors concluded that, in general, about half of the respondents (48.6 %) consider it impossible to get a high-quality humanitarian education without the participation of a teacher, moreover, approximately the same number of respondents (47.8 %) expressed an opinion about the need for off-line education. Although it is worth noting that a quarter of the respondents consider the format of distance learning with the use of ICT acceptable. It should also be noted that the majority of respondents (68.1 %) do not see any real competition for a teacher, as well as for representatives of other professions from cyber-physical systems based on AI at the current moment or in the foreseeable future.

Summarizing all of the above mentioned facts, we can conclude that when trying to incorporate information technologies, including AI, into our life and into educational technologies in particular, it should be kept in mind that these technologies are just tools designed to improve the quality of the educational process and the interaction of all its participants. At the same time, it is necessary to take into account that these tools are new, not yet sufficiently mastered by both teachers and students, and, therefore, not yet causing the level of trust (4.2 % of respondents) for their effective use, even under the condition that their safety and reliability in use will be precisely confirmed.

References

- [Acosta, 2019](#) – Acosta, R. (2019). Artificial intelligence and copyright. [Electronic resource]. URL: <https://jolt.law.harvard.edu/digest/category/?cat=digest-notes>. (date of access: 23.03.2021)
- [AI in Education, 2021](#) – Artificial intelligence in Education. [Electronic resource]. URL: <https://en.unesco.org/artificial-intelligence/education> (date of access: 03.03.2021).
- [Akinrinola et al., 2019](#) – Akinrinola, A., Adebayo, S., Onakpoya, L.U., Nwaozuru, U.C. (2019). Toward Culturally-Inclusive Educational Technology in a Globalized World. In book

The Roles of Technology and Globalization in Educational Transformation. *IGI Global*: 177-194. DOI: 10.4018/978-1-5225-9746-9.ch014

Akyuz, 2020 – Akyuz, Y. (2020). Effects of Intelligent Tutoring Systems (ITS) on Personalized Learning (PL). *Creative Education*. 11(06): 953-978. DOI: 10.4236/ce.2020.116069

Anderson et al., 2020 – Anderson, L.W., Krathwohl, D.R., Airasian, P.W., Cruikshank, K.A., Mayer, R.E., Pintrich, P.R., Raths, J., Wittrock, M.C. (2000). A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives, abridged edition. New York: Pearson.

Bali, 2017 – Bali, M. (2017). Against the 3A's of EdTech: AI, Analytics, and Adaptive Technologies in Education. *The Chronicle of Higher Education*. [Electronic resource]. URL: <https://www.chronicle.com/blogs/profhacker/against-the-3as-of-edtech-ai-analytics-and-adaptive-technologies-in-education/64604> (date of access: 20.03.2021).

Barakina, 2021 – Barakina, E.Yu. (2021) K voprosu ob ustanovlenii eksperimental'nogo pravovogo rezhima v oblasti primeneniya iskusstvennogo intellekta [To the issue of establishing an experimental legal regime in the field of artificial intelligence application]. *Rossiiskoe pravosudie*. 2: 64-67. [in Russian]

Bortalevich et al., 2019 – Bortalevich, S.I., Lapin, A.V., Kharitonov, S.S. (2019). Iskusstvennyi intellekt v sisteme obespecheniya ekonomicheskoi bezopasnosti [Artificial intelligence in the system of ensuring economic security]. *Poslannik MIRBISA*. 2(18): 18-26. DOI: 10.25634/MIRBIS.2019.2.3 [in Russian]

Bruhn, 2020 – Bruhn, E. (2020). Virtual Internationalization in Higher Education. Bielefeld. DOI: 10.3278/6004797w

Bugaichuk, 2017 – Bugaichuk, K. (2017). Model' SAMR i taksonomiya Bluma [SAMR model and Bloom's taxonomy]. [Electronic resource]. URL: <http://e-lpro.blogspot.com/2017/05/samr.html> (date of access: 13.03.2021). [in Russian]

Chankseliani, 2017 – Chankseliani, M. (2017). Four Rationales of HE Internationalization: Perspectives of U.K. Universities on Attracting Students From Former Soviet Countries. *Journal of Studies in International Education*. 2: 1-18. DOI: <https://doi.org/10.1177/1028315317725806>

Chelioudakis, 2019 – Chelioudakis, E. (2019). Deceptive AI machines on the battlefield: Do they challenge the rules of the Law of Armed Conflict on military deception? [Electronic resource]. URL: <http://arno.uvt.nl/show.cgi?fid=142853> (date of access: 17.03.2021). [in Russian]

Chen, 2018 – Chen, S. (2018). China's schools are quietly using AI to mark students' essays... but do the robots make the grade? [Electronic resource]. URL: <https://www.scmp.com/news/china/society/article/2147833/chinas-schools-are-quietly-using-ai-mark-students-essays-do> (date of access: 09.03.2021).

Dam, 2019 – Deblina, D.D. (2019). Can robots replace teachers in colleges and universities? August 9. [Electronic resource]. URL: <https://www.torontosom.ca/blog/can-robots-replace-teachers-in-colleges-and-universities> (date of access: 13.03.2021).

de Wit et al., 2015 – de Wit, H., Egron-Polak, E., Howard, L., Hunter, F. (Eds.). (2015). Internationalisation of higher education. Brussels, Belgium: European Union.

Dendev, 2013 – Dendev, B. (red.) (2013). Informatsionno-kommunikatsionnye tekhnologii v obrazovanii: monografiya [Information and communication technologies in education: monografiya]. Moskva: IITO YuNESKO. [in Russian]

Education, 2021 – Education. Generation Alpha. [Electronic resource]. URL: <https://generationalpha.com/articles/education/> (date of access: 07.03.2021).

EMIS, 2021 – Educational Management Information System (EMIS). Unesco IIEP Learning Portal. [Electronic resource]. URL: <https://learningportal.iiep.unesco.org/en/glossary/educational-management-information-system-emis> (date of access: 11.03.2021).

Eskindarov, 2021 – Eskindarov, M.A. (ed) (2021). Transformatsiya obrazovatel'nogo protsessa v usloviyakh smeny pokolenii: Monografiya [Transformation of the educational process under the terms of generational change: Monografiya]. Moskva. Prospekt. 496 p. [in Russian]

Feng, Law, 2021 – Feng, S., Law, N. (2021). Mapping Artificial Intelligence in Education Research: a Network-based Keyword Analysis. *International Journal of Artificial Intelligence in Education*. [Electronic resource]. URL: https://www.researchgate.net/publication/350078895_

Mapping_Artificial_Intelligence_in_Education_Research_a_Network-based_Keyword_Analysis (date of access: 13.03.2021). DOI: 10.1007/s40593-021-00244-4

First ever consensus on AI, 2019 – First ever consensus on Artificial Intelligence and Education published by UNESCO. [Electronic resource]. URL: <https://en.unesco.org/news/first-ever-consensus-artificial-intelligence-and-education-published-unesco> (date of access: 04.03.2021).

Frolova et al., 2020 – Frolova, E.V., Rogach, O.V., Ryabova, T.M. (2020). Digitalization of education in modern scientific discourse: new trends and risks analysis. *European Journal of Contemporary Education*. 9(2): 313-336.

Frolova, 2021 – Frolova, E.V., Rogach, O.V., Tyurikov, A.G., Razov, P.V. (2021). Online Student Education in a Pandemic: New Challenges and Risks. *European Journal of Contemporary Education*. 10(1): 43-52. DOI: 10.13187/ejced.2021.1.43

Gaebel, 2018 – Gaebel, M., Zhang, T., Bunescu, L., Stoeber, H. (2018). Trends 2018: Learning and teaching in the European Higher Education Area. Brussels, Belgium: EUA.

Gómez-Galán et al., 2021 – Gómez-Galán, J., Martínez-López, J.Á., Lázaro-Pérez, C., Fernández-Martínez, M. del M. (2021). Usage of Internet by University Students of Hispanic Countries: Analysis Aimed at Digital Literacy Processes in Higher Education. *European Journal of Contemporary Education*. 10(1): 53-65.

Gorokhova, 2020 – Gorokhova, S.S. (2020). Identifikatsiya iskusstvennykh intellektual'nykh sistem v pravovom pole: osnovy kiberprava [Identification of artificial intelligent systems in the legal field: fundamentals of cyber-law]. *Yuridicheskie issledovaniya*. 6: 1-11. [in Russian]

Grishkun, 2018 – Grishkun, V.V. (2018). Problemy i puti effektivnogo ispol'zovaniya tekhnologii informatizatsii v obrazovanii [Problems and ways of effective use of informatization technologies in education]. *Vestnik Moskovskogo universiteta. Seriya 20. Pedagogicheskoe obrazovanie*. 2: 10-15. [in Russian]

Hippasus, 2021 – Hippasus [Electronic resource]. URL: <http://www.hippasus.com/> (date of access: 13.03.2021).

II v obuchenii, 2021 – II v obuchenii [AI in Training]. Slovar'-Spravochnik po korporativnomu obucheniyu – Universitet Sberbanka. [Electronic resource] URL: <https://sberbank-university.ru/edutech-club/glossary/936/> (date of access: 04.03.2021). [in Russian]

Kalinina, 2018 – Kalinina, S.D. (2018). Tsifrovaya pedagogika: revolyutsionnyi sdvig v pedagogicheskoi paradigme ili novoe videnie sovremennoi obrazovatel'noi sredy? [Digital pedagogy: a revolutionary shift in the pedagogical paradigm or a new vision of the modern educational environment?]. *Obrazovanie i obshchestvo*. 5(112): 32-36. [in Russian]

Kashive et al., 2020 – Kashive, N., Powale, L., Kashive, K. (2020). Understanding user perception toward artificial intelligence (AI) enabled e-learning. *International Journal of Information and Learning Technology*. [Electronic resource]. URL: https://www.researchgate.net/publication/347516230_Understanding_user_perception_toward_artificial_intelligence_AI_enabled_e-learning (date of access: 17.03.2021). DOI: 10.1108/IJILT-05-2020-0090

Kuhn, 2012 – Kuhn, T. (2012). The structure of scientific revolutions. Fourth edition. The structure of scientific revolutions. With An Introductory Essay by Ian Hacking. 4th ed. Chicago; London.

Leading Countries, 2018 – Leading Countries of the World. Lessons from Using Advanced Learning Analysis in the Education Sector. [Electronic resource]. URL: https://www.leadingcountries.com/wpcontent/uploads/2018/08/19498_MSEdu_LearningAnalytics12ppBrochure_V2.pdf (date of access: 11.03.2021).

Luckin et al., 2016 – Luckin, R., Holmes, W., Griffiths, M., Forcier, L.B. (2016). Intelligence Unleashed: an argument for AI in Education. London: Person. 60 p. [Electronic resource]. URL: <https://www.pearson.com/content/dam/corporate/global/pearson-dot-com/files/innovation/Intelligence-Unleashed-Publication.pdf> (date of access: 20.03.2021).

MECFlix, 2021 – MECFlix. [Electronic resource]. URL: <https://www.mecflix.mec.gov.br> (date of access: 09.03.2021).

Memorandum on AI, 2019 – Memorandum on Artificial Intelligence and Child Rights. UNICEF Office of Innovation. [Electronic resource]. URL: <https://www.unicef.org/innovation/reports/memoAIchildrights> (date of access: 11.03.2021).

Mohammed, Watson, 2019 – Mohammed, P., Watson, E. (2019). Towards Inclusive Education in the Age of Artificial Intelligence: Perspectives, Challenges, and Opportunities. In book *Artificial Intelligence and Inclusive Education*: 17-37. DOI: 10.1007/978-981-13-8161-4_2

Morkhat, 2017 – Morkhat, P.M. (2017). *Iskusstvennyi intellekt: pravovoi vzglyad: nauchnaya monografiya* [Artificial intelligence: a legal view: a scientific monograph]. Moskva: Buki Vedi. [in Russian]

Morozova et al., 2020 – Morozova, A.L., Byzina, Yu.N., Trostina, K.V., Godina Dzhamilya, Kh. (2020). Information Technologies in Foreign Language Education *European Journal of Contemporary Education*. 9(4): 827-838.

Neznamov, Naumov, 2018 – Neznamov, A.V., Naumov, V.B. (2018). Strategiya regulirovaniya robototekhniki i kiberfizicheskikh sistem [Strategy of regulation of robotics and cyberphysical systems]. *Zakon*. 2: 69-90. [in Russian]

Nosov, Sokolov, 2016 – Nosov, N.Yu., Sokolov, M.D. (2016). Tendentsii razvitiya iskusstvennogo intellekta [Trends in the development of artificial intelligence]. *Sovremennye nauchnye issledovaniya i innovacii*. 5: 86-89. [in Russian]

Paskova, 2019 – Paskova, A.A. (2019). Tekhnologii iskusstvennogo intellekta v personalizatsii elektronno obucheniya [Artificial intelligence technologies in e-learning personalization]. *Vestnik majkopskogo gosudarstvennogo tekhnologicheskogo universiteta*. 3(42): 113-122. DOI: 10.24411/2078-1024-2019-13010. [in Russian]

Perera, Aboal, 2019 – Perera, M., Aboal, D. (2019). The impact of a mathematics computer-assisted learning platform on students' mathematics test scores. MERIT Working Papers. [Electronic resource]. URL: <http://www.merit.unu.edu> (date of access: 09.03.2021).

Popova, 2020 – Popova, A.V. (2020). Pravovye aspekty ontologii iskusstvennogo intellekta [Legal aspects of Artificial intelligence ontology]. *Gosudarstvo i pravo*. 11: 115-127. DOI: 10.31857/S102694520012531-5. [in Russian]

Popova et al., 2021a – Popova, A.V., Balashkina, I.V., Nikitin, P.V., Prokopovich, G.A. (2021). Ontology of artificial intelligence: on the dehumanization of social regulators. In book: Elena G. Popkova et al. (Eds): *Studies in Systems, Decision and Control Springer Nature*. DOI: 10.1007/978-3-030-56433-9_10

Popova et al., 2021b – Popova, A.V., Gorokhova, S.S., Abramova, M.G., Balashkina, I.V. (2021). Legal system and artificial intelligence in modern Russia: goals and tools of digital modernization. In book: Elena G. Popkova et al. (Eds): *Studies in Systems, Decision and Control. Springer Nature*. DOI: 10.1007 / 978-3-030-56433-9_11

Pyrnova, Zaripova, 2019 – Pyrnova, O.A., Zaripova, R.S. (2019). Tekhnologii iskusstvennogo intellekta v obrazovanii [Artificial intelligence technologies in education]. *Rossiyskij zhurnal obrazovaniya i psikhologii*. 10(3): 41-44. [in Russian]

Rashid, 2019 – Rashid, L. (2019). Entrepreneurship Education and Sustainable Development Goals: Aliterature Review and a Closer Look at Fragile States and Technology-Enabled Approaches. *Sustainability*. 11(19). DOI: 10.3390/su11195343

Rolinson et al., 2018 – Rolinson, P., Arievidh, E.A., Ermolina, D.E. (2018). Ob"ekty intellektual'noi sobstvennosti, sozdannye s pomoshch'yu iskusstvennogo intellekta: osobennosti pravovogo rezhima v Rossii i za rubezhom [Objects of intellectual property created with the help of artificial intelligence: features of the legal regime in Russia and abroad]. *Zakon*. 5: 63-71. [in Russian]

Ruchkina i dr., 2020 – Ruchkina, G.F., Demchenko, M.V. Popova, A.V. i dr. (2020). Teoriya pravovogo regulirovaniya iskusstvennogo intellekta, robotov i ob"ektov robototekhniki v Rossiiskoi Federatsii: monografiya [Theory of legal regulation of artificial intelligence, robots and robotics objects in the Russian Federation: monograph]. M.: Prometei. 296 p. [in Russian]

Schiff, 2021 – Schiff, D. (2021). Out of the laboratory and into the classroom: the future of artificial intelligence in education. *AI u SOCIETY*. 36(5). DOI: 10.1007/s00146-020-01033-8

Sirotova, Michvocikova, 2021 – Sirotova, M., Michvocikova, V. (2021) Virtual Reality – Part of Supervised Teaching Practice for University Students – Future Teachers? *European Journal of Contemporary Education*. 10(1): 127-136.

Sultanova, 2015 – Sultanova, L.Sh. (2015). Malaziiskii opyt vnedreniya innovatsionnykh form v sisteme vysshego obrazovaniya [The Malaysian experience of introducing innovative forms

in the higher education system]. *Elektronnoe obuchenie v sisteme nepreryvnogo obrazovaniya*. 1-1: 661-666. [in Russian]

Sunkel, Trucco, 2012 – *Sunkel, G., Trucco, D.* (2012). Las tecnologías digitales frente a los desafíos de una educación inclusiva en América Latina. Algunos casos de buenas prácticas [Digital technologies facing the challenges of inclusive education in Latin America. Some good practice cases]. [Electronic resource]. URL: https://repositorio.cepal.org/bitstream/handle/11362/35386/S2012809_es.pdf (date of access: 09.03.2021). [in Spain]

Toffler, 2009 – *Toffler, E.* (2009). Tret'ya volna [The Third wave]. [Per. K.Yu. Burmistrova i dr.]. Moskva: AST: AST Moskva. (Arkhangel'sk: IPP "Pravda Severa"). 795 p. [in Russian]

Tononi et al., 2016 – *Tononi, G., Boly, M., Massimini, M., Koch, C.* (2016). Integrated information theory: from consciousness to its physical substrate. *Nature Reviews Neuroscience*. 17: 450-461.

UNESCO Recommendations, 2011 – The structure of the teacher's ICT competence. – UNESCO Recommendations – Digital Library. [Electronic resource]. URL: https://unesdoc.unesco.org/ark:/48223/pf0000213475_rus (date of access: 13.03.2021).

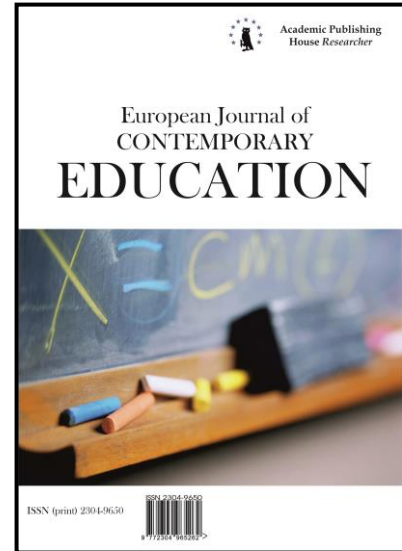
UNICEF Innovation, 2020 – UNICEF Innovation. [Electronic resource]. URL: <https://www.unicef.org/evaluation/reports#/> (date of access: 11.03.2021).

Yaponskie roboty, 2018 – Yaponskie roboty. Chudesa yaponskoi robototekhniki [Japanese robots. Wonders of Japanese Robotics]. [Electronic resource]. URL: <http://nihon-go.ru/yaponskie-robotyi-chudesa-yaponskoy-robototekhniki/> (date of access: 13.03.2021). [in Russian]



Copyright © 2021 by Academic Publishing
House Researcher s.r.o.
All rights reserved.
Published in the Slovak Republic
European Journal of Contemporary Education
E-ISSN 2305-6746
2021. 10(2): 297-307
DOI: 10.13187/ejced.2021.2.297
www.ejournal1.com

IMPORTANT NOTICE! Any copying, reproduction, distribution, republication (in whole or in part), or otherwise commercial use of this work in violation of the author(s) rights will be prosecuted in accordance with international law. The use of hyperlinks to the work will not be considered copyright infringement.



Digital Transformation of Legal Education: Problems, Risks and Prospects

Maksim V. Demchenko ^a, Mehriban E. Gulieva ^{a,*}, Tatiana V. Larina ^a, Evgeniya P. Simaeva ^a

^a Financial University under the Government of the Russian Federation, Moscow, Russian Federation

Abstract

The subject of the research is the regulatory legal acts of the Russian Federation regulating the digital transformation of legal education. The objectives of the article are to identify risks, problems of digitalization of legal education, as well as formulate directions for the development of legal regulation of the introduction of digital technologies in education in the specialty of jurisprudence in Russia. As a result of the study, it was revealed that the digital transformation process involves the implementation of both organizational, economic and legal measures. It has been established that it is necessary to optimize educational standards for teaching digital competencies to law students, develop state programs within the digital educational environment for the implementation of innovations, digital platforms, ensure the protection of personal data and prevent cyber-attacks in the educational process.

The study used the chi-square test to test statistical hypotheses. It was established on the example of the Financial University under the Government of the Russian Federation that the improvement of digital skills in educational activities is facilitated by training at the online institute of the Financial University. In this regard, it is recommended to introduce a structural unit in Russian universities that would deal with the problems of online education.

The main directions of digitalization of legal education are the development and implementation of a unified digital platform for legal education, the introduction of artificial intelligence in electronic legal education, and the implementation of advanced training programs for higher school educators in jurisprudence. Conclusions are formulated that the practical recommendations obtained from the research can be applied in developing the Concept of digital transformation of science and higher education.

Keywords: legal education, digital transformation, digital competencies, online learning, educator, student, digital educational environment, higher education, e-learning.

* Corresponding author
E-mail addresses: MEGulieva@fa.ru (M.E. Gulieva)

1. Introduction

At present, in the context of the digital transformation of economic relations, which requires appropriate legal regulation aimed at ensuring the efficiency and security of the digitalization process, the most promising vectors in higher education are mastering legal knowledge in the digital economy (Ruchkina, Vengerovsky, 2020).

As you know, one of the main tasks of ensuring the implementation of the national project «Digital Economy» is the successful implementation of the federal program «digital personnel», which is aimed, firstly, at training new specialists in the field of digital economy with legal knowledge, and secondly, at advanced training, retraining of specialists in this field.

In Russia, higher education is an integral part of vocational education, the purpose of which is to ensure the training of highly qualified personnel in the basic areas of socially useful activity in accordance with the needs of the state, society, as well as meeting the needs of the individual in intellectual, cultural, and moral development, deepening and expanding education, scientific and pedagogical qualifications.

The modern digital economy causes a high demand for qualified graduates in the financial and legal analytical field, who have a systematic vision of economic, financial and legal problems, are able to correctly assess the development opportunities of various market institutions and make effective decisions in unusual situations.

Thus, the purpose of the study is to improve legal education in the context of digitalization by developing practical recommendations for implementing its digital transformation based on an analysis of problematic issues, risks that impede an effective electronic educational process in the field of jurisprudence.

2. Materials and methods

The methodology for studying problematic issues of digital transformation of legal education with the aim of further improving the directions of development of the digital educational environment in the field of jurisprudence is a synthesis of legal science methods based on materialistic dialectics: comparative legal, formal legal, systemic legal (legal aspect), – with analysis main indicators of the development of the digital economy (financial and economic aspect).

Legal technologies of legal analysis make it possible to conduct a system analysis to study the legal, social, organizational and economic processes of the digital transformation of education in general, as well as legal education in particular.

The chi-square test was used to test statistical hypotheses.

3. Results

At the moment, the legal regulation of the digital transformation of education is represented by the following by-laws:

- The message of the President of the Russian Federation to the Federal Assembly of January 15, 2020, which says that in 2021 it is necessary to start the digital transformation of the national school in full, to provide teachers and students with access to advanced educational programs, to introduce individual approaches to learning (Poslanie Prezidenta RF..., 2020);

- Decree of the President of the Russian Federation of 10.10.2019 No. 490 "On the development of artificial intelligence in the Russian Federation". Much attention is paid to the development of the legal framework in the field of artificial intelligence, robots and robotics objects in our country, both on the part of experts, scientists, and on the part of legislative authorities (Ruchkina, 2020);

- Passport of the national project "Education" (approved by the Presidium of the Council under the President of the Russian Federation for Strategic Development and National Projects, protocol No. 16 of 12.24.2018) (Pasport natsional'nogo proekta..., 2018);

- Passport of the priority project "Modern digital educational environment in the Russian Federation" (approved by the Presidium of the Council under the President of the Russian Federation for Strategic Development and Priority Projects, Minutes No. 9 dated 10.25.2016);

- Plan of activities of the Ministry of Science and Higher Education of the Russian Federation for the period from 2019 to 2024 (approved by the Ministry of Education and Science of Russia 08.02.2019);

- Order of the Ministry of Education of Russia dated 02.12.2019 No. 649 "On approval of the Target model of the digital educational environment" ([Prikaz Minprosveshcheniya Rossii..., 2019](#)).

The concept of artificial intelligence is also contained in current technical standards. So, "artificial intelligence is a simulated (artificially reproduced) intellectual activity of human thinking" ([Ruchkina i dr., 2020](#)).

Now, within the framework of the federal project "Digital Educational Environment", the Center for the Digital Transformation of Education has been created and is functioning.

A federal information and service platform for the digital educational environment, a set of standard information solutions have been developed and implemented in order to implement the target model of the digital educational environment in educational institutions.

It is also planned to create an integration platform for lifelong education (vocational training and additional education) and a set of services that provide navigation and support for citizens when choosing educational programs and organizations that carry out educational activities ([Metodicheskie rekomendatsii..., 2020](#)).

Among the many problems of digital transformation of legal education, the following aspects can be formulated:

- organizational and educational activities that require retraining of legal education personnel, as well as the introduction of digital competencies into the educational standard in jurisprudence.

- financial and economic, involving the allocation by the state through various government support measures (grants, competitions, government programs) for the introduction of digital technologies, innovations, digital platforms in e-learning in jurisprudence.

- legal is to optimize legislation in the field of education, by eliminating gaps in the terminology of digital legal education, developing a Concept for the development of digital education, regulating the process of introducing a single digital platform, ensuring electronic security of participants in the educational process, and others.

The direction of the federal program «Providing the digital economy with competent personnel» includes measures to develop a model of competencies in the digital economy, a profile of competencies and a personal development path; improving training and retraining programs for the digital economy, providing training and retraining of specialists in the competencies of the digital economy, as well as grant support for educational projects ([Prikaz Minprosveshcheniya Rossii..., 2019](#)).

Within the framework of the program, a model of competencies of the digital economy will be developed – a list of key competencies that each citizen needs for effective professional and everyday activities in the digital economy. This model will complement the existing requirements for competencies inherent in educational programs and requirements for the implementation of professional activities.

The digitalization of society and the economy leads to a change in priorities in the choice of specialties, a drop in social demand for humanitarian education in general and legal education in particular. The number of first-year students studying in Moscow in the field of digital technologies in 2018 grew to 19.6 thousand people. This is 11 % more than in 2017. The number of vacancies for IT specialists in Moscow exceeded 20 thousand – this is 25 % more than a year earlier. The emerging practice makes it possible to assume that the demand for the profession of information technology, digital sphere in the short term will sharply exceed the supply, their prestige in society will automatically rise.

4. Discussion

The training of legal personnel today requires the competent construction of the educational process and should not be replaced by a simple transfer of a known body of knowledge and learning the skills of a future profession. The essence of the legal educational process is the totality of educational and self-educational processes aimed at solving the problems of legal education, legal education and personal development in accordance with the state educational standard. Its effectiveness is possible in the conditions of continuity of the process, a unified legal educational policy that allows for level and profile differentiation; the sequence of legal education and its variable modeling, depending on the level of preparedness of the subjects of the educational process, regional features of its implementation.

Within the framework of the Federal project, it is proposed to pilot a new type of educational programs of higher education lasting up to 2 years (analogues of associate degree, half-bachelor) for at least 10 specialties of the digital economy.

Modern society requires competitive professionals who can communicate in a professional foreign language in their specialty.

The communicative competence of a lawyer can be defined as the ability of a specialist to carry out communication in the process of execution various legal actions and solving legal problems on the basis of specially formed knowledge and skills. The formation of the professional competence of a lawyer at the present stage of development of higher schools is inconceivable without integration into the general system of preparing digital education (Demchenko et al., 2017).

A lawyer in the digital economy will have to master a whole range of digital competencies, including primarily programming skills. Possession of such special competencies will become a necessary element of basic training already at the level of a higher legal education (undergraduate or graduate) (Metodicheskie rekomendatsii..., 2020):

- formulation and assessment of the main problems of legal regulation in the field of digital technologies, incl. problems of correlation of public and private regulation, ensuring, information security, protecting the interests of citizens of society, the state.

- the formulation and assessment of the problem of determining information as an object of law, the principles of disseminating information, the rights and obligations of the holder of information, the subjects of dissemination of information in electronic form; legal regulation of the use of sites, legal problems of domain name registration.

- formulation and analysis of the fundamentals of the legal regulation of the provision of telematic communication services, hosting, instant messaging services, information retrieval on the Internet; the activities of the news aggregator, online publications, the activities of the audiovisual service; problems of protecting the rights and legitimate interests of certain groups of the population in the information sphere using electronic technologies.

- the formulation and analysis of the legal problems of protecting privacy when using "digital technologies", including legal regulation of the processing, storage and use of personal data; problems of using images of citizens; legal ways to protect against illegal collection and use of information about the private lives of citizens, including covert audio and video surveillance, recording movement and contacts, and transactions.

- analysis of the legal regulation of the collection and use of "big data», features of the protection of rights and legitimate interests in the dissemination of false information, information discrediting honor, dignity and business reputation.

- solving the problem of legal regulation of electronic document management, incl. electronic document and electronic signature, principles of using electronic signature, types of electronic signature, use of electronic signature in the provision of state and municipal services.

- the formulation of the provisions of the legal regulation of the use of electronic documents in commercial circulation, the problems of concluding contracts on the Internet; legal regulation of business aggregators; the use of electronic documents, electronic audio and video recordings as evidence in court; the implementation of e-justice.

- an explanation of the main problems of the legal regulation of electronic payments, digital rights, "digital assets", including concepts of a payment system, a national payment system; rules of the payment system and its participants; Legal regulation of money transfers using electronic technologies, incl. concepts of electronic cash, electronic means of payment.

- formulation of legal regulation of the use of payment cards; legal regulation of the use of ATMs and payment terminals; the use of "blockchain" technology, the problems of legal regulation of digital rights and "digital assets", including "cryptocurrencies"; Legal regulation of crowdfunding, smart contracts.

- the formulation of the legal regulation of "smart things", "artificial intelligence". Able to apply the acquired knowledge, skills in relation to a simulated or specific life situation.

- the ability to apply the acquired knowledge, skills in relation to a simulated or specific life situation.

It is especially important to also take into account in the digital transformation of legal education the ability to combine various methods of teaching legal disciplines, taking into account the contingent of students – representatives of generation z (Ruchkina, Shaydullina, 2020).

As you know, the new generation is more receptive to interactive methods of teaching, the use of gamification of the educational process, presentations with animation elements. Generation Z spends 52 % of their daytime playing online, so it's important to use this format in education. Gamification ignites the spirit of competition and makes learning fun.

Based on the analysis of the scientific literature and the results of the sociological research conducted, it has been established that the students are more satisfied with the quality of interactive sessions with elements of gamification (57.01 %) than with the quality of training by traditional methods (23.36 %) and the quality of the content of classes conducted by traditional methods (19.63 %). It has been revealed that the use of interactive forms of training with elements of gamification is the most effective: to increase the effectiveness of mastering the training material (20 %) (Demchenko, Vinichenko, 2018).

When teaching Z, it is worth remembering that this is a generation that will not only experience but also use nanotechnology, 3D printing and self-driving cars in everyday life. They will own professions for which names have not yet been invented. They easily master technologies and cannot imagine the world without its digitalization. Therefore, it is more important not to transfer theoretical knowledge to them, but to teach them to explore and learn about the world. In the future, not what people already know will be appreciated, but what new they can learn and apply in work and life.

The most significant components of the methodology of teaching legal disciplines are: 1) rationalization of the subject, setting goals and objectives of teaching, 2) selection of content and structuring of the subject, 3) determination of methods and techniques of teaching, 4) definition and use of assessment tools, 5) planning of educational activities. Teaching methods as ordered, interconnected methods of pedagogical activity of a teacher and educational activities of students to achieve educational goals can be presented in various classifications depending on the choice of the main criterion. The classification of teaching methods is their system ordered by a certain basis (feature) (Klimova, Karpova, 2019).

Education is a mutual process. The main thing in working with students is constant contact between students, educators and the dean's office. It is important to search for optimal and compromise solutions to all emerging issues, corporate spirit, benevolence combined with exactingness, mutual understanding and openness, willingness to help each other.

However, in a digital economy, a lawyer can no longer be completely unaware of the technical side of the business he is involved in. This is a fine line: there is no need to become a technical specialist, but it is imperative to understand the area of technology within which it is necessary to protect the rights of the employer or client. For example, if this is the domain of domain disputes, then you need to know the domain name system, including some of its technical aspects, the procedure for registering domain names, use special terminology, etc.

Often controversial situations that arise in the digital environment can be resolved with the help of current legislation. The difficulty is usually caused by the fact that many legal norms, of course, do not directly provide for the possibility of their application to Internet relations. In such circumstances, interpretation of legal provisions is required. Unfortunately, many lawyers hope to find in the law clearly prescribed instructions for each life case, and, not finding it, refer to existing gaps in the law.

A lawyer specializing in digital technology must understand how he can find the right norm in case of a dispute; he must be able to interpret the law and correctly express his thoughts.

The educational process in higher education is also undergoing a digital transformation. However, this process is not always effective. Consider some of the factors hindering the introduction of digital technology in the educational process. In order to create high-quality educational content, adequate digital technologies are needed, which may not even be available in metropolitan law schools. Therefore, one of the main obstacles to digitalization of higher education today is the lack of an adequate material and technical base. In this regard, in the formation of the information and educational environment, educational institutions should first of all think about its adequate technical and technological support.

The next factor is the reluctance of educators to learn new information technologies. This reluctance is due to several objective and subjective factors.

Thirdly, the absence of effective material incentives for the creation of digital educational content is relevant for higher education. The establishment of adequate time standards for certain types of work should be the subject of an interested dialogue between educators and university leaders.

Within the framework of the Federal project, the country's leading educational organizations will develop programs and provide training for managers and teams of CDO managers. A quick leap in the development of the digital economy in Russia cannot be made without the involvement of foreign labor and the best specialists. To this end, the Federal Project provides for the creation of a card for a young professional – a special tool with a legally fixed status that will give the right to enter and work in the Russian Federation, as well as a grant system to attract talented foreign applicants and employees in the professions that are in demand in the country.

We should not forget that the educational process in higher education, due to the objective circumstances of the development of information technology, is undergoing some optimization. Distance education is developing, which, for example, in emergency circumstances, the inability to attend educational institutions, is the only possible. At the same time, the teaching methodology is changing.

The rating shows how long (in days) a particular university has spent its educational process on the platform since the beginning of the 2019/2020 academic year.

When compiling the rating, the educational behavior of 129 666 students and 17 923 teachers from 836 organizations of Russian-language higher education in Russia and neighboring countries was analyzed.

Table 1. Rating of the efficiency of using digital resources on the educational platform "Yurayt"

No	The name of the university	The number of conditional days of using the Yurayt platform
1.	Russian Academy of National Economy and Public Administration under the President of the Russian Federation	16127
2.	Ural State Law University	9955
3.	Russian State University of Justice	9006
4.	Financial University under the Government of the Russian Federation	8648
5.	Irkutsk State University	5445

In 2018, the Financial University under the Government of the Russian Federation launched a major project to modernize existing IT systems and build a new digital platform for an educational institution in order to improve the efficiency of university management and provide new modern digital services for all participants in the educational process.

The first stage of the project was the implementation of the task of automated planning and scheduling of training sessions.

The contractor for the project is the Galaktika IT company – the Expert Center of the Galaktika Corporation, the basic system is the Galaktika Training Schedule. The system was installed and configured in the first half of 2019. Since September 2019, the system has been put into operation and the schedule for the first semester of the academic year 2019–2020 has been drawn up entirely in the Galaktika RUZ system. Since 2020, the Galaktika Training Schedule system has been under maintenance and development, the work is being performed by Galaktika IT.

The new system made it possible to solve the following issues:

- control over the unevenness of the contingent of students up to each student
- prompt notification of participants in the educational process about changes in the schedule of training sessions
- control and analysis of information on the planned and actual schedule of training sessions.

The Galaktika RUZ system has become a full-fledged and reliable source of data for other systems of the university, which made it possible to implement new convenient services at the university. Data from the "Galaktika RUZ" system is used for the ACS system, which improves the security of the university, as well as for the "Individual work of a teacher" system – in automatic mode, data on the actual classes conducted are used to calculate the effectiveness (KPI) of employees.

The university is actively introducing new educational technologies and moving to the formation of individual educational trajectories of students. A competency-based approach to training specialists is being introduced into the educational process.

The path to the widespread introduction of online learning, including mass open online courses - training courses with interactive participation and open access via the Internet today is being implemented through the priority project in the field of education "Modern Digital Educational Environment in the Russian Federation", which provides for a number of key areas, development which goes in parallel:

- adoption of legal and regulatory acts aimed at the development of online learning. In particular, fixing the status of online courses as equal parts of educational programs.

- Creation of an information resource providing access to online courses on the principle of "one-stop shop" and combining a number of existing online learning platforms thanks to a unified user authentication system.

- Creation in 2025 of 7,500 online courses on secondary, higher and further education programs with the involvement of leading developers, both from government agencies and the business community.

- the formation of a system of expert and user assessment of the quality of the content of online courses;

- Creation of ten Regional centers of competence in the field of online learning;

- training and education of at least 10,000 educators and experts in the field of online education;

The successful implementation of the priority project "Modern Digital Educational Environment in the Russian Federation" will fundamentally change the approach to training citizens of the country, prepare Russia for the transition to a new technological structure – the digital economy.

Managing the educational process remotely, the teacher sometimes does not know with whom he is dealing. His role as a mentor is lost and goes into a different quality. The teacher has a new technological function of the communicator, uniting students in groups, and groups are formed not by him, but by the interest of students in the discipline. Remote technology changes the social status of the teacher. The academic degree and title, previously an indicator of the level of teacher training, are in the background. The teacher is in demand if he is interesting to the student.

The student independently chooses content that does not always coincide with the worldview of the teacher. The use by the student of the information necessary for him forms a system of motives for activity and is the basis for the formation of professional competencies. The transition to the depersonalization of the student is one of the side problems of the digital revolution, which will lead to a change in the student who is psychologically unformed. In this regard, along with professional competencies at the stage of training a lawyer, it is necessary to form the competence of an "information-digital culture", of which digital literacy is an integral part. It is orientation in the digital space that makes it possible to understand how digital reality works, how a person interacts with digital technologies, what moral qualities, how socially significant in the professional activity of a graduate of a legal educational institution, need to be developed in a digital environment (Simaeva, 2019).

Also, the level of digital literacy is influenced by a person's professional activity. Working students showed the highest values of the digital literacy index when compared with other categories of the population (Figure 1).

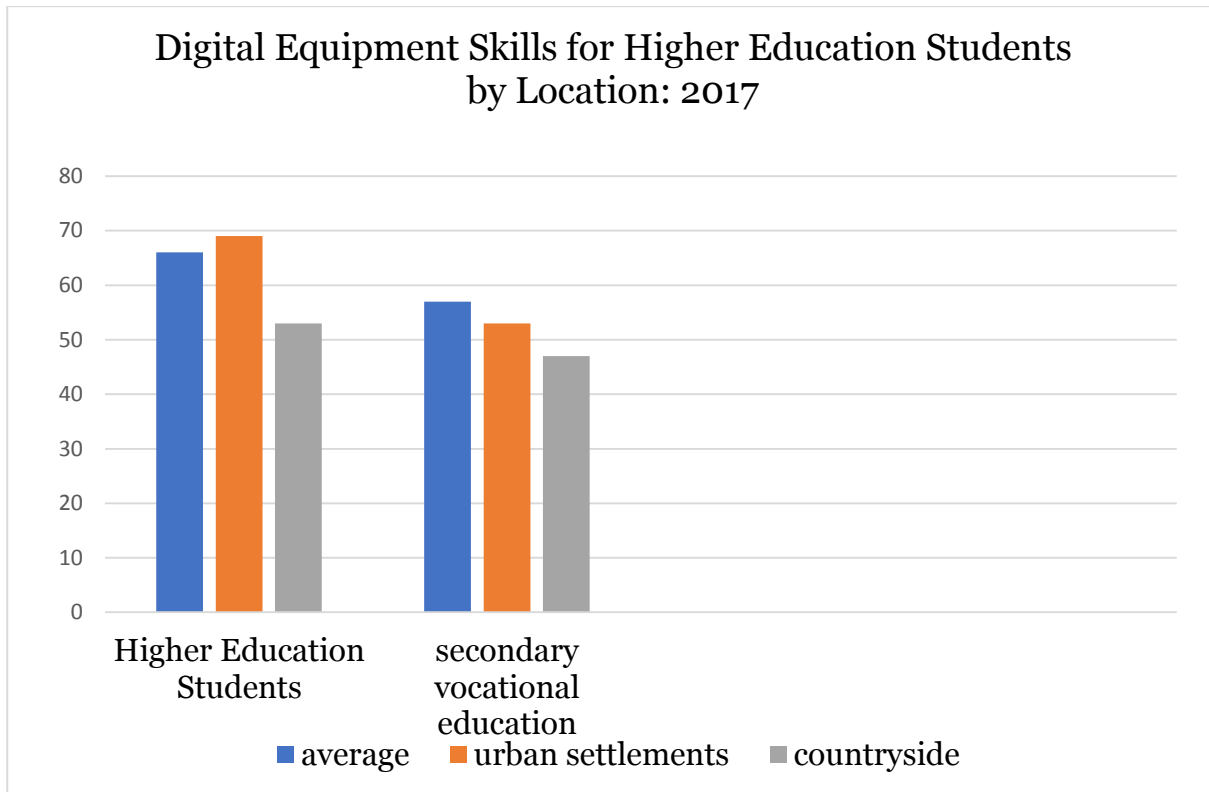


Fig. 1. Digital Equipment Skills for Higher Education Students by Location: 2017

Only 27 % of Russians – one in four – have a high level of digital literacy. Due to the lack of knowledge and skills in the field of digital technologies, many people and organizations were not ready to work remotely in self-isolation.

The federal project "Human Resources for the Digital Economy" set target values for the share of Russians with digital literacy and key competencies of the digital economy. This is 26 % of the population in 2018, 27 % – in 2019, 30 % – in 2020 and 32 % – in 2021 (information in accordance with the passport of the Federal Project "Human Resources for the Digital Economy" is given in [Tables 2, 3](#)).

Table 2. Digital Literacy Index, in percentage points, by type of student employment

	Student (not working)	Student (working)
Digital Literacy Index	61	64
Information literacy	61	67
Communication literacy	64	65
Digital content creation	59	57
Digital security	61	68
Problem solving skills in a digital environment	61	62

According to the results of the NAFI study, the share of Russians with a sufficient level of digital literacy has remained practically unchanged over the past three years. So, in 2018, 26 % of Russians had a high level of digital literacy. As of January 2020, this share amounted to 27 % – the backlog from the target values of the federal project so far amounted to 3 percentage points. (27 % versus the expected 30 %).

Table 3. The share of the population with digital literacy (according to the passport of the Federal Project "Human Resources for the Digital Economy")

	2018	2019	2020	2021	2022	2023	2024
The share of the population with digital literacy and key competencies of the digital economy (according to the passport of the Federal Project "Human Resources for the Digital Economy")	26 %	27 %	30 %	32 %	36 %	38 %	40 %

Live communication between the student and the teacher, as well as contacts in a virtual environment should be balanced and determined by the curriculum as well as lecture and seminar classes, while the share of real and virtual time can be designed taking into account the formation of appropriate competencies. The intention to reduce learning only to the acquisition of skills poses a danger to the formation of students of utilitarian thinking and, as a result, a distorted worldview.

Today, almost every university has a law faculty that specializes in training personnel for a particular industry. Legal education should ensure the transition from authoritarian and textual didactics (when a future lawyer learns the text of a normative act recommended by a teacher and doctrinal interpretations of legal norms) to a comprehensive perception of information. When tens of thousands of new norms are adopted per year, existing laws change significantly and hundreds of new documents are developed, orient It is not possible in this space without work to find information and a comprehensive understanding of the rule of law. This can be achieved only by integrating reference and information systems in training. It is necessary to include disciplines in the university curriculum that allow the student to acquire skills in the field of new technologies, including obtaining evidence on the network, ensuring cybersecurity, electronic record keeping, and others.

5. Conclusion

As a result of research into the digitalization of legal education at the present time, using the example of the activities of the Financial University under the Government of the Russian Federation, significant data were obtained, indicating the need to develop and improve the digitalization of education.

According to the Department of Psychology and Human Capital Development and the Department of Sociology of the Financial University, 65 % of students and about 70 % of educators have experienced problems in the transition to digital education. The number of graduates who received excellent marks increased by almost 35 % compared to last year. If we compare the results of the summer sessions of 2019 and 2020, the number of people who received an unsatisfactory grade decreased by 30 %. Accordingly, the number of graduates who received honors diplomas also increased.

Let's calculate the significance of the research results (p-value) on the need to introduce digital technologies in legal education. So, at the beginning of distance learning in 2020, 65 % of students, 70 % of teachers have problems associated with the use of digital technologies in the educational process. After continuing education, for example, at the online education institute of the Financial University, the percentage of digital literacy of students and educators changed, 35 % and 45 %, respectively. Let's figure out the meaning of the χ^2 (chi-square). Determine the number of degrees of freedom by the formula $n-1$ and get 1. Next, by the formula $\chi^2 = \sum ((o-e)^2/e)$, we get the χ^2 -square value equal to 0.001. Using the χ^2 -squared spreadsheet to find the p-value, we find it to be 0.010, which is less than the 0.05 significance level. This means that it has been proven that there is a very likely connection between the results that we observed regarding the problems of digital literacy of students and educators at the initial level of distance learning.

According to the demand for graduates, even during a pandemic, the Financial University under the Government of the Russian Federation is part of the five leading universities in Russia. In the context of a pandemic, the university held a Career Day, which was attended by about 30 ministries and departments, various commercial structures, about 2.5 thousand students took

part online. In addition, the activities of the Institute of Online Education, created at the end of 2019, are of particular importance, which raised the qualifications of more than 50 % of teachers in the program for the use of digital technologies. In the future, it is recommended in higher educational institutions to create such online education institutions that, on their own, assist in the training of digital personnel for education. As a result of the distance learning mode, only 75 % of the surveyed students supported the full-time format, which means that the digital format is also in demand today.

Summarizing the above, it is advisable to formulate the following practical recommendations for the digital transformation of legal education:

- to develop at the federal level the main strategic document – the Concept of digital transformation of science and higher education, consolidating the use of a digital educational platform, the basic concepts of digital education, features of the transformation of training in specialties and other issues;

- to monitor the current legislation in the field of education, making changes in accordance with the Concept of digital transformation of science and higher education.

- in order to ensure the protection of intellectual property rights when using copyright methods of teaching legal disciplines using digital technologies, develop a Strategy for the Development of Intellectual Property;

- develop a Program ("road map") to increase the level of digital literacy among the population, including with the aim of forming and developing digital skills among students and educators;

- to develop state programs to support educational institutions for equipping with digital infrastructure.

It is also advisable to carry out activities for the digital transformation of legal education in each individual university, faculty. So, for example, among the most global measures for the transformation of legal education at the Law Faculty of the Financial University under the Government of the Russian Federation is the optimization of curricula for basic educational programs, the development of project activities of teachers and students, the active inclusion of digital tools in the educational process, the formation of our own strategic directions, scientific research in the field of basic sciences and research of applied value. The Development Program of the Faculty of Law was developed and adopted, the implementation of which will help to qualitatively improve the competitiveness of graduates and the university as a whole (Ruchkina, 2020).

Development of the institution of intellectual property especially in the light of challenges the modern era requires the combined efforts of many departments and different levels of government (Demchenko, 2019).

None of the strategic planning documents contains a full range of measures to regulate intellectual property issues. The development of the institution of intellectual property should become national priority. In this regard, it seems necessary to develop a single document for the development of the institution of intellectual property – the National Development Strategy.

References

Demchenko et al., 2017 – Demchenko, T.S., Demchenko, M.V., Ilyina, I.Yu. (2017). Razvitie professional'nyh kompetencij s cel'yu kar'ernogo rosta molodyh specialistov v kontekste social'nogo kontrolya [Development of professional competencies for the career growth of young specialists in the context of social control]. *Ekonomika obrazovaniya*. 6: 49-56. [in Russian]

Demchenko, 2019 – Demchenko, M.V. (2019). O sovershenstvovanii sistemy ocenki i kommercializacii intellektual'noj sobstvennosti v obrazovatel'nyh organizacijah vysshego obrazovaniya [On improving the system of assessment and commercialization of intellectual property in educational institutions of higher education]. *Ekonomika obrazovaniya*. 1: 72-83. [in Russian]

Demchenko, Vinichenko, 2018 – Demchenko, T.S., Vinichenko, M.V., Demchenko, M.V., Ilina, I.Y., Buley, N.V., Duplij, E.V. (2018). Students Satisfaction With Interactive Forms of Training With Elements of Gamification. *International Journal of Engineering and Technology (UAE)*. T. 7. 4(38): 109-111.

Klimova, Karpova, 2019 – Klimova, S.V., Karpova, N.G. (2019). Teoretiko-metodologicheskie podkhody k obespecheniyu finansovoi gramotnosti posredstvom predmetno-

yazykovogo integrirovannogo obucheniya [Theoretical and methodological approach to financial literacy through content and language integrated learning]: monograph. Koll. avtorov; pod red. professorov I.I. Klimovoi, S.V. Karpovoi, N.G. Kondrakhinnoi; otv. red. G.A. Dubinina. Moscow: RUSAYNS. 400 p. [in Russian]

[Metodicheskie rekomendatsii..., 2020](#) – Metodicheskie rekomendatsii po voprosam vnedreniya Tselevoi modeli tsifrovoi obrazovatel'noi sredy v sub"ektakh Rossiiskoi Federatsii ot 14.01.2020 N MR-5/02 [Methodological recommendations on the implementation of the Target model of the digital educational environment in the constituent entities of the Russian Federation dated January 14, 2020 N MR-5/02]. SPS Konsul'tantPlyus. [in Russian]

[Methodical approach to teaching law, 2020](#) – Methodical approach to teaching law in a foreign language: government regulation of economic activity: monograph. Team of authors; edited by Professor G.F. Ruchkina. Riga: SCIENTIFIC WORLD, 2020. 162 p.

[Prikaz Minprosveshcheniya Rossii..., 2019](#) – Prikaz Minprosveshcheniya Rossii ot 02.12.2019 № 649 "Ob utverzhdenii Tselevoi modeli tsifrovoi obrazovatel'noi sredy" (Zaregistrirvano v Minyuste Rossii 24.12.2019 № 56962) [Order of the Ministry of Education of Russia dated 02.12.2019 No. 649 "On approval of the Target model of the digital educational environment" (Registered in the Ministry of Justice of Russia 24.12.2019 No. 56962)]. SPS Konsul'tantPlyus. [in Russian]

[Passport natsional'nogo proekta..., 2018](#) – Passport natsional'nogo proekta "Obrazovanie" (utv. prezidiumom Soveta pri Prezidente RF po strategicheskemu razvitiyu i natsional'nym proektam, protokol ot 24.12.2018 № 16) [Passport of the national project "Education" (approved by the Presidium of the Council under the President of the Russian Federation for Strategic Development and National Projects, minutes of December 24, 2018 No. 16)]. SPS Konsul'tantPlyus. [in Russian]

[Poslanie Prezidenta RF..., 2020](#) – Poslanie Prezidenta RF Federal'nomu Sobraniyu ot 15.01.2020 [The message of the President of the Russian Federation to the Federal Assembly dated 15.01.2020]. SPS Konsul'tantPlyus. [in Russian]

[Ruchkina i dr., 2020](#) – *Ruchkina, G.F., Demchenko, M.V., Popova, A.V. et al. (2020). Teoriya pravovogo regulirovaniya iskusstvennogo intellekta, robotov i ob"ektov robototekhniki v Rossijskoj Federacii* [The theory of legal regulation of artificial intelligence, robots and robotics objects in the Russian Federation]: Monograph. Ed. G.F. Ruchkina. M.: Prometheus. 296 p. [in Russian]

[Ruchkina, 2020](#) – *Ruchkina, G.F. (2020). Interv'yu s dekanom YUridicheskogo fakul'teta Finuniversiteta* [Interview with the dean of the Faculty of Law of the Financial University]. FGOBU VO "Financial University under the Government of the Russian Federation": official website, 2020. [Electronic resource]. URL: <http://www.fa.ru/News/2020-10-05-id.aspx> (date of access: 09.05.2020). [in Russian]

[Ruchkina, 2020](#) – *Ruchkina, G.F. (2020). Iskusstvennyj intellekt, roboty i ob"ekty robototekhniki: k voprosu o teorii pravovogo regulirovaniya v Rossijskoj Federacii* [Artificial intelligence, robots and robotics objects: on the theory of legal regulation in the Russian Federation]. *Bankovskoe parvo*. 1: 7-18. [in Russian]

[Ruchkina, Shaydullina, 2020](#) – *Ruchkina, G.F., Shaydullina, V.K. (2020). Obrazovatel'nyj process i obuchenie studentov pokoleniya z: osobennosti organizacii i transformacii* [Educational process and teaching of generation z students: features of organization and transformation]. *Yuridicheskoe obrazovanie i nauka*. 10: 3-10. [in Russian]

[Ruchkina, Vengerovskiy, 2020](#) – *Ruchkina, G.F., Vengerovskiy, E.L. (2020). Pravovoe regulirovanie ekonomicheskogo sotrudnichestva stran – chlenov BRIKS v sfere optimizacii processov razrabotki innovacionnyh cifrovyyh i mobil'nyh tekhnologij* [Legal regulation of economic cooperation between the BRICS member countries in the field of optimization of the development of innovative digital and mobile technologies]. *Mezhdunarodnoe publichnoe i chastnoe parvo*. 1: 20-24. [in Russian]

[Simaeva, 2019](#) – *Simaeva, E.P. (2019). Problemy cifrovoj gramotnosti v Rossii: pravovoj analiz* [Problems of digital literacy in Russia: legal analysis]. *Samoupravlenie*. Vol. 2. 1(114): 309-311. [in Russian]



Copyright © 2021 by Academic Publishing
House Researcher s.r.o.

All rights reserved.

Published in the Slovak Republic

European Journal of Contemporary Education

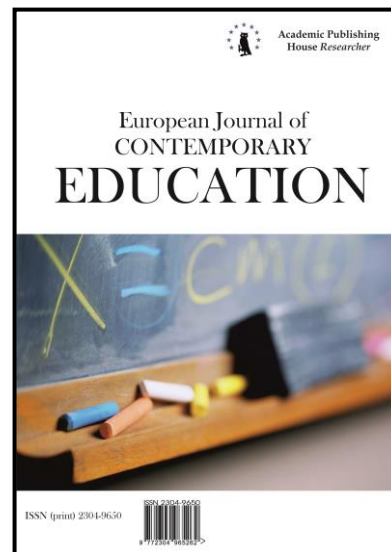
E-ISSN 2305-6746

2021. 10(2): 308-323

DOI: 10.13187/ejced.2021.2.308

www.ejournal1.com

IMPORTANT NOTICE! Any copying, reproduction, distribution, republication (in whole or in part), or otherwise commercial use of this work in violation of the author(s) rights will be prosecuted in accordance with international law. The use of hyperlinks to the work will not be considered copyright infringement.



The Development of Fair Play in Physical Education and School Sports: A Systematic Review

Benjamín Navarro Domínguez ^a, José Antonio Cerrada Nogales ^a, Manuel Tomás Abad Robles ^{a,*},
Francisco Javier Giménez Fuentes-Guerra ^a

^a University of Huelva, Spain

Abstract

In today's society, values are already an important part of any social and educational project. Physical activity and sport are excellent instruments to promote the conveyance of values resulting in personal and social development. However, an increasing number of authors state that the mere practice of physical activity in itself does not develop morality. The aims of this study were: 1) to conduct a systematic review of the effects of those research studies related to fair play where intervention programmes were implemented; 2) to describe and review these interventions. For this purpose, a systematic search was undertaken, in accordance with the PRISMA Declaration guidelines, in the Web of Science, Scopus, and SportDiscus databases. A total of 13 studies which met the inclusion criteria were selected. The results showed that the Sport Education Model, with the implementation of a fair play system, obtained a statistically significant increase in the level of respect for social conventions, respect for rules and referees, full commitment, and respect for opponents. On the other hand, the application of the Personal and Social Responsibility model led to improvements in fair play, rough play and the importance of winning. The main practical application of this systematic review is to help teachers and coaches in the development of fair play, as well as to identify those methodologies which provide the best results for the development of fair play in students and athletes during the sports training stage.

Keywords: fair play, methodology, sport training, sport education, personal and social responsibility.

* Corresponding author

E-mail addresses: manuel.abad@dempc.uhu.es (M.T. Abad Robles),
benjamin.navarro@alu.uhu.es (B.N. Domínguez), joseantonio.cerrada123@alu.uhu.es (J.A. Cerrada Nogales),
jfuentes@dempc.uhu.es (F.J. Giménez Fuentes-Guerra)

1. Introduction

Values represent enduring beliefs that a specific mode of conduct or end-state of existence is personally or socially preferable to an opposite or converse mode of conduct or end-state of existence (Rokeach, 1973). In today's society, values are already an important part of any social and educational project (Ortega, Mínguez, 2001). Values education could be identified with "that perspective of education which aims to instil in students different ideals of conduct which will enable them to become in the future more solidary, democratic and socially committed citizens" (Giménez, 2003: 36).

Physical activity and sport are excellent instruments to promote the conveyance of values resulting in personal and social development (Escartí et al., 2005; Ruiz, Cabrera, 2004). However, an increasing number of authors state that the mere practice of physical activity in itself does not develop morality (Carranza, Mora, 2003; Gutiérrez, 2004).

Amat and Batalla (2000) claim that for an adequate education in values to take place, physical activity and sport must be approached in such a way as to foster self-knowledge and improve the self-concept, promote dialogue as an instrument to solve conflicts, the participation of everybody, enhance personal autonomy, take advantage of failure as an educational element, promote respect for and acceptance of individual differences, and benefit from game, training and competition situations to work on social skills. Therefore, values education should be a day-to-day process, influenced by the atmosphere created around young people, made up of fathers, mothers, coaches, teachers and peer group (Leo et al., 2009).

From an educational point of view, it is considered that both the game and sport involve unavoidable basic ideals which must be followed and respected by students or players. These should be promoted by teachers and coaches, and one of these basic ideals is fair play (Giménez, Díaz, 2001). In this regard, the Diccionario de las Ciencias del Deporte (Aquesolo, 1992: 220), defines fair play as "respect and recognition for the game rules, having an appropriate relationship with the opponent, an attitude of integrity in victory and defeat, and promoting equality among all participants during sport, as well as rejecting violent attitudes and showing maximum commitment".

On the other hand, Cruz et al. (1996) consider that the possible causes of the detriment to fair play in children and young people are the attitudes, behaviour and values of coaches aimed at competitive success, the behaviour and attitudes of parents and spectators at matches, and the inadequate system of sanctions in some regulations which favours the offender. Therefore, it is necessary to have tools to help convey appropriate behaviours in the educational environment, as well as initiatives to favour the practice of physical and sporting activities based on fair play (Pinheiro, 2013). Furthermore, it should be borne in mind that the way in which the teacher or coach presents and deals with sports content has a significant influence on the adequate promotion and development of values through the practice of physical activity and sport (Guerra, Pintor, 2002). In this sense, in recent years, studies have emerged aimed at developing intervention programmes to improve the ethical behaviour of participants (Cecchini et al., 2003), through the implementation of different models. Among them, it is worth highlighting the Sport Education Model (Siedentop, 1994), designed to provide authentic and educational experiences for students, and Hellison's (1995) Personal and Social Responsibility Model, which is one of the most widely applied at present in terms of the development of personal and social responsibility and sporting behaviours such as effort, cooperation and sportspersonship (Belando et al., 2012; Hellison, 2011).

The practice of sport in educational contexts favours cognitive, social and affective experiences, promotes knowledge and respect for ethical values which are the foundation of civil coexistence and are essential for the exercise of active and conscious citizenship (Tortella, Fumagalli, 2017). Considering the importance of the development of pro-social behaviours, and more specifically, of fair play with school-age boys and girls, the aims of this study were: 1) to conduct a systematic review on the effects of those researches related to fair play in which intervention programmes were implemented; 2) to describe and examine these interventions.

2. Methods

The PRISMA Statement and the practical guide on systematic reviews with or without meta-analysis (Moher et al., 2015; Urrútia, Bonfill, 2010) were used to undertake this study.

Eligibility criteria

The inclusion criteria applied to this study were: a) full text articles, b) articles which implemented an intervention programme, c) date of publication between 2000 and 2020, and d) language: English, Spanish and Portuguese. Therefore, articles were included on the basis of the screening carried out according to the different eligibility criteria outlined above. Two research studies from other sources were also included, after analysing the references of the included articles.

Sources of information

The search for the different documents was based on three databases (Web of Science, Scopus and SportDiscus) during the month of March 2021. Two different search blocks were established: 1) Fair play and 2) Physical Education OR sport.

Selection of studies and data collection process

After conducting the search for the different articles, the title and abstract of the articles were analysed to find the most relevant ones, thus excluding those which did not meet the inclusion criteria. Finally, 12 studies were selected and used for data collection. Fair play, in some of the selected studies, made reference to a part of the intervention programme used, while in others, it was the subject matter of the study.

Quality assessment

The quality assessment of the selected papers was performed using the Standard Quality Assessment Criteria for quantitative and qualitative studies (Kmet et al., 2004). Two observers scored the studies independently. The inter-rater agreement was calculated using the intra-class correlation coefficient, resulting in an almost perfect coefficient of .927 ($p < .05$) (Landis, Koch, 1977). After implementing the inter-rater agreement, a higher cut-off point of .53 for qualitative studies and .61 for quantitative studies was obtained (see Table 1). The overall points assigned by the first observer for qualitative and quantitative research ranged from .60 to .85 and .62 to .86 respectively, while those of the second observer ranged from .53 to .85 for qualitative studies and .61 to .89 for quantitative studies.

Table 1. Inter-rater agreement scores of studies

Quantitative Studies	Observer 1	Observer 2
Palou et al. (2020)	.82	.82
Casado-Robles et al. (2020)	.82	.82
Burgueño and Medina-Casabón (2020)	.86	.82
Lis-Velado and Carriedo (2019)	.79	.78
Naves et al. (2019)	.62	.69
Gil-Madróna et al. (2016)	.68	.71
Azevedo et al. (2016)	.68	.61
Vidoni et al. (2013)	.75	.68
Cecchini et al. (2007)	.78	.82
Palou et al. (2007)	.75	.71
Cecchini et al. (2003)	.82	.89
Qualitative Studies	Observer 1	Observer 2
Perlman and Goc (2010)	.85	.85
Vidoni and Ward (2009)	.60	.53

3. Results

Selection of studies

The initial search generated 535 results. The papers were analysed and 2 additional studies were identified from other sources. In addition, duplicate articles were discarded. This led to the exclusion of 12 studies. The remaining 525 were screened for the different inclusion criteria. Finally, after performing the analysis, 13 studies were included in this systematic review as they passed the different inclusion criteria (see Figure 1).

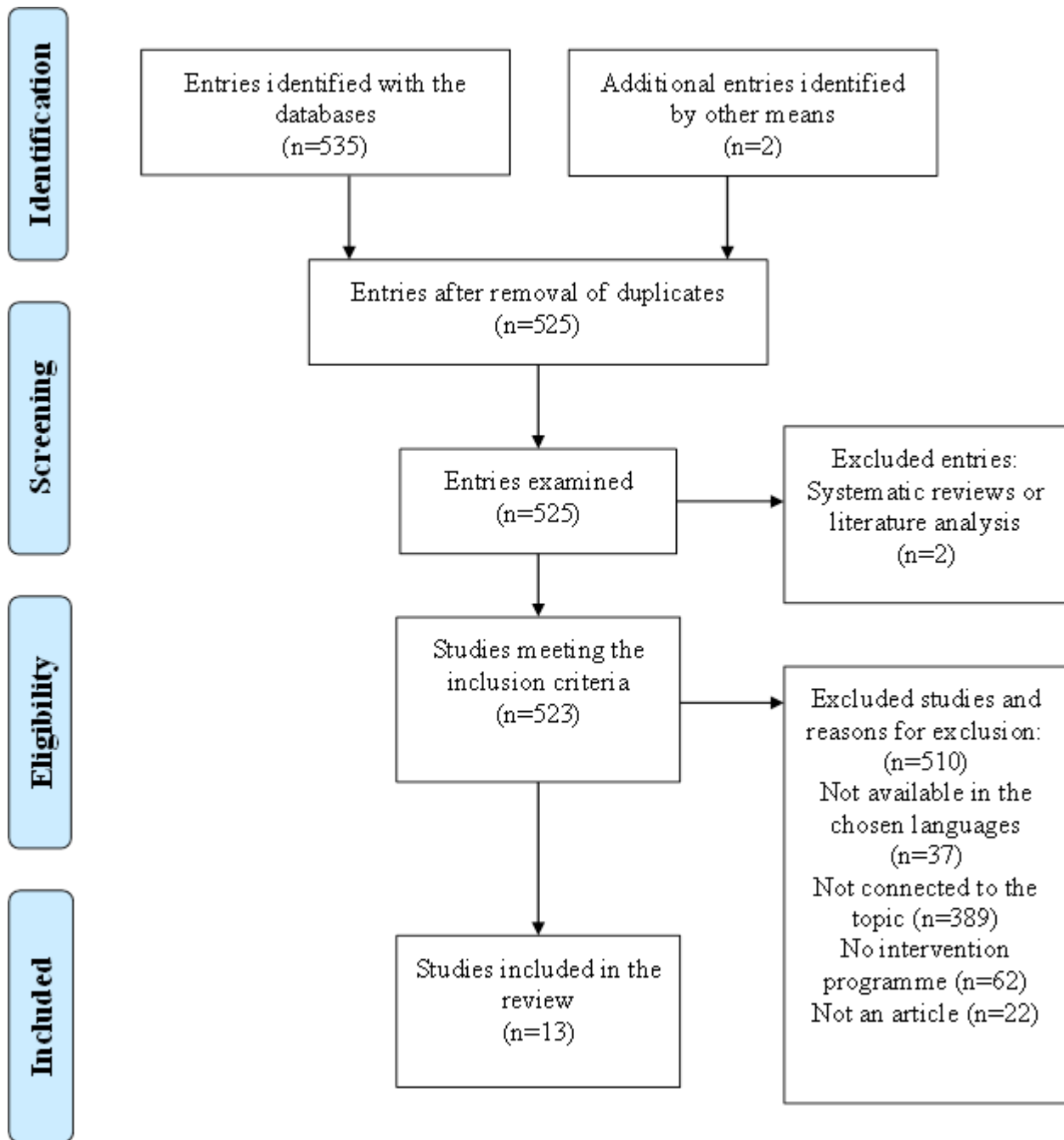


Fig. 1. Flow diagram for the systematic review process according to PRISMA statements

Characteristics of the studies

The main characteristics of the selected studies are shown below (see Tables 2 and 3).

Table 2. Characteristics of participants, duration, instrument and protocol of the research studies

Studies	Country	N (Sample)	Age and educational level/context	Duration of the study	Instruments	Protocol
Palou et al. (2020)	Balearic Islands (Spain)	1097 adolescents (854 males and 243 females)	10-16 years old M = 12.50 Football, basketball and volleyball clubs	Throughout the season	Fair play attitudes scale (Cruz et al., 1996). It is a questionnaire divided into 3 subscales: rough	Control Group: Not specified Experimental group: Intervention

					play, importance of winning and enjoyment	programme based on working on an adequate motivational environment
Casado-Robles et al. (2020)	Granada (Spain)	114 students (62 women and 52 men)	13-16 years old M = 14.0 SD = 1.1 Secondary Education	12 sessions of 60 minutes	Iturbide-Luquin and Elosua-Oliden (2017) Multidimensional sportspersonship Questionnaire	Control Group: Direct instruction-based programme Experimental group: Programme based on the Sport Education Model (Siedentop, 1994)
Burgueño and Medina-Casabón (2020)	Almeria (Spain)	148 high school students (70 boys and 78 girls) Experimental Group 74 subjects Control Group 74 subjects	16-18 years old M = 17.04 SD = .99 Secondary Education	16 sessions of 60 minutes (two sessions a week)	The Spanish version of the Multidimensional Sportspersonship Orientation Scale (Martín-Albo et al., 2006) was used	Control Group: Traditional teaching model where the teacher managed fair play Experimental group: Methodology based on the Sport Education model where a fair play accounting system was established
Lis-Velado and Carriedo (2019)	Oviedo (Spain)	92 students (50 males and 42 females) Control group 45 subjects Experimental Group 47 subjects	10-12 years old M = 10.38 SD = .55 Primary Education	3 sessions in each group and 6 days of competition	Fair play attitudes scale (Cruz et al., 1996)	Control Group: Football league using a traditional competitive system Experimental group: Football league using a system based on Brave League
Naves et al. (2019)	Asturias (Spain)	9 children	9-10 years old Football Club	14 sessions over 2 months	Fair play attitudes scale (Cruz et al., 1996)	The football sessions are based on the TARGET model, built on strategies for promoting an atmosphere of mastery and involvement in the task

Gil-Madrona et al. (2016)	Albacete (Spain)	274 students between 6th and 8th grades	11-13 years old Primary Education	24 sessions (1 session a week)	Three Likert-scale questionnaires developed by the research team were used	Control Group: In the control group, the existing planning was followed Experimental group: The intervention involved the integration of values and social skills
Azevedo et al. (2016)	United Kingdom	12 eighth graders (12-13 years old) and 9 ninth graders (13-14 years old)	12-14 years old Secondary Education	15 sessions of 1 hour (one session a week)	Accelerometers were used to count the number of steps and Moderate to Vigorous Physical Activity (MVPA)	Baseline conditions: Conventional football sessions were conducted Intervention: The intervention programme based on the Fair Play Game was implemented
Vidoni et al. (2013)	United States	70 sixth graders (41 girls and 29 boys) divided into three P.E. classes	10-12 years old Secondary Education	17 sessions of between 45 and 50 minutes	Pedometers were used to measure the number of steps per minute of the participants during the PE sessions	Baseline conditions: The lessons were taught in the conventional way using pedometers Intervention: The intervention programme based on the Fair Play Game was implemented
Perlman and Goc (2010)	United States	24 students (17 boys and 7 girls)	15-18 years old Secondary Education	12 sessions of 72 minutes	Interviews were conducted to assess students' and teachers' perceptions of their experiences with the Sport Education model	Methodology based on the Sport Education Model
Vidoni and Ward (2009)	United States	2 Physical Education classes. In each class, three students were analysed	12-13 years old Primary Education	18 sessions of 40 minutes	Direct systematic observation was used (Van Der Mars, 2006)	Lesson 1 and 2: Sport Education model with no instruction on fair play and then Sport Education model with instruction on fair play
Cecchini et al. (2007)	Asturias (Spain)	186 students (94 females and 92 males)	13-14 years old Secondary Education	20 sessions of 1 hour	Fair play attitudes scale (Cruz et al., 1996)	Control Group: Not specified Experimental

		Control Group 61 subjects (30 girls and 31 boys) Experimental Group A 62 subjects (32 girls and 30 boys) Experimental Group B 63 subjects (32 girls and 31 boys)				group A: The five levels of the model to Develop Personal and Social Responsibility were applied Experimental group B: The first four levels of the model to Develop Personal and Social Responsibility were applied
Palou et al. (2007)	Balearic Islands (Spain)	245 players Control group 136 subjects Experimental Group 109 subjects	15-16 years old Football clubs	Throughout the season	Fair play attitude scale (EAF): developed by Boixadós (1998)	Control Group: Not specified Experimental group Intervention to improve sportspersons hip and fair play
Cecchini et al. (2003)	Oviedo (Spain)	142 children (73 girls and 69 boys) Control group 70 subjects Experimental Group 72 subjects	12-13 years old Secondary Education	10 sessions of 1 hour	Fair play attitudes scale (Cruz et al., 1996)	Control Group: Not specified Experimental group: Intervention programme adapting the model to Develop Personal and Social Responsibility (Hellison, 1995)

Table 3. Objectives, design, intervention programme and main research findings

Studies	Study Objective	Design	Intervention programme	Main Results
Palou et al. (2020)	To analyse the effectiveness of an intervention programme aimed at coaches so as to assess their attitude in favour of fair play in sport, aspects such as enjoyment, the need to win and anti-social behaviour in young players in	Quasi-experimental pre-test, post-test design with control and experimental group	At the beginning of the season, a training session was delivered to the coaches based on two blocks: adaptive motivational environment and positive communicative style. Secondly, the questionnaire was handed out to the athletes. Subsequently, the researcher analysed the behaviour of the coaches during the competitions	In the analysis of football clubs, the value of winning decreases in the experimental group. In the data concerning basketball, downward trends were observed in the sections related to winning and rough play, and finally, the data for volleyball showed positive

	the Balearic Islands		and, finally, the questionnaire was provided again to the athletes at the end of the season	values in the section related to the perception of winning
Casado-Robles et al. (2020)	To examine the effect of a teaching unit of the Sports Education Model in Physical Education on sportspersonship and objective levels of regular Physical Activity in comparison with a traditional sports methodology in Secondary Education students	quasi-experimental, controlled, randomised natural-group design	A programme based on the Sport Education Model was carried out. The intervention was divided into five phases: one introductory phase session, two targeted phase sessions, two pre-season phase sessions, six in-season phase sessions and one final event session	In the Fair Play dimension, no statistically significant differences were found between the control and experimental groups
Burgueño and Medina-Casabón (2020)	To examine the influence of an intervention programme based on Sports Education on the five orientations of sportspersonship proposed by Vallerand et al. (1996) and Vallerand et al. (1997)	Clustered randomised design, with a non-equivalent control group and pre- and post-intervention measures	The intervention consisted of three phases. The initial phase was made up of an introductory session and a guided practice. The autonomous practice phase aimed to develop technical and tactical skills. Finally, the final phase included regular competition and a culminating event. In addition, a fair play points accounting system was established which was initiated during the pre-season competition and continued until the end	In both the intergroup and intragroup (experimental group) analyses, there were statistically significant increases in the level of respect for social conventions, respect for rules and referees, full commitment and respect for opponents
Lis-Velado and Carriedo (2019)	To analyse the effects of a football competition based on the Brave League (2015) on fair play attitudes, goal orientations, effort, and pressure-stress in students in the fifth year of primary school	Quasi-experimental pre-test, post-test design with control and experimental group	In the experimental group, participants took part in a championship with a format characterised by the existence of two types of rankings, one evaluating the fair play of the students and the other being conventional. In this format, the team coming first in the fair play ranking was declared the winner, and only in the event of a tie was the conventional ranking used	Intergroup analysis: the results showed the same results as the preliminary analyses, with significant differences still found in rough play, $U = 649$, $Z = -3.198$, $p < .001$, $r = .33$; and in importance in winning, $t(90) = 2.935$, $p = .004$, $d = .62$
Naves et al. (2019)	To verify whether the motivational	Not specified	During the sessions, tasks were set as a challenge for	In the factor regarding the

	environment and the working atmosphere created by the teacher or coach can improve fair play behaviours, autonomy in learning, peer relationships, a better perception of competition and more enjoyment in practice		the players, always looking for the greatest motivation. The players themselves were the ones who set their objectives, looked for mistakes and worked to improve them. The intervention focused on the learning process and the individual needs were taken into account	importance of winning in football, there was a decrease of 1.15 points. In terms of the acceptance of rough play, there was also a decrease of 1.01 points, while in the item referring to enjoyment, there was an increase of 0.95 points
Gil-Madrona et al. (2016)	To examine the effectiveness of PE lesson plans which focus on teaching social skills and values within the content of fair play, social relations, personal effort and self-improvement, good manners and self-control in the socio-emotional domain of students in the 6th-8th grades	Experimental design with control and experimental group, and with pre- and post-intervention measures	The contents of the intervention programme, focused on values education, were organised in different blocks: enjoyment, effort, emotional control, respect for rules, intervention techniques and fair play, which in turn consisted of: respect for teammates and opponents, respect for referees, learning to be a good winner and accepting when you lose	In the intervention group there was a significant improvement in students' perceptions of values ($t = -8.05$; $p < .01$) and in PE teachers' perceptions of the values of enjoyment ($t = -7.10$; $p < .01$), fair play ($t = -8.09$; $p < .01$), social relationship ($t = -6.48$; $p < .01$), good manners ($t = -7.43$; $p < .01$) and emotional control ($t = -6.03$; $p < .01$)
Azevedo et al. (2016)	To investigate the effects of Fair Play on objectively measured levels of MVPA among secondary school students from marginal neighbourhoods in the UK with different levels of Physical Activity, during physical education lessons	Single-behaviour multiple baseline design in two classes	An intervention based on the Fair Play Game was carried out, consisting of: goal setting, unidentified monitored student, reinforcement after the end of the session by providing examples, feedback and reward	The single-subject analysis revealed that the Fair Play Game intervention displayed a positive but weak treatment effect in participants with low levels of Physical Activity. However, students with medium and high MVPA showed no positive changes between baseline and intervention phases
Vidoni et al. (2013)	To replicate the Fair Play Game intervention programme in three sixth-grade classes and investigate its effects on children's activity in terms of the number of steps during a handball	Multiple baseline design to assess the effects of the intervention on the dependent variable	An intervention based on the Fair Play Game was implemented. The most relevant aspects of the intervention were: the creation of a wall with the names of the teams where information could be written down, the request for examples to the students about how they could be more active and	One of the three teams belonging to class 1 achieved the objective. In class 2, two of the three teams reached the objectives, and all three teams in class 3 attained the proposed objectives

	teaching unit		the reinforcement through the analysis of the active behaviours observed during the session	
Perlman and Goc (2010)	To provide a qualitative examination of students and teachers perceptions and experiences within two consecutive seasons applying the Sport Education Model by using the perspective of the self-determination theory	A case study approach based on self-determination theory (Deci, Ryan, 1985) was used	Each unit followed a three-phase format. In the first phase, students were placed in teams and were assigned the different roles. In the second phase, they prepared the fields, performed team practices and warm-ups, followed by the practise of proposed games, and finally, in the last phase, a competition was held followed by an award ceremony	In terms of fair play, the implementation of the intervention led to an improvement in the sense of empathy within the class by reducing negative sporting behaviour
Vidoni and Ward (2009)	To analyse the influence of the intervention on fair play behaviours during a Physical Education unit and to research the use of the Sport Education Model as a baseline to determine to what extent it promotes fair play behaviours	Multiple baseline design based on two behaviours	The experimental condition involved a programme called Fair Play Instruction based on the following features: graphic, prompts and praise, positive peer identification and feedback	In class 1, the data for active participation increased with a mean of 77 % and the data for waiting decreased with a mean of 24 %. In addition, helpful behaviours were constant, while the data for harmful behaviours was lower, with a mean of 0.7. In class 2, the levels of active participation increased with a mean of 70 % and helpful behaviours showed similar levels to those prior to the intervention
Cecchini et al. (2007)	To examine the impact of Hellison's (1995) model for the development of personal and social responsibility on fair play and self-control in young people.	Quasi-experimental pre-test, post-test design with control and experimental group.	Experimental Group A: The five levels of Hellison's (1995) intervention programme were applied through an indoor football teaching unit. The design of the sessions included integrated rules and levels aimed at developing values related to fair play and its transfer to the everyday life. Experimental Group B: The first four levels of the	In the variable of opinions related to fair play, there were significant differences between groups A and B, when compared to the control group, in all the variables. In both groups there was an increase in the variable of enjoyment ($F_{1,180} = 47.93, P < .001, n^2 = 0.34$) and decreases

			Personal and Social Responsibility model were applied, thus not working on the fifth level of transfer	in the variables referring to rough play ($F_{1,180} = 144.02$, $P < .001$, $n^2 = 0.61$) and the value of victory ($F_{1,180} = 65.90$, $P < .001$, $n^2 = 0.42$)
Palou et al. (2007)	To analyse fair play attitudes in junior football players and to see the effects of an intervention on the promotion of fair play	Quasi-experimental pre-test, post-test design with control and experimental group	The intervention conducted with the coaches consisted of a dossier to promote fair play and sportspersonship in football at school age, based on the protocol of advice to coaches by Boixadós (1998). The application of the intervention to coaches and players was undertaken through three theoretical-practical sessions and the dissemination of triptychs and dossiers	Regarding the variable "Attitude towards winning", there were no significant differences. On the other hand, the results did not vary for the variable "Attitude towards rough play", and there were no significant differences for the variable "enjoyment".
Cecchini et al. (2003)	To assess the implementation of an intervention programme based on the Personal and Social Responsibility model (Hellison, 1995), in young school children	Quasi-experimental pre-test, post-test design with control and experimental group	The daily session was organised in the following phases: open practice and time dedicated to the teacher's personal contact with the students, awareness-raising talk with the entire group, practical development of the activity with integrated standards and levels, and meeting of the entire group to assess the work accomplished and to reflect on the values developed	There were statistically significant improvements related to enjoyment, $t(1, 70) = 10.76$, $p < .001$. Furthermore, decreases were observed in variables measuring negative aspects such as rough play, $t(1, 70) = -19.32$, $p < .001$ and the imperative pursuit of victory $t(1, 70) = -13.12$, $p < .001$

4. Discussion

The aims of this study were: 1) to conduct a systematic review of the effects of those research studies related to fair play where intervention programmes were implemented; 2) to describe and examine these interventions. The selected studies addressed fair play in different ways. Four out of the thirteen studies (Azevedo et al., 2016; Burgueño, Medina-Casaubón, 2020; Gil-Madrona et al., 2016; Vidoni et al., 2013), treated it as an element included in the intervention programme, while another eight (Casado-Robles et al., 2020; Cecchini et al., 2007; Cecchini et al., 2003; Naves et al., 2019; Lis-Velado, Carriedo, 2019; Palou et al., 2007; Palou et al., 2020; Perlman, Goc, 2010), referred to fair play as the subject matter of study. The study carried out by Vidoni and Ward (2009) addressed fair play from both perspectives.

All five studies were conducted in the educational sphere, specifically in the Primary and Secondary Education stages, referring to fair play as part of the intervention programme implemented. This aspect is important to underline, as schools can and should represent the driving force in the promotion of fair play, not only through sport activities, but in all the

dimensions where the educational process is embodied (Pignato et al., 2020). In this regard, the research carried out by Vidoni and Ward (2009) and Burgueño and Medina-Casabón (2020) used a methodology based on the Sports Education Model including elements related to fair play. In the study conducted by Vidoni and Ward (2009), an instruction on fair play was provided to students, obtaining an increase in data on active participation. The differences in the level of active participation, before and after implementing the intervention, are similar to the motor participation reported in previous studies (Grant et al., 1990; Randall, Imwold, 1989). On the other hand, in the study conducted by Burgueño and Medina-Casabón (2020), after the application of the intervention based on the Sport Education model, where a fair play accounting system was established, the results showed a statistically significant increase in the level of respect for social conventions, respect for rules and referees, full commitment, and respect for opponents. In terms of social conventions, Brock and Hastie (2007) obtain results along the same lines, insofar as they found that secondary school students exhibit appropriate behaviours such as shaking hands with opponents and acknowledging their opponents' good performance. The positive results obtained in the item referring to respect for opponents match those obtained by Méndez-Giménez et al. (2015), and Brock and Hastie (2007), as both studies reveal that students help other classmates and are kind to them. This fact can be explained by the curricular scaffolding of the Sport Education Model which promotes an environment encouraging task participation. Conversely, the results reported in the study by Azevedo et al. (2016) showed that the Fair Play Game intervention had a positive, but weak, treatment effect on participants who engaged in little physical activity. Nevertheless, students with medium and high MVPA did not display positive changes between baseline and intervention phases. These outcomes do not support the results found by Vidoni and Ulman (2012), and Vidoni et al. (2013). One of the possible reasons could be the timing, as the intervention was conducted with a frequency of one day per week.

Regarding the research studies dealing with fair play as a subject matter of study, it was observed that four out of nine studies were conducted in secondary education (Cecchini et al., 2007; Cecchini et al., 2003; Casado-Robles et al., 2020; Perlman, Goc, 2010), two in Primary Education (Lis-Velado, Carriedo, 2019; Vidoni, Ward, 2009) and three in sports clubs (Palou et al., 2020; Naves et al., 2019; Palou et al., 2007).

Both in the study conducted by Casado-Robles et al. (2020) and in those developed by Perlman and Goc (2010) and Vidoni and Ward (2009), an intervention programme based on the Sport Education Model was used. Firstly, in the research carried out by Vidoni and Ward (2009), and referring to the results related to fair play, the beneficial behaviours from a social point of view showed similar levels after the intervention, while the detrimental behaviours were lower and tended to stabilise. Unlike previous studies (Giebink, McKenzie, 1985; Patrick et al., 1998), the results reported in this research do not show such pronounced differences. In the study undertaken by Perlman and Goc (2010), the implementation of the intervention based on the Sport Education Model led to an improvement in terms of class empathy by reducing unsporting behaviour. Meanwhile, in the research carried out by Casado-Robles et al. (2020), no statistically significant differences were found between the control and experimental groups in the dimension of fair play. Nonetheless, studies such as those by Vidoni and Ward (2009), Perlman and Goc (2010) and Wahl-Alexander et al. (2016), unlike Casado-Robles et al. (2020), were conducted following a qualitative methodology. Therefore, the design of the Casado-Robles et al. (2020) study (natural-group randomised controlled) may entail an advantage over most studies based on a single-group design.

The study by Lis-Velado and Carriedo (2019) found no significant differences associated with fair play between the control and experimental groups. These results are similar to those of another study, Sampol et al. (2007), which analysed the effects of an intervention to promote fair play in young football players. In turn, Cecchini et al. (2003) and Cecchini et al. (2007) observed, in pre-adolescents, that participants in the experimental group produced significant improvements in terms of enjoyment, and significant decreases were detected in variables measuring negative aspects such as rough play and the imperious pursuit of victory after an intervention based on Hellison's (1995) Personal and Social Responsibility model. Both studies highlight the fact that the values learned during the interventions implemented can be transferred to other dimensions, but only if the experiences are specifically designed and conducted for this purpose (Danish et al., 1990).

By contrast, in the study by Naves et al. (2019), there was a decrease in the factors referring to the importance of victory and rough play, and an increase in the item referring to enjoyment.

Previous studies have obtained positive results after the application of this method (Cecchini et al., 2014; Sevil et al., 2018). Likewise, in the study by Palou et al. (2007), an intervention programme aimed at improving sportspersonship and fair play was implemented, but no statistically significant results were obtained, which does not coincide with the findings of Gibbons and Ebbeck (1997) regarding the desire to win, or with the results reported by Borràs et al. (2003) concerning rough play.

The main limitation of the systematic review is that the studies differ in terms of sample, instruments, and protocols. Regarding the characteristics of the sample, the fact that the studies differ in the size of the sample stands out. In addition, the instruments used, except for four studies that use the same tool, are different and measure fair play in different ways. Some of them analyse the fair play globally and others distinguish sub-scales of measurement within fair play. In addition, the protocols and interventions carried out in research vary significantly. All the above, together with the fact that the studies deal with the concept of fair play in different ways, makes it difficult to analyse them and, therefore, to compare the findings. It should also be mentioned that a meta-analysis was not carried out due to the unequal treatment and measurement of fair play in the analyzed research, and that most of the quantitative articles did not meet the requirements for such a meta-analysis (non-control group, non-reporting of means and standard deviations). Only four of the articles included in the systematic review met the requirements for conducting a meta-analysis, so conducting the meta-analysis may have less power (Jackson, Turner, 2017). Thus, it was considered appropriate to conduct an in-depth qualitative analysis of the 13 studies included in the systematic review. In this sense, future research should aim at studying the influence of the mentioned and new methodologies on fair play, both in educational contexts and in sports clubs, using a common instrument in order to achieve a broader and more complete comparison.

5. Conclusion

The application of the Sports Education Model together with the implementation of other aspects related to fair play can favour the active participation and pro-social behaviours of young people, highlighting respect for social conventions, respect for rules and referees, commitment and respect for opponents. In turn, the application of Hellison's (1995) model of Personal and Social Responsibility obtained improvements on fair play, such as a remarkable increase on the subscale referring to enjoyment, and significant decreases on the subscales relating to rough play and the importance of victory in the educational context. Alternatively, in the sports context, through the implementation of the TARGET model, positive results can be achieved, as far as fair play is concerned, in the variables relating to the importance of winning, rough play and enjoyment.

The main practical application of this systematic review is to help teachers and coaches in the development of fair play, as well as to identify those methodologies which provide the best results for the development of fair play in students and athletes during the sports training stage.

References

- Aquesolo, 1992 – Aquesolo, J. (1992). Diccionario de las Ciencias del Deporte [Dictionary of Sports Sciences]. Málaga: Unisport. [in Spanish]
- Amat, Batalla, 2000 – Amat, M., Batalla, A. (2000). Deporte y educación en valores [Sport and education in values]. *Aula de Innovación Educativa*. 91: 10-13. [in Spanish]
- Azevedo et al., 2016 – Azevedo, L.B., Vidoni, C., Dinsdale, S. (2016). Effects of “Fair Play Game” Strategy on Moderate to Vigorous Physical Activity in Physical Education. *The Physical Educator*. 73: 757-776. DOI: 10.18666/TPE-2016-V73-I4-7115
- Belando et al., 2012 – Belando, N., Ferriz-Morell, R., Moreno-Murcia, J.A. (2012). Personal and social improvement through the promotion of responsibility for physical and sporting activity. *Revista Internacional de Ciencias del Deporte*. 8(29): 202-222. DOI: 10.5232/ricyde2012.02902
- Boixadós, 1998 – Boixadós, M. (1998). Avaluació del clima motivacional i de les actituds de fairplay en futbolistes alevins i infantils i efectes de l'assessorament psicològic a llurs entrenadors [Evaluation of motivational climate and fair play attitudes in young and child footballers and effects of psychological counselling for coaches]. Bellaterra: Universitat Autònoma de Barcelona. [in Catalan]

Borràs et al., 2003 – Borràs, P.A., Palou, P., Ponseti, F.J., Cruz, J. (2003). Promoción de la deportividad en el fútbol en edad escolar. Evaluación de los comportamientos relacionados con el Fair Play [Promotion of sportsmanship in school-age football. Assessment of Fair Play behaviours]. In S. Marquéz (Ed.). *Psicología de la Actividad Física y el Deporte: Perspectiva Latina* [Psychology of Physical Activity and Sport: Latin Perspective] (pp. 207-218). León: Universidad de León. [in Spanish]

Brock, Hastie, 2007 – Brock, S.J., Hastie, P.A. (2007). Students' conceptions of fair play in sport education. *ACHPER Aust. Health Lifestyles*. 54: 11-15.

Burgueño, Medina-Casabón, 2020 – Burgueño, R., Medina-Casabón, J. (2020). Sport Education and Sportsmanship Orientations: An Intervention in High School Students. *International Journal of Environmental Research of Public Health*. 17(837). DOI: 10.3390/ijerph17030837

Carranza, Mora, 2003 – Carranza, M., Mora, J.M. (2003). Educación Física y valores: educando en un mundo complejo [Physical Education and Values: Educating in a Complex World]. Barcelona: Graó. [in Spanish]

Cecchini et al., 2014 – Cecchini, J.A., Fernández-Río, J., Méndez-Giménez, A. (2014). Effects of Epstein's TARGET on adolescents' intentions to be physically active and leisure-time physical activity. *Health Educational Research*. 29(3): 485-490. DOI: 10.1093/her/cyu007

Cecchini et al., 2003 – Cecchini, J.A., Montero, J., Peña, V. (2003). Repercusiones del programa de intervención para desarrollar la responsabilidad personal y social sobre los comportamientos de fair-play y el autocontrol [Impact of the intervention programme to develop personal and social responsibility on fair play behaviour and self-control]. *Psicothema*. 15. 631-637. [in Spanish]

Cecchini et al., 2007 – Cecchini, J.A., Montero, J., Alonso, A., Izquierdo, M., Contreras, O. (2007). Effects of personal and social responsibility on fair play in sports and self-control in school-aged youths. *European Journal of Sport Science*. 7(4): 203-211. DOI: 10.1080/17461390701718497

Cruz et al., 1996 – Cruz, J., Capdevila, L., Boixados, M., Pintanel, M., Alonso, C., Mimbbrero, J., Torregosa, M. (1996). Identificación de conductas, actitudes y valores relacionados con el fairplay en deportistas jóvenes [Identification of behaviours, attitudes and values related to fair play in young athletes]. *Investigaciones en Ciencias del Deporte*. 9: 37-87. [in Spanish]

Danish et al., 1990 – Danish, S.J., Petitpas, A.J., Hale, B.D. (1990). Sport as a context for developing competence. In T.P. Gullotta, G.R. Adams, R. Montemayor (Eds.). *Developing social competency in adolescence* (pp. 169-194). Newbury park, CA: sage.

Escartí et al., 2005 – Escartí, A., Pascual, C., Gutiérrez, M. (2005). Responsabilidad personal y social a través de la educación física y el deporte [Personal and social responsibility through physical education and sport]. Barcelona: Graó. [in Spanish]

Gibbons, Ebbeck, 1997 – Gibbons, S., Ebbeck, V. (1997). The effect of different teaching strategies on the moral development of physical education students. *Journal of Teaching in Physical Education*. 17: 85-98.

Giebink, McKenzie, 1985 – Giebink, M.P., McKenzie, T.L. (1985). Teaching sportsmanship in physical education and recreation: An analysis of interventions and generalization effects. *Journal of Teaching in Physical Education*. 4: 167-77. DOI: 10.1123/jtpe.4.3.167

Gil-Madrona et al., 2016 – Gil-Madrona, P., Samalot-Rivera, A., Kozub, F.M. (2016). Acquisition and Transfer of Values and Social Skills through a Physical Education Program Focused in the Affective Domain. *Motricidade*. 12(3): 32-38. DOI: 10.6063/motricidade.6502

Giménez, Díaz, 2001 – Giménez, F.J., Díaz, M. (2001). Diccionario de Educación Física en Primaria [Dictionary of Physical Education in Primary]. Huelva: Universidad de Huelva. [in Spanish]

Giménez, 2003 – Giménez, F.J. (2003). El deporte en el marco de la Educación Física [Sport in the context of Physical Education]. Sevilla: Wanceulen. [in Spanish]

Grant et al., 1990 – Grant, B.C., Ballard, K.D., Glynn, T.L. (1990). Teacher feedback intervention, motor on task behavior, and successful task performance. *Journal of Teaching in Physical Education*. 9: 123-39.

Guerra, Pintor, 2002 – Guerra, G., Pintor, P. (2002). Educación en valores a través de la Educación Física: aplicación de un programa en Educación Secundaria [Education in values

through physical education: implementation of a programme in secondary education]. *Lecturas: Educación Física y deportes*. 54. [in Spanish]

[Gutiérrez, 2004](#) – *Gutiérrez, M.* (2004). El valor del deporte en la educación integral del ser humano [The value of sport in the integral education of the human being]. *Revista de Educación*. 335: 105-126. [in Spanish]

[Hellison, 2011](#) – *Hellison, D.R.* (2011). Teaching responsibility through physical activity (3rd ed). Champaign IL: Human Kinetics.

[Hellison, 1995](#) – *Hellison, D.R.* (1995). Teaching personal and social responsibility through physical activity. Champaign, IL: Human Kinetics.

[Iturbide-Luquin, Elosua-Oliden, 2017](#) – *Iturbide-Luquin, L. M., Elosua-Oliden, P.* (2017). Los valores asociados al deporte: análisis y evaluación de la deportividad [Values associated with sport: analysis and evaluation of sportsmanship]. *Revista de Psicodidáctica*. 22(1): 29-36. DOI: 10.1016/S1136-1034(17)30041-2 [in Spanish]

[Jackson, Turner, 2017](#) – *Jackson, D., Turner, R.* (20017). Power analysis for random-effects meta-analysis. *Research Synthesis Methods*. 8(3): 290-302. DOI: 10.1002/jrsm.1240

[Kmet et al., 2004](#) – *Kmet, L., Lee, R., Cook, L.* (2004). Standard quality assessment criteria for evaluating primary research papers from a variety of fields. Edmonton: Alberta Heritage Foundation for Medical Research, Canada.

[Landis, Koch, 1997](#) – *Landis, J.R., Koch, G.G.* (1977). The measurement of observer agreement for categorical data. *Biometrics*. 33: 159-174. DOI:org/10.2307/2529310

[Leo et al., 2009](#) – *Leo, F.M., Sánchez-Miguel, P.A., Sánchez-Oliva, D., Gómez, F.R., García-Calvo, T.* (2009). Análisis de las relaciones existentes entre la orientación y el clima motivacional con los comportamientos antisociales en jóvenes deportistas [Analysis of the relationships between guidance and motivational climate and antisocial behaviours in young athletes]. *Revista Iberoamericana de Psicología del Ejercicio y el Deporte*. 1: 15-28. [in Spanish]

[Martín-Albo et al., 2006](#) – *Martín-Albo, J., Núñez, J.L., Navarro, J.G., González, V.M.* (2006). Validity of the Spanish version of the Multidimensional Sportspersonship Orientations Scale. *Journal of Sport Psychology*. 515(1): 9-22.

[Méndez-Giménez et al., 2015](#) – *Méndez-Giménez, A., Fernández-Río, J., Méndez-Alonso, D.* (2015). Modelo de educación deportiva versus modelo tradicional: efectos en la motivación y deportividad [Sports education model versus traditional model: effects on motivation and sportiness]. *Revista Internacional de Medicina y Ciencias de la Actividad Física y del Deporte*. 15(59): 449-466. DOI: 10.15366/rimcafd2015.59.004 [in Spanish]

[Moher et al., 2015](#) – *Moher, D., Shamseer, L., Clarke, M., Ghersi, D., Liberati, A., Petticrew, M., Shekelles, P., Stewart, L. A., PRISMA Group.* (2015). Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015 statement. *Systematic Reviews*. 4(1). DOI: 10.1186/2046-4053-4-1

[Naves et al., 2019](#) – *Naves, J., Fernández, A., San Pedro, M. B., González, C.* (2019). Target: un modelo para la mejora de las necesidades psicológicas, la motivación y el fair-play en escolares de primaria [Target: a model for improving psychological needs, motivation and fair play in primary school children]. *Revista Inclusiones*. 6: 73-97. [in Spanish]

[Ortega, Mínguez, 2001](#) – *Ortega, P., Mínguez, R.* (2001). Los valores en educación [Values in education]. Barcelona: Ariel educación. [in Spanish]

[Palou et al., 2020](#) – *Palou, P., Bermejo, J. M., Borràs, P.A., Ponseti, F.J.* (2020). Effects of an educational intervention regarding fair play on sports team coaches. *Journal of Human Sport and Exercise*. 15(2): 419-431. DOI: 10.14198/jhse.2020.152.16

[Palou et al., 2007](#) – *Palou, P., Borràs, P.A., Ponseti, F.X., Vidal, J., Torregrosa, M.* (2007). Intervención para la promoción de actitudes de fairplay en futbolistas cadetes [Intervention for the promotion of fair play attitudes in cadet footballers]. *Apunts. Educación Física y Deportes*. 89: 15-22. [in Spanish]

[Patrick et al., 1998](#) – *Patrick, C.A., Ward, P., Crouch, D.W.* (1998). Effects of holding students accountable for social behaviors during volleyball games in elementary physical education. *Journal of Teaching in Physical Education*. 17: 143-56.

[Perlman, Goc, 2010](#) – *Perlman, D., Goc, G.* (2010). A self-determined perspective of the Sport Education Model. *Physical Education and Sport Pedagogy*. 15(4): 401-418. DOI: 10.1080/17408980903535800

[Pignato et al., 2020](#) – *Pignato, S., Patania, V., Casolo, F., Valentini, M.* (2020). School, sport and fair play. *Journal of Human Sport and Exercise*. 15(4proc): S1169-S1177. DOI: <https://doi.org/10.14198/jhse.2020.15.Proc4.18>

[Pinheiro, 2013](#) – *Pinheiro, V.* (2013). O comportamento do treinador em competição na promoção do fair play. Um estudo nos escalões de Futebol de Formação. Unpublished Doctoral Dissertation [The behavior of the coach in competition in promoting fair play. A study in the training football ranks. Unpublished Doctoral Dissertation]. Universidad de Lleida, España. [in Portuguese]

[Randall, Imwold, 1989](#) – *Randall, L.E., Imwold, C.H.* (1989). The effect of an intervention on academic learning time provided by preservice physical education teachers. *Journal of Teaching in Physical Education*. 8: 271-9. DOI: 10.5232/ricyde2007.00602

[Rokeach, 1973](#) – *Rokeach, M.* (1973). The nature of human values. Nueva York: Free Press.

[Ruiz, Cabrera, 2004](#) – *Ruiz, G., Cabrera, D.* (2004). Los valores en el deporte [Values in sport]. *Revista de Educación*. 335: 9-19. [in Spanish]

[Sampol et al., 2007](#) – *Sampol, P.P., Rotger, P.A., Verdaguer, F.X., Conti, J.V., Álvarez, M.T.* (2007). Intervención para la promoción de actitudes de fairplay en futbolistas cadetes [Intervention for the promotion of fair play attitudes in cadet footballers]. *Apunts. Educación Física y Deportes*. 3(89): 15-22. [in Spanish]

[Sevil et al., 2018](#) – *Sevil, J., Abós, A., Sanz, M., García, L.* (2018). El “Lado Claro” y El “Lado Oscuro” de la Motivación en Educación Física: Efectos de una Intervención en una Unidad Didáctica de Atletismo [The “Clear Side” and the “Dark Side” of Motivation in Physical Education: Effects of an Intervention in an Athletics Didactic Unit]. *Revista Iberoamericana de Diagnóstico y Evaluación Psicológica*. 1(46): 93-107. [in Spanish]

[Siedentop, 1994](#) – *Siedentop, D.* (1994). Sport education: Quality P.E. through positive sport experiences. Champaign: Human Kinetics.

[Tortella, Fumagalli, 2017](#) – *Tortella, P., Fumagalli, G.* (2017). The effect of teaching methodologies in promoting physical and cognitive development in children. In R. Meeusen, S. Schaefer, P. Tomporowski, R. Bailey (Eds.). *Physical Activity and Educational Achievement: Insights from Exercise Neuroscience* (pp. 303-316). London: Routledge.

[Urrútia, Bonfill, 2010](#) – *Urrútia, G., Bonfill, X.* (2010). PRISMA declaration: a proposal to improve the publication of systematic reviews and meta-analyses. *Medicina Clínica*. 135(11): 507-511. DOI: 10.1016/j.medcli.2010.01.015

[Van Der Mars, 2006](#) – *Van Der Mars, H.* (2006). Time and learning in physical education. In D. Kirk, M.M. O’Sullivan, D. MacDonald (Eds.). *Handbook of physical education* (pp. 191-213). Thousand Oaks, CA: Sage.

[Vidoni et al., 2013](#) – *Vidoni, C., Lee, C., Azevedo, L.B.* (2013). Fair Play Game: a group contingency strategy to increase students’ active behaviours in physical education. *Journal of Physical Education, Recreation & Dance*. 85(5): 1-15. DOI: 10.1080/03004430.2013.847834

[Vidoni, Ulman, 2012](#) – *Vidoni, C., Ulman, J.D.* (2012). The fair play game: Promoting social skills in physical education. *Strategies*. 25(3): 26-30.

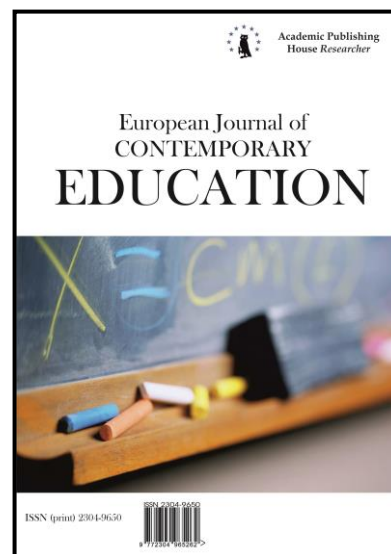
[Vidoni, Ward, 2009](#) – *Vidoni, C., Ward, P.* (2009). Effects of Fair Play Instruction on student social skills during a middle school Sport Education unit. *Physical Education and Sport Pedagogy*. 14(3): 285-310. DOI: 10.1080/17408980802225818

[Wahl-Alexander et al., 2016](#) – *Wahl-Alexander, Z., Sinelnikov, O., Curtner-Smith, M.* (2016). A longitudinal analysis of students’ autobiographical memories of participation in multiple Sport Education seasons. *European Physical Education Review*. 23(1): 25-40. DOI: 10.1177/1356336X15624246



Copyright © 2021 by Academic Publishing
House Researcher s.r.o.
All rights reserved.
Published in the Slovak Republic
European Journal of Contemporary Education
E-ISSN 2305-6746
2021. 10(2): 324-337
DOI: 10.13187/ejced.2021.2.324
www.ejournal1.com

IMPORTANT NOTICE! Any copying, reproduction, distribution, republication (in whole or in part), or otherwise commercial use of this work in violation of the author(s) rights will be prosecuted in accordance with international law. The use of hyperlinks to the work will not be considered copyright infringement.



An Approximation to Mediation from Within. The Case of Secondary Education in Spain

Laura García-Raga ^{a,*}, Roser Grau Vidal ^a, Ramón López Martín ^a

^a University of Valencia, Spain

Abstract

School coexistence is an educational challenge and the implementation of mediation is an essential tool for managing conflicts and improving interpersonal relationships. However, there are few studies that show its impact and even fewer that take into account students' perceptions. In this ex post facto research, we are interested in finding out the ratings provided by students from Spanish secondary schools where mediation takes place, paying special attention to those students who mediate conflicts. Specifically, the aim is to highlight the strengths and weaknesses of mediation from the perspective of the participating students and to detect any significant differences depending on whether or not the student is a mediator, their gender, the educational stage and school year. To this end, 1,198 students answered a validated questionnaire developed ad hoc. As general results, the descriptive and inferential analyses show that there is an overall positive assessment of mediation, even though the students who are mediators provide higher ratings. In addition, there are hardly any differences between boys and girls, ratings are generally more positive in the compulsory secondary school stage and, more specifically, in the first years of secondary school. Regarding initiatives that could strengthen school mediation practices, it is necessary to provide information on mediation services in the education centres, train all students and expand the scope of mediation.

Keywords: mediation, secondary education, student, peer mediator, democratic values, conflict resolution, interpersonal communication, interpersonal relationships.

1. Introduction

Recent studies have stressed the importance of creating relationships based on dialogue, respect and nonviolence. Schools, as settings for the learning of social and citizenship skills, must

* Corresponding author

E-mail addresses: laura.garcia@uv.es (L. García-Raga), roser.grau@uv.es (R. Grau Vidal), ramon.lopez@uv.es (R. López Marín)

commit to the objective of teaching students how to coexist and relate to one another and, consequently, communicate peacefully (García-Raga, López, 2011; Nguyen-Thi et al., 2020).

From this standpoint, promoting democratic values such as peace, cooperation, responsibility and participation should be the main objective as well as an integral part of the school's vision.

Education reforms in most countries have increasingly made coexistence a prime concern and have implemented strategies targeted at improving school climate. One of these strategies is mediation, which entails a process of handling interpersonal conflicts. The conflicting parties volunteer to talk to each other in a confidential manner to transform the situation by themselves with the help of one or two impartial third parties (mediators). Peer mediators create optimal, fair conditions so that the process can be an educational learning experience (Boqué, 2018).

School mediation has been developed over several decades both at the theoretical and applied levels. In the United States, conflict resolution in educational institutions began in the 1960s with two different movements: cooperative learning and the culture of peace and justice. In the 1970s and 1980s, formal mediation programmes were initiated in schools in the USA, Canada, England and New Zealand. The 1980s saw the emergence of the first associations and institutions which tried to coordinate experiences, including the National Association for Mediation in Education and Educators for Social Responsibility. A decade later, programmes began spreading to other countries such as Spain (García-Raga, López, 2007), Germany, Italy and Russia (Konovalov, 2014). In Latin America, it coincided with universal access to basic education (Possato et al., 2016; Chrispino, Chrispino, 2002; Highton, 1996).

Mediation is a way to tackle conflicts peacefully. While its main goal is to develop a culture of peace, the benefits of school mediation go beyond conflict resolution, as pointed out in several empirical studies (Caballero, 2010; Ibarrola-García, Iriarte, 2014; Leonov, Glavatskikh, 2017; Moral, Pérez, 2010; Nix, Hale, 2007; Paulero, 2011; Torrego, Galán, 2008; Turnuklu et al., 2010; Villanueva, Usó; Adrián, 2003) as well as theoretical studies (Bonafé-Schmitt, 2000; Boqué, 2003; García-Raga, López, 2007; García-Raga et al., 2012; Pulido et al., 2013; Tucker, Maunder, 2015). Mediation encourages student participation, strengthens interpersonal relationships, prevents violence and boosts democratic citizenship skills and values (Puig-Gutiérrez, Morales-Lozano, 2015); it also promotes dialogue, decision-making and the assumption of responsibility, among other objectives that are essential for coexistence.

There exist different school mediation models (Konovalov, 2014), but in Spain the most successful mediation practices are those that train secondary education students, aged 12 to 18, to mediate conflicts between their peers. With a long tradition in English-speaking countries (Burrell et al., 2003; Garrard, Lipsey, 2007), these initiatives are based on the idea that "peers are a source of knowledge and active members of the educational community, capable of promoting social and moral development in their schools" (Fernández, 2008: 142). Peer mediators appear to have a positive impact on mediation since they are better than adults at connecting with their peers (Cohen, 2005; Cowie, Fernández, 2006; Nix, Hale, 2007; Torrego, 2013). From this perspective, steps are taken to train a group of students who will listen to other students and help them to propose fair, realistic solutions to conflicts. With students at the forefront, there is an effort to introduce a philosophy of handling conflictive situations by improving negotiation and coexistence among people and their relationship systems (Avilés, 2019). In any case, peer mediators need essential training in communication techniques and the mediation process itself.

So far, very few programmes have attempted to analyse mediation processes from within and examine students' perceptions and opinions (García-Raga et al., 2018; Ibarrola-García, Iriarte, 2013a; Silva, Torrego, 2017). Thus, the aim of this paper is to introduce a renewed analytical perspective by highlighting the importance of its protagonists (students) and compare ratings between peer mediators and non-mediators as well as between different school year levels and different gender. Our findings enable us to assess school mediation practices and suggest improvements that can be considered in different educational settings.

2. Method Objectives

The aim of this study is to examine the impact of school mediation from the perspective of secondary education students. Specific objectives are as follows:

- To gain feedback on school mediation from secondary education students of 18 schools located in different autonomous regions in Spain.
- To highlight the strengths and weaknesses of school mediation from the perspective of students who are taking part in this study.
- To gain a deeper understanding of the main differences between students' perceptions, especially peer mediators' perceptions.
- To detect any significant differences in mediation ratings according to gender, education stage and school year.
- To contribute to the discovery of the most characteristic profile of peer mediators and their role.

Sample

A total of 1,198 students from 18 state secondary schools located in various autonomous regions in Spain participated in the study. As observed in table 1, the regions with the highest participation were Valencia (36.4 %) and Catalonia (12.9 %). A non-probability sampling procedure was used to avoid adverse effects in the study.

Table 1. Sample distribution according to autonomous region

Autonomous Region	Frequency	Percentage
Andalucia	53	4.4
Aragon	17	1.4
Asturias	19	1.6
Balearic Islands	82	6.8
Canary Islands	92	7.7
Castilla – La Mancha	34	2.8
Castilla – Leon	20	1.7
Catalonia	155	12.9
Valencia Community	436	36.4
Galicia	128	10.7
Madrid	118	9.8
Murcia	44	3.7
Total	1198	100.0

Source: authors

Specifically, 541 male students (45.4 %) and 650 female students (54.6 %) took part, making a total of 1,191. Seven participants did not respond to this item. Students attended compulsory secondary education (89.8 %) or upper-secondary education, (10.2 %), called ESO and Bachillerato respectively in Spanish. In Spain, compulsory secondary education ranges from the ages of 12 to 16 while the non-compulsory subsequent stage ranges from the ages of 16 to 18. Different studies (Karatzias et al., 2002; Lino, 2007; Ng, Tsang, 2008; Pozzoli, Gini, 2021) demonstrate that compulsory secondary education is where most conflicts emerge; hence, it is where mediation is most needed. In addition, it is widely known that the maturity level of students is different in both stages, which affects mediation processes. In Table 2 we provide detailed data of the specific sample in our study.

Table 2. Distribution of the sample according to school year level

School year level	Frequency	Percentage
First year of compulsory secondary education (1 st ESO)	212	17.8
Second year of compulsory secondary education (2 nd ESO)	272	22.8
Third year of compulsory secondary education	345	28.9

(3 rd ESO) Fourth year of compulsory secondary education	242	20.3
(4 th ESO) First year of upper secondary education (1 st Bachillerato)	68	5.7
Second Year of upper secondary education (2 nd Bachillerato)	54	4.5

Source: authors

Regarding peer mediators, they represent 7.6 % of all the participants (91 students). In this part of the sample, 57 participants are female and 34 are male. The school year with most mediators is the second year of ESO (27), followed by third and fourth years with 22 and 21 students, respectively. Conversely, in the first year of ESO there are only 9 students and in upper secondary education there are 7 in the first year and 5 in the second year.

Instruments

The instrument used to gather information from students was an ad hoc questionnaire (García-Raga, Grau, 2017). This technique is a frequent procedure within the framework of social sciences. J. Pérez (Pérez, 1991: 106) defines it as “a set of various types of questions, normally prepared systematically and carefully, on the facts and aspects that are of interest for the research or assessment and can be applied in various ways”. Its design is based on educational approaches and objectives for school mediation by various authors that have been previously cited and by the analysis of other questionnaires linked to the topic (Ibarrola-García, Iriarte, 2012).

In a previous study (García-Raga, Grau, 2017) the instrument was subjected to a validation process. A group of ten judges reviewed the construct validation, a well-established procedure for this type of study (Bakieva et al., 2018); they assessed the quality of the instrument based on relevance and pertinence criteria. As a result, the instrument was first fine-tuned. Subsequently, we conducted a pilot study with 153 secondary education students from a state school in Valencia (Spain). The reliability of the instrument, measured by Cronbach's alpha ($\alpha = 0.72$), exceeded the minimum required for non-cognitive tests ($\alpha = 0.72$), thus confirming the metric quality of the scale.

A definitive proposal of 66 Likert-type items was outlined. The questionnaire was structured into three sections with questions or statements, according to the type of respondents: all students (items 1 to 19), students who have used the mediation service (items 20 to 42) and peer mediators (items 43 to 66).

In the mediation-related questions, all respondents have four options to choose from. These are on a Likert-type scale ranging from 1 to 4, in which 1 = strongly disagree, 2 = disagree, 3 = agree and 4 = strongly agree.

Procedure and data analysis

Participants responded through an online platform* and we made a commitment to return the results to each participating school. The Statistical Package for the Social Sciences (SPSS) version 20.0 was used to analyse the information by carrying out descriptive and inferential analysis on the gathered data. Through the questionnaire we gained feedback from students regarding all the components and dimensions of the mediation service provided in schools. Once the distribution of the sample was verified as normal, the ANOVA test was conducted to identify the existence of statistically significant differences in gender and school year level between independent samples.

3. Results

We now present some of the most representative results that allow us to respond to the proposed objectives. To that end, we analyse items 1 to 19 and 43 to 66 of the questionnaire. If we analyse the responses of the entire sample, the items referring to the school's mediation service

* A web tool for online questionnaires [Electronic resource]. URL: <http://www.encuestafacil.com>

(items 5 to 8) demonstrate that a high percentage claim that they do not know what school mediation consists of (65.5 %), whereas 34.5 % claim they do. Specifically, the responses to the item referring to knowledge of the school's mediation service follow the same line in that 33.4 % claim that they know about it, whereas 66.6 % do not. It is noteworthy that 62 % are not aware of peer mediators while 38 % are.

Only 50.5 % have received training compared to 49.5 % who did not. Of those who claim they have received training, the data analysed reveal that the most common training processes include school workshops (74 %), courses held in schools (68.6 %), seminars (67.5 %), training in class (67.5 %) and conferences (65.6 %). On the contrary, if we observe data on peer mediators, we can verify that all participants have received training in this area even though they claim that they are not completely aware of the mediation service in its entirety and depth. This training was mainly received in school-organised workshops and courses (66 %), followed by conferences and seminars on mediation (41 %).

The ranking of mediation (items 9 to 18 on the questionnaire) demonstrates that students show overall agreement on the questions regarding mediation and its usefulness in the school setting. The mean score of each item for peer mediators and non-mediators is reflected in [Table 3](#).

Table 3. Rating of mediation and significant differences between the study groups

Item	Peer mediators (PM)	Non-mediators (NM)	Signific. asymptote bilateral
9. Mediation is used by students in my school to resolve conflicts	3.36	3.13	.086
10. I think that mediation has helped to reduce the number of disciplinary punishments in my school	2.95	2.62	.004*
11. Mediation has increased respect among classmates	2.70	2.55	.386
12. Mediation has encouraged dialogue among classmates	2.86	2.58	.016*
13. Mediation has improved relationships between students and teachers	2.61	2.47	.348
14. Mediation has increased student participation in resolving school conflicts	3.1	2.68	.000*
15. Mediation has helped to resolve minor conflicts that could turn into more serious problems	3.38	2.96	.000*
16. Since school mediation began in my school, teachers can teach better	2.43	2.26	.307
17. I think that mediation has improved school coexistence	3.12	2.69	.000*
18. Conflicts can be resolved using mediation	3.47	3.16	.002*

Source: Authors

* $p < .05$

The most highly ranked items by both groups include item 9 (PM = 3.36; NM = 3.13), which refers to the use of mediation as a resource to resolve conflicts; item 15, which refers to the use of mediation as a tool to resolve minor conflicts that could turn into more serious problems, with a mean score of 3.38 for peer mediators and 2.96 for non-mediators; and item 18, which acquired a score of 3.47 and 3.16 respectively and demonstrates that a large number of students value mediation as a way to resolve conflicts.

Peer mediators rank mediation the most positively. Their ranking for all items exceeds that of non-mediators with significant differences in some items, namely items 14, 15 and 17 (see [Figure 1](#)). In this context, no significant values were found.

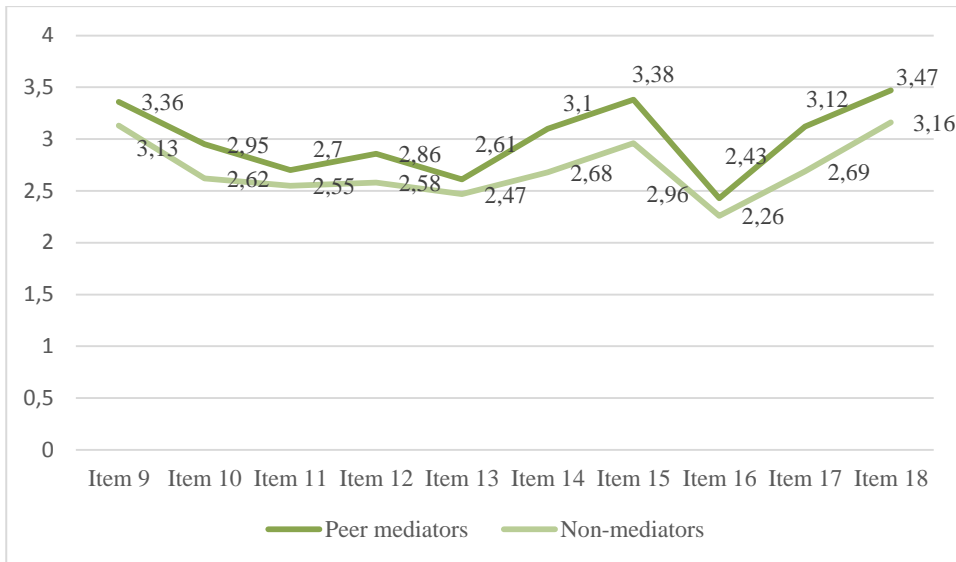


Fig. 1. Rating by peer mediators and non-mediators
Source: authors

Lower-ranked items, but still equally positive, include item 11, which refers to increased respect among classmates (PM = 2.70; NM = 2.55), and item 13, related to improved relationships between students and teachers (PM = 2.61; NM = 2.47).

The first part of the questionnaire ends with item 19: “Would you recommend mediation?”. The results show that neither peer mediators (59.3 %) nor non-mediators (62.6 %) recommend mediation, whereas 36.3 % and 35.7 %, respectively, do consider mediation to be a good strategy to resolve conflicts. As far as peer mediators are concerned, it should be noted that 38.5 % participated in mediation processes (item 43) on one occasion only, followed by 21.5 % who participated on 2 occasions, 9.2 % on 3 occasions, 7.7 % on 4 occasions and 1.5 % on 5 and 7 occasions, respectively.

The most common origin of mediated conflicts (item 44) can be seen in [Figure 2](#). Disagreements account for 62.8 % and rumours account for 60.9 %. Less chosen items, but still with a high percentage, include cultural reasons (33.3 %) and name-calling (32.7 %).

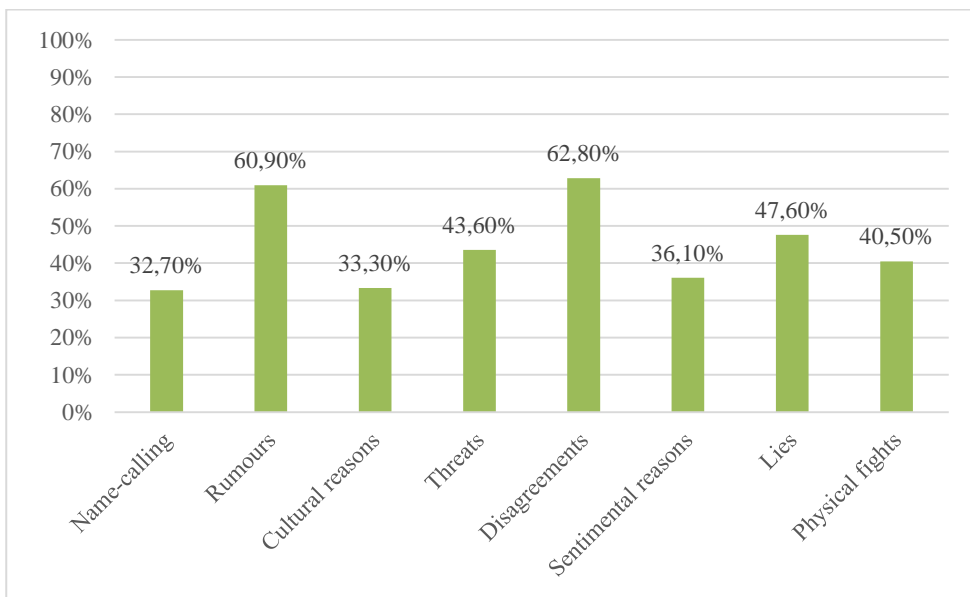


Fig. 2. Origin of conflict
Source: authors

If we delve a little deeper into this aspect, the data obtained indicating the gender variable show that females have dealt with more conflicts based on rumours, disagreements and physical fights, while males have dealt with a larger number of conflicts based on name-calling (Figure 3).

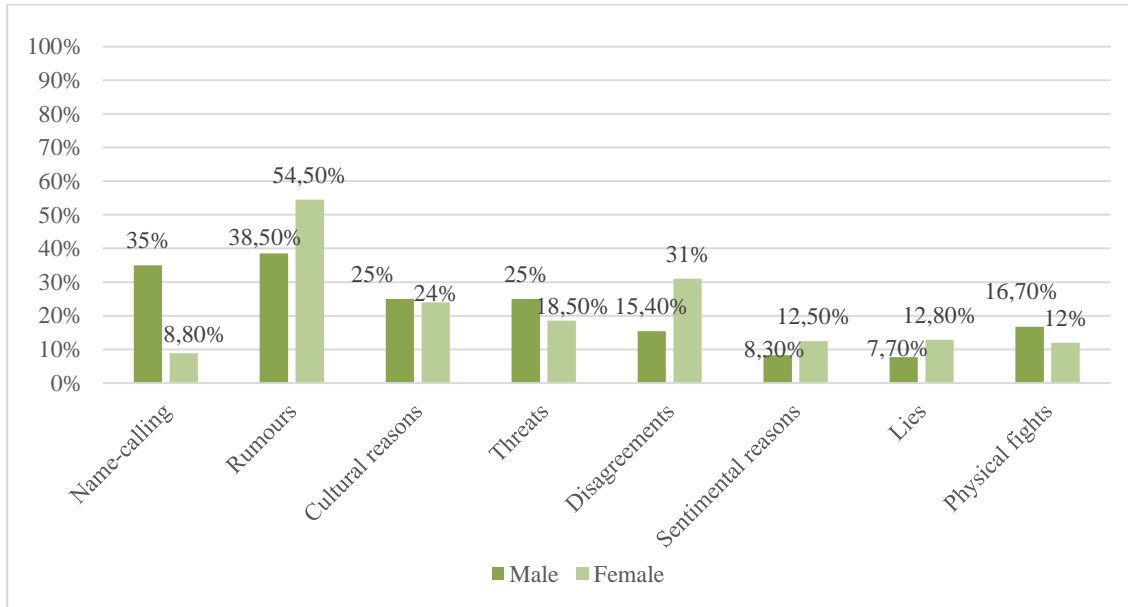


Fig. 3. List of causes of conflict according to gender

Source: authors

Item 45 (“What is the main reason you became a mediator?”) shows that a large part of the sample (36.8 %) did it voluntarily, whereas 20.6 % became mediators because it seemed interesting and 14.7 % were appointed by their peers. The least chosen reasons were regarding a teacher (11.8 %) or other classmates (11.8 %) being mediators.

Items 46 to 66, about rating mediation by peer mediators, are obviously rated positively (Table 4).

Table 4. Rating of mediation by peer mediators

Item	Mean
46. I believe I have the suitable characteristics to be a mediator	3.19
47. I like being a mediator because I am a peaceful person and I feel bad when there are problems	3.01
48. I like being a mediator because my classmates trust me to resolve conflicts	2.99
49. I like being a mediator to collaborate with the teacher	2.78
50. Besides being a mediator I participate in other school activities to improve coexistence in my school	2.69
51. One advantage of being a mediator is that I can miss class hours	2.35
52. I like being a mediator because I feel valued by the teachers	2.58
53. I have felt more responsible since I became a mediator	2.67
54. I have felt criticised for being a mediator	1.78
55. My family understands my work as a mediator	2.93
56. I am satisfied to be a mediator	3.23
57. Being a mediator has helped me to actively participate in school	3.04
58. In mediation processes I have learnt skills that are not taught in school subjects	3.35
59. Being a mediator has helped me to understand other people’s point of view	3.32
60. Being a mediator has helped me to express my feelings	2.74

61. Being a mediator has taught me to listen better to others	3.18
62. Being a mediator has helped me to communicate better with others	3.05
63. Thanks to being a mediator I reflect on different ways to resolve a conflict	3.21
64. Being a mediator has helped me to be more respectful with others	3.09
65. After the experience I would recommend being a mediator to a friend	3.28
66. Being a mediator has helped me in other situations in my life and not only at school (with my family, groups of friends...)	3.22

Source: authors

As we can observe, the highest rated items are item 58 ($X = 3.35$), item 59 ($X = 3.32$) and item 68 ($X = 3.28$). Conversely, the least rated item by far is item 54, which indicates a positive result. Therefore, the overall results show that the feedback provided by peer mediators in 18 schools is positive.

Comparing these responses according to gender, we can affirm that there is no significant difference in any item related to ranking mediation by peer mediators.

However, there are significant differences when we compare the results according to the school year level (Table 5). In item 50, the differences are between third- and first-year students in compulsory secondary education (ESO) since the latter participate more in other activities than the former. Item 57 shows differences between third-year students, who agree that mediation has helped them to participate more in school, and fourth-year students (ESO), as well as first- and second-year students of upper secondary education (Bachillerato), who think otherwise.

Table 5. Rating of mediation by peer mediators according to school year level

Item	School Year level						Sig. ANOVA
	Mean 1 st year ESO	Mean 2 nd year ESO	Mean 3 rd year ESO	Mean 4 th year ESO	Mean 1 st year Bachillerato	Mean 2 nd year Bachillerato	
Item 46	3.29	3.48	2.95	3.14	3.29	2.80	.119
Item 47	3.43	3.00	2.90	3.31	3.00	2.60	.576
Item 48	3.29	3.09	2.84	2.93	2.71	3.20	.698
Item 49	3.00	3.14	2.86	2.47	2.57	2.00	.053
Item 50	3.33	3.00	2.19	2.84	2.14	2.80	.024*
Item 51	2.43	2.50	2.05	2.68	2.57	1.40	.125
Item 52	3.14	2.77	2.38	2.58	2.43	2.00	.369
Item 53	2.86	2.95	2.50	2.53	2.57	2.60	.545
Item 54	1.57	2.14	1.77	1.58	1.57	1.60	.404
Item 55	3.00	3.09	2.91	2.74	2.86	3.00	.845
Item 56	3.14	3.41	3.23	3.05	3.43	3.00	.769
Item 57	2.86	3.18	3.36	2.79	2.71	2.60	.044*
Item 58	3.57	3.41	3.45	3.16	3.29	3.20	.664
Item 59	3.43	3.27	3.59	3.00	3.57	3.00	.141
Item 60	2.71	2.82	2.68	2.94	2.57	2.20	.613
Item 61	3.14	3.32	3.14	3.11	3.29	3.00	.943
Item 62	3.00	3.09	3.09	2.95	2.86	2.80	.970
Item 63	3.29	3.18	3.32	3.05	3.43	3.00	.831
Item 64	3.14	3.23	3.18	2.89	3.00	2.80	.723
Item 65	2.86	3.41	3.41	3.16	3.29	3.20	.628
Item 66	2.86	3.45	3.32	3.00	3.57	2.60	.190

Source: Authors

* $p < .05$

4. Discussion

In accordance with our first objective on how secondary education students perceive school mediation, we must highlight the favourable opinion they have, as it is deemed to be beneficial in conflict resolution and in preventing violent situations, as L. Villanueva, I. Usó, J.E. Adrián (Villanueva et al., 2013) indicated in their study. S. Ibarrola-García, C. Iriarte (Ibarrola-García, Iriarte, 2013b) also share this idea even though their study is focused on the perceptions of teacher mediators. It is conflict management under the peer mediation model, as revealed by B. Hansberry, C. Hansberry (Hansberry, Hansberry, 2018), which will lead to positive outcomes in the school setting. Extending this mediation model to other schools and even to other countries, considering their own particularities and regulations, could lead to a more positive school climate.

However, when asked if they would recommend mediation processes, the results are not as positive. This might be because they have not participated in these processes or they might be unaware of the existence of mediation services; only 34.5 % of students admit they know about this service (38 % in the case of peer mediators). As stated in M.P. García-Longoria (García-Longoria, 2002), students need to be informed about the mediation service that exists in their schools so that they can use it when needed. Providing information on mediation services is an aspect that needs to be improved, as underscored in other studies that have examined experiences of this nature (Pulido et al., 2014). Information could be made available at the beginning of the academic year through workshops, posters, videos and leaflets. Schools could also exchange mediation experiences and raise awareness of the educational potential.

These data and the findings that claim that only half of the students (50.5 %) have received training entice us to propose a change of the current model. It should be remembered that, in general, only those students who are going to be mediators receive information through workshops and courses organised by their schools or perhaps a specialised seminar or conference. But if the objective is to build a culture of mediation that creates a climate of coexistence in the education community, training should be targeted at all students; the mediation team may be highly trained but “if the rest of the education community is unaware of basic mediation aspects, the likelihood of limited use increases” (Boqué, 2018: 78).

With reference to our second objective referring to highlighting the strengths and weaknesses of mediation, we stress that conflict resolution must be one of the virtues of mediation because the solutions adopted are assumed to be positive for the affected students (Sezen, Bedel, 2015). However, the most important aspect is not the solution, it is the learning of conflict management skills that mediation programmes often promote in students, as shown in the meta-analysis conducted by F. Turk (Turk, 2018). Fostering a positive attitude towards the development of interpersonal relationships is an indisputable benefit of the implementation of these processes, and the school itself is a privileged setting for students to build positive social relationships by reinforcing ties with their peers. What is more, it is constructive for students to perceive an improvement in teacher-student relationships, even though it is one of the items that attained a lower score.

As stated previously, the observed weaknesses should be mentioned in order to improve. We discovered that in addition to the lack of information provided in schools regarding mediation services, there is a shortage of awareness policies. This makes it difficult to build a culture of mediation to motivate many students; we are a long way from designing models suitable for training a large part of the education community and spreading a cooperative attitude in favour of mediation processes.

Regarding the objective of gaining a deeper understanding of the main differences between peer mediators and non-mediators, it has been demonstrated that mediators show more positive opinions. This situation is understandable since those who have first-hand experience in school mediation are more capable of detecting its educational potential, as shown in other studies (Andronnikova, Radzikhovskaya, 2020; Hansberry, Hansberry, 2018). Undoubtedly, mediation provides valuable lessons for being a decent person and living with others; in the case of mediators, it also provides practical tools that strengthen these skills beyond the school setting. Peer mediators, as indicated above, promote communicative and participatory skills. The advantages have also been detected in other studies. Research conducted by C. Cassinerio, P.S. Lane-Garon (Cassinerio, Lane-Garon, 2006) focused on how school mediation improves school climate, prevents violent situations and develops certain skills and perceptions such as empathy in students. It should be noted that the study carried out by S. Ibarrola-García, C. Iriarte (Ibarrola-

García, Iriarte, 2013a), showed that mediation leads to emotional, social cognitive and moral learning in mediators.

While we understand that the study of the profile of peer mediators demands more extensive research, in our attempt to approach this reality we want to highlight that a mediator should develop skills such as being patient, reflexive, empathetic, unbiased, assertive, trustworthy, as well as mindful of opportunities for personal growth. Above all, mediators need to have a great ability to establish a conversation to share opinions, needs and wishes. It is true that in our study a great majority of peer mediators are in the second year of compulsory secondary education (ESO) and are mostly female. This should be considered when making an overall assessment, although it is quite common for them to acknowledge that they feel confident in carrying out this task and value positively the recognition towards their work by their classmates and teachers.

There were no differences detected in terms of the positive assessment of mediation processes based on participants' gender (regardless of whether they are mediators or non-mediators). However, as observed in other studies (Moral, Pérez, 2010), feedback provided by female students was slightly more positive than male students' feedback; perhaps the roles transmitted by families and the context of associating helping behaviour with the female role may explain these findings (Naylor, Cowie, 1999). Differences found regarding the source of conflict are interesting from the peer mediator perspective since female mediators have attended to more conflicts caused by rumours, disagreements and physical fights than their male counterparts, who have attended to a larger number of name-calling conflicts, which is consistent with studies carried out by J. Ng, S. Tsang (Ng, Tsang, 2008). A future line of analysis could be based on a more in-depth approach to the factors that influence these differences. Students who have conflicts do not choose voluntarily their mediators in many schools; the mediator could be a female or male regardless of the situation. It might be more insightful to analyse if conflicts differ according to the gender variable. There are studies that detect differences, underscoring that male students usually show more physical aggression whereas female students tend to show more relational aggression. (Murray-Close, Ostrov, 2009; Toldos, 2005).

5. Conclusion

Finally, regarding differences between school year levels, it can be observed that the overall assessment is more positive in the first years of compulsory secondary education, which can be justified because the sample of students who turn to mediation is generally higher in those years. Broadly speaking, students in the first years of secondary education use mediation services more because there are more school conflicts, as indicated in studies by J.M. Avilés, I. Monjas (Avilés, Monjas, 2005), whose results show that more individual aggressors appear between the ages of 13 and 14 and that these numbers decrease with age. In the upper secondary education stage (Bachillerato) students usually show maturity in handling their conflicts, they are also more interested and responsible towards everything that happens at school.

By synthesising the data presented in the study, we found that school mediation is considered advantageous and a top-notch educational opportunity for students. It makes it easier for peer mediators and non-mediators to tackle their own conflicts and learn different interpersonal and social skills. In any case, we coincide with A.J. Morales, C. Caurín (Morales, Caurín, 2014), stating "mediation still hasn't developed its potential" (p. 6) because, among other issues, it does not avoid underuse in other settings (Ballard et al., 2011) beyond conflict management among students, without addressing structural conflicts linked to traditions rooted in the so-called school culture.

Accordingly, we think the trajectory of school mediation has only just begun, especially if we are able to head towards building a culture of mediation that reaches the entire education community. A culture that means a proactive attitude towards tolerance, the acceptance of the richness of diversity, active listening, and ultimately, the enhancement of a special awareness, not only of the training of conflict management skills, but also a privileged educational aid to improve coexistence. We are committed to the training capacity and the transformative character of mediation, which transcends the limited version of a mere instrument for conflict resolution.

In short, even though students' perspectives demonstrate that schools promote coexistence based on mediation, we must reflect on these results and strive for more in-depth research on how to effectively implement proactive strategies for positive conflict management at a wider scale. And

even more so in the current pandemic, in which the unreplaceable role of schools as settings for coexistence has been highlighted.

5. Acknowledgements

This research is funded by Conselleria de Educació, Cultura y Deporte de la Generalitat Valenciana (Spain) [Council of Education, Culture and Sports of Valencia Regional Government]. Project N° GV2015-048 “Evaluación de la mejora de la convivencia en los centros educativos a partir de la implementación de los proyectos de mediación escolar en el ámbito estatal” [Assessment of the improvement of coexistence in schools based on the implementation of school mediation projects at the national level].

References

- [Andronnikova, Radzikhovskaya, 2020](#) – *Andronnikova, O.O., Radzikhovskaya, O.E.* (2020). Specifics of the attitude of students with deviant behaviour to school mediation service. *Journal of Siberian Federal University. Humanities and Social Sciences*. 13(9): 1517-1528. DOI: 10.17516/1997-1370-0660
- [Avilés, 2019](#) – *Avilés, J.M.* (Coord.) (2019). Los sistemas de apoyo entre iguales: de los equipos de ayuda a la cibermentoría [Peer support systems: from support teams to cybermentoring]. Barcelona: Graó. [in Spanish]
- [Avilés, Monjas, 2005](#) – *Avilés, J.M., Monjas, I.* (2005). Estudio de incidencia de la intimidación y el maltrato entre iguales en la educación secundaria obligatoria mediante el cuestionario CIMEI [Study of the incidence of intimidation and bullying in compulsory secondary education using the CIMEI questionnaire] (J.M. Avilés, 1999). *Anales de psicología*. 21(1): 27-41. [in Spanish]
- [Bakieva et al., 2018](#) – *Bakieva, M., Jornet-Meliá, J.M., González-Such, J., Leyva Barajas, Y.E.* (2018). Colegialidad docente: validación lógica del instrumento para autoevaluación docente en España y México [Teacher collegiality: logical validation of the instrument for teacher self-evaluation in Spain and Mexico]. *Estudios sobre educación*. 34: 99-127. [in Spanish]
- [Ballard et al., 2011](#) – *Ballard, R.H., Holtzworth-Munroe, A., Applegate, A.G., D’Onofrio, B.* (2011). Factors affecting the outcome of divorce and paternity mediations. *Family Court Review*. 49(1): 16-33.
- [Bonafé-Schmitt, 2000](#) – *Bonafé-Schmitt, J.* (2000). La médiation scolaire par les élèves [School mediation by students]. Paris: ESF. [in Spanish]
- [Boqué, 2003](#) – *Boqué, M.C.* (2003). Cultura de mediación y cambio social [Culture of mediation and social change]. Barcelona: Gedisa. [in Spanish]
- [Boqué, 2018](#) – *Boqué, M.C.* (2018). La mediación va a la escuela [Mediation goes to school]. Madrid: Narcea. [in Spanish]
- [Burrell et al., 2003](#) – *Burrell, N.A., Zirbel, C.S., Allen, M.* (2003). Evaluating peer mediation outcomes in educational settings: a meta-analytic review. *Conflict Resolution Quarterly*. 21(1): 7-26.
- [Caballero, 2010](#) – *Caballero, M.J.* (2010). Convivencia escolar: un estudio sobre buenas prácticas [School coexistence: a study on good practices]. *Revista de Paz y Conflictos*. 3: 154-169.
- [Cassinerio, Lane-Garon, 2006](#) – *Cassinerio, C., Lane-Garon, P.S.* (2006). Changing school climate one mediator at a time: year-one analysis of a school-based mediation program. *Conflict Resolution Quarterly*. 23(4): 447-460.
- [Chrispino, Chrispino, 2002](#) – *Chrispino, A., Chrispino, R.S.P.* (2002). Políticas educacionais de redução da violência: mediação do conflito escolar [Education policies for reducing violence: mediation of school conflict]. São Paulo: Editora Biruta. [in Spanish]
- [Cohen, 2005](#) – *Cohen, R.* (2005). Students resolving conflict: peer mediation in schools. Tucson, AZ: Good Year Books.
- [Cowie, Fernández, 2006](#) – *Cowie, H., Fernández, F.J.* (2006). Ayuda entre iguales en la escuela: desarrollo y retos [Peer support at school: development and challenges]. *Revista Electrónica de Investigación Psicoeducativa*. 4(2): 291-310. [in Spanish]
- [Fernández, 2008](#) – *Fernández, I.* (2008). Los programas de ayuda para la mejora de la convivencia en instituciones educativas [Support programmes for improving coexistence in educational institutions]. *Bordón. Revista de Pedagogía*. 60(4): 137-150. [in Spanish]

García-Longoria, 2002 – *García-Longoria, M.P.* (2002). La mediación escolar, una forma de enfocar la violencia en las escuelas. *Alternativas. Cuadernos de Trabajo Social*. 10: 319-327.

García-Raga et al., 2012 – *García-Raga, L., Martínez, M.J., Sahuquillo, P.* (2012). Hacia una cultura de convivencia. La mediación como herramienta socioeducativa [Towards a culture of coexistence. Mediation as a socio-educational tool]. *Cultura y Educación*. 24(2): 207-217. [in Spanish]

García-Raga et al., 2018 – *García-Raga, L., Bo, R.M., Mondragón, J.* (2018). Significado y sentido de la mediación escolar desde la perspectiva del alumnado mediador de secundaria [Meaning and sense of school mediation from the perspective of secondary school student mediators]. *Revista Española de Orientación y Psicopedagogía*. 29(3): 79-93. [in Spanish]

García-Raga, Grau, 2017 – *García-Raga, L., Grau, R.* (2017). Diseño y validación de un instrumento para evaluar el impacto de la mediación escolar [Design and validation of an instrument for assessing the impact of school mediation]. In M.C. Pérez-Fuentes, J.J. Gázquez, M.M. Molero, Á. Martos, M.M. Simón, A.B. Barragán (Coord.), *La Convivencia Escolar: Un acercamiento multidisciplinar [School Coexistence: A Multidisciplinary Approach]*. Vol. II, 93-99. [in Spanish]

García-Raga, López, 2007 – *García-Raga, L., López, R.* (2007). Mediación y sistema escolar. La convivencia como horizonte [Mediation and the school system. Coexistence as a horizon], in R. López Martín (coord.), *Las múltiples caras de la mediación: y llegó para quedarse [The many faces of mediation: and it got here to stay]* (pp. 71-109). Universitat de València. [in Spanish]

García-Raga, López, 2011 – *García-Raga, L., López, R.* (2011). Convivir en la escuela. Una propuesta para su aprendizaje por competencias [Living together at school. A proposal for skill-based learning]. *Revista de educación*. 356: 531-555. DOI: 10-4438/1988-592X-RE-2010-356-050 [in Spanish]

Garrard, Lipsey, 2007 – *Garrard, W.M., Lipsey, M.W.* (2007). Conflict resolution education and antisocial behavior in U.S. schools: a meta-analysis. *Conflict Resolution Quarterly*. 25(1): 9-38. DOI: 10.1002/crq

Hansberry, Hansberry, 2018 – *Hansberry, B., Hansberry, C.* (2018). How to do restorative peer mediation in your school. London and Philadelphia: Jessica Kingsley Publisher.

Highton, 1996 – *Highton, E.I.* (1995). Mediación para resolver conflictos [Mediation for resolving conflicts]. Buenos Aires: AD-HOC. [in Spanish]

Ibarrola-García, Iriarte, 2012 – *Ibarrola-García, S., Iriarte, C.* (2012). La convivencia escolar en positivo: mediación y resolución de conflictos [Positive school coexistence: mediation and conflict resolution]. Madrid: Pirámide. [in Spanish]

Ibarrola-García, Iriarte, 2013a – *Ibarrola-García, S., Iriarte, C.* (2013). Percepción de la mejora personal y social en los alumnos mediadores y mediados y profesores mediadores [Perception of personal and social improvement in peer mediators and teacher mediators]. *Campo Abierto*. 32(2): 117-143. [in Spanish]

Ibarrola-García, Iriarte, 2013b – *Ibarrola-García, S., Iriarte, C.* (2013). La influencia positiva de la mediación escolar en la mejora de la calidad docente e instituciones: percepciones del profesor mediador [Positive influence of school mediation in the quality in teaching and institutions]. *Profesorado. Revista de currículum y formación del profesorado*. 17(1): 368-384. [in Spanish]

Ibarrola-García, Iriarte, 2014 – *Ibarrola-García, S., Iriarte, C.* (2014). Desarrollo de las competencias emocional y sociomoral a través de la mediación escolar entre iguales en educación secundaria [Development of emotional, social and moral skills through peer mediation in secondary education]. *Revista Currículum*. 27: 9-27.

Karatzias et al., 2002 – *Karatzias, A., Power, K.G., Swanson, V.* (2002). Bullying and victimization in Scottish Secondary Schools: Same or separate entities? *Aggressive Behavior*. 28: 45-61.

Konovalov, 2014 – *Konovalov, A.Y.* (2014). Mediation in the Education System: a Review of the Experience of Different Countries. *Psychological-Educational Studies*. 6(3):18-30. DOI: 10.17759/psyedu.2014060303

Leonov, Glavatskikh, 2017 – *Leonov, N.I., Glavatskikh, M.M.* (2017). Changing the image of a conflict situation while training school students in mediation skills: State of the Art. *Psychology in Russia*. 10(2): 165-178.

Lino, 2007 – Lino, E. (2007). Acoso escolar: pautas para reconocer y paliar este problema en secundaria [School bullying: tips to recognise and alleviate this problem in secondary education]. *Revista Aula*. 167: 38-41.

Moral, Pérez, 2010 – Moral, A., Pérez, M. (2010). La evaluación del programa de prevención de la violencia estructural en la familia y en los centros escolares [The assessment of the prevention programme for structural violence in the family and schools]. *Revista Española de Orientación y Psicopedagogía (REOP)*. 21(1): 25-36. [in Spanish]

Morales, Caurín, 2014 – Morales, A.J., Caurín, C. (2014). Espacios de entendimiento: percepción del conflicto y mediación escolar [Spaces of understanding: perception of school conflict and mediation]. *Scripta Nova. Revista Electrónica de Geografía y Ciencias Sociales*. 496(6):1-20. [in Spanish]

Murray-Close, Ostrov, 2009 – Murray-Close, D., Ostrov, J.M. (2009). A longitudinal study of forms and functions of aggressive behavior in early childhood. *Child Development*. 80: 828-842. DOI: 10.1111/j.1467-8624.2009.01300

Naylor, Cowie, 1999 – Naylor, P., Cowie, H. (1999). The effectiveness of peer support systems in challenging school bullying: the perspectives and experiences of teachers and pupils. *Journal of Adolescence*. 22: 467-479.

Ng, Tsang, 2008 – Ng, J., Tsang, S. (2008). School Bullying and the Mental Health of Junior Secondary School Students in Hong Kong. *Journal of School Violence*. 7(2): 3-20. DOI: 10.1300/J202v07n02_02

Nguyen-Thi et al., 2020 – Nguyen-Thi, M., Huynh, V., Giang, T., Bui, H. (2020). Many Social Problems in Vietnam Stem from the Communication Problems among High School Students While No School Counseling Support is Provided – the Urgent Need of Forming School Counseling Model for Vietnamese High School Students. *European Journal of Contemporary Education*. 9(1): 102-113. DOI: 10.13187/ejced.2020.1.102

Nix, Hale, 2007 – Nix, C., Hale, C. (2007). Conflict within the structure of peer mediation: an examination of controlled confrontation in at-risk school. *Conflict Resolution Quarterly*. 24(3): 327-348.

Paulero, 2011 – Paulero, R. (2011). Alumnos mediadores: construyendo la paz [Peer mediators: building peace]. *Revista Chilena de Derecho y Ciencia Política*. 1(2): 89-104. [in Spanish]

Pérez, 1991 – Pérez, J. (1991). Pedagogía Experimental. La medida en Educación [Experimental Pedagogy. The measure in education]. Madrid: UNED. [in Spanish]

Possato et al., 2016 – Possato, B.C., Rodríguez-Hidalgo, A.J., Ortega-Ruiz, R., Zan, D.J.P. (2016). O mediador de conflitos escolares: experiências na América do Sul [The school conflict mediator: experiences in South America]. *Psicología Escolar e Educacional*. 20(2): 357-66. [in Spanish]

Pozzoli, Gini, 2021 – Pozzoli, T., Gini, G. (2021). Longitudinal Relations between Students' Social Status and Their Roles in Bullying: The Mediating Role of Self-Perceived Social Status. *Journal of School Violence*. 20(1): 76-88. DOI: 10.1080/15388220.2020.1850462

Puig-Gutiérrez, Morales-Lozano, 2015 – Puig-Gutiérrez, M., Morales-Lozano, J.A. (2015). La formación de ciudadanos: conceptualización y desarrollo de la competencia social y cívica [The training of citizens: conceptualisation and development of social and civic skills]. *Educación XX1*. 18(1): 259-282. DOI: 10.5944/educXX1.18.1.12332 [in Spanish]

Pulido et al., 2013 – Pulido, R., Martín-Seoane, G., Lucas-Molina, B. (2013). Orígenes de los programas de mediación escolar: distintos enfoques que influyen en esta práctica restaurativa [Origins of school mediation programmes: different approaches that influence this restorative practice]. *Anales de Psicología*. 29(2): 385-392. [in Spanish]

Pulido et al., 2014 – Pulido, R., Calderón, S., Martín-Seoane, G., Luas-Molina, B. (2014). Implementación de un programa de mediación escolar: análisis de las dificultades percibidas y propuestas de mejora [Implementation of a school mediation programme: analysis of perceived difficulties and proposals for improvement]. *Revista Complutense de Educación*. 25(2): 375-392. [in Spanish]

Sezen, Bedel, 2015 – Sezen, B., Bedel, A. (2015). The investigation of the effect of negotiation and mediation training on interpersonal problem-solving approaches and anger of adolescents. *Education and Science*. 182(40): 63-75.

Silva, Torrego, 2017 – Silva, I., Torrego, J.C. (2017). Percepción del alumnado y profesorado sobre un programa de mediación entre iguales [Perception of students and teachers regarding a peer mediation programme]. *Qualitative Research in Education*. 6(2): 214-238. DOI:10.17583/qre.2017.2713 [in Spanish]

Toldos, 2005 – Toldos, M.P. (2005). Sex and age differences in self-estimated physical, verbal and indirect aggression in Spanish adolescents. *Aggressive Behavior*. 31: 13-23.

Torrego, 2013 – Torrego, J.C. (Coord.) (2013). La ayuda entre iguales para mejorar la convivencia escolar [Peer support to improve school coexistence]. Madrid: Narcea. [in Spain]

Torrego, Galán, 2008 – Torrego, J.C., Galán, A. (2008). Investigación evaluativa sobre el programa de mediación de conflictos en centros escolares [Evaluative research on a conflict mediation programme in schools]. *Revista de Educación*. 347: 369-394. [in Spain]

Tucker, Maunder, 2015 – Tucker, E., Maunder, R. (2015). Helping children to get along: teachers' strategies for dealing with bullying in primary schools. *Educational Studies*. 41(4): 466-470.

Türk, 2018 – Türk, F. (2018). Evaluation of the effects of conflict resolution, peace education and peer mediation: a meta-analysis study. *International Education Studies*. 11(1): 25-43.

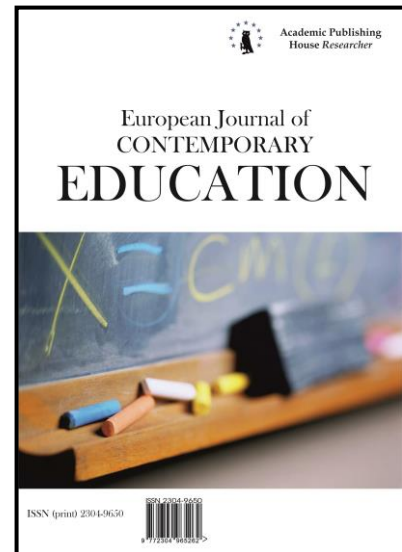
Turnuklu et al., 2010 – Turnuklu, A., Kaçmaz, T., Gurler, S., Türk, F. (2010). The effects of conflict resolution and peer mediation training on Turkish elementary school students' conflict resolution strategies. *Journal of Peace Education*. 7(1): 30-45. DOI: 10.1080/1740020090337092

Villanueva et al., 2013 – Villanueva, L., Usó, I., Adrián, J.E. (2013). Los programas de mediación entre iguales: una herramienta eficaz para la convivencia escolar [Peer mediation programmes: an effective tool for school coexistence]. *Apuntes de Psicología*. 31(2): 165-171.



Copyright © 2021 by Academic Publishing
House Researcher s.r.o.
All rights reserved.
Published in the Slovak Republic
European Journal of Contemporary Education
E-ISSN 2305-6746
2021. 10(2): 338-358
DOI: 10.13187/ejced.2021.2.338
www.ejournal1.com

IMPORTANT NOTICE! Any copying, reproduction, distribution, republication (in whole or in part), or otherwise commercial use of this work in violation of the author(s) rights will be prosecuted in accordance with international law. The use of hyperlinks to the work will not be considered copyright infringement.



Internet Addiction Scale: A Parametric Study through the EFA and Polychoric Correlation Matrices

Arturo García-Santillán ^{a,*}, Esmeralda Mexicano-Fernández ^b, Violetta S. Molchanova ^{c,d}

^a UCC Business School at Universidad Cristóbal Colón, Veracruz, México

^b Medical Research Center at Universidad Cristóbal Colón, Veracruz, México

^c Cherkas Global University (International Network Center for Fundamental and Applied Research), Washington, USA

^d Volgograd State University, Volgograd, Russian Federation

Abstract

The purpose of the study is to determine the degree of Internet addiction in engineering students. It takes as a theoretical reference the scale proposed by Young (1998), which establish the criteria and ranges of addiction. The instrument is in Likert format with responses ranging from 1 (rarely) to 5 (always). The participants were 306 students of the Engineering career enrolled in the different school grades of the Technological Institute of Tierra Blanca, Veracruz in the 2020–2021 school year. For data analysis, the statistical technique of exploratory factor analysis with extraction of principal components and Varimax rotation is used. In addition, for instruments designed with Likert scales, it is necessary to use the Polychoric Correlation matrices for factor analysis (Richaud, 2005; Ogasawaras, 2011). The main findings are: a factorial structure of six factors was obtained, which explains 63.1 % of the total variance and is in accordance with Young's proposal (1998), however the indicators are integrated differently in each factor. The level of internet addiction of the students does not fall within the normal range; the highest percentage is mild, which does not generate an alert in which immediate attention should be paid. It was also found that there is no difference in internet addiction in relation to gender.

Keywords: internet, addiction, clinical disorder, polychoric matrices.

1. Introduction

Background and problem statement

With the emergence of information and communication technologies (ICTs), there has undoubtedly been a great advance in all human activities worldwide. Of course, the different

* Corresponding author

E-mail addresses: agarcias@ucc.mx (A. García-Santillán)

applications in which ICTs are integrated contributed to the innovation of business, government, educational, cultural and domestic sectors to name a few.

Given this, one might think that the Internet has undoubtedly facilitated communication in all aspects of human life. Said in this way, we could think that technologies per se constitute an important bridge for communications, but it also opens the possibility of falling into addictions such as the internet itself, video games, mobile telephony and everything that uses technology in what we now call the digital era.

In this regard, Griffiths (1995) has been pointed out as one of the pioneers in defining technological an addiction as those in which excessive use of technology intervenes. In the same idea, Goldberg (1995) another pioneer, establishes criteria for diagnosing internet addiction disorder. Later, Young (1998) established the criteria for diagnosing Internet Addiction Syndrome (Info Addiction Disorder [IAD]), which were adapted from the criteria used to diagnose Pathological Gambling.

Hence, a question arises in the following terms: If technology generates addiction and this in turn constitutes a bridge for Internet access, and if we consider that the student is permanently in school activities that link him to these technologies, then:

QR1 Do the professional-level students who study engineering show symptoms of internet addiction? In other words, what is the degree of addiction to the internet in engineering students?

QR2. Do the data collected for the empirical study constitute an identity matrix? And QR3. Does the degree of Internet addiction in students differ by gender? These questions lead us to establish the objectives of the study: O1. Determine the degree of internet addiction that is present in engineering students; O2. Analyze if the data matrix is not an identity matrix and O3. Determine if the degree of internet addiction in students differs by gender.

It also seeks to demonstrate: H1: The degree of addiction to the internet that exists in engineering students is normal; H2: The data matrix is not an identity matrix and H3: The degree of internet addiction that exists in engineering students differs by gender.

2. Literature Review

This empirical study is aligned with the theory of Internet addiction proposed by Young (1996), who defined the criteria to identify this phenomenon in people. She considers that addiction is a deterioration in the control of the use of the Internet and that the "netdependent" person distorts her professional, family and of course personal purposes, precisely because of excessive use of the Internet. The criteria defined in the scale designed by Young (1998) are:

- 1 Do you spend more time than you think you should surfing the net?
- 2 Do you think you would have a problem if you reduced the time you spend on the Internet?
- 3 Have your relatives complained about the hours you spend on the computer?
- 4 Is it hard for you to stay off the web for several days in a row?
- 5 Do your relationships suffer from spending many hours connected to the computer?
- 6 Are there areas or files on the network that you find difficult to resist?
- 7 Do you have problems controlling the impulse to purchase products and services offered on the web?
- 8 Have you tried unsuccessfully to reduce your use?
- 9 Do you get much of your life pleasure from being online?

Regarding the state of the art, we can point out that in recent decades, some researchers have been concerned with understanding and explaining the phenomenon of Internet addiction and what it derives from. This includes video games and mobile telephony, among other issues (Echeburúa, Corral, 1994; Echeburúa, Amor y Cenea, 1998; Davis, 2001; Estallo, 2001; Becoña, 2006; Estévez et al., 2009).

In the same way, in relation to addiction to the internet or technology -also called cyber addiction-, it has been defined in many different ways as referred by Terán (2019). An example of this: addiction to new technologies, compulsive use of the internet, including pathological internet use and addiction to screens to name a few terms.

In relation to this phenomenon, psychiatrist Ivan Goldberg (1995, cited in Terán 2019) proposed a series of criteria to diagnose internet addiction disorder. Together with the Griffiths (1995), he is seen as a pioneer in defining technological addictions.

An important theoretical reference on this issue has been Dr. Kimberly Young, a psychiatrist at the University of Pittsburgh. Young (1997, 1998) has referred that the problem is not only physical but also psychological. It is derived from internet abuse, that is, excessive use of the computer. It also generates behavioral, physiological and cognitive symptoms in users. In another study by Young (1996) she identified that 51 % of the people surveyed were prone to occupational problems, 52 % were prone to financial problems and a higher percentage (58 %) to academic problems.

However, Carbonell, Fuster, Chamarro and Oberts, (2012) have reported that Internet addiction is associated with the use and time in which users are connected, but that it does not necessarily generate psychological damage. According to them, it has not been shown that there is a cause-effect relationship between connection time and the probable psychological problems of the individuals

The evolution of modern society has led to internet addiction in users of information and communication technologies. Excessive use of technological tools at work, at home, in academic educational institutions, among others, have constituted the door for the use of computers (Griffiths, 2000; Muñoz-Rivas et al., 2003; Johansson, Götestam, 2004; García del Castillo et al., 2008; Greenfield, 2009).

In turn, Davis (2001) classified internet addiction according to the following parameter: Primary addictions, those that correspond to online games on computers, those related to the virtual search for friendships or affective relationships. On the other hand, Secondary Addictions are those whose impulses are focused on online shopping, connecting to the stock markets, gambling and addiction to pornography and virtual sex. A study by Gracia et al. (2002) applied an online test to 1664 users. In their findings, they found recurring thoughts in users that forced them to stay connected to the internet, in addition to experiencing feelings of guilt. They even identified a low social interaction, hence they looked for chats to interact in addition to pornographic pages. This leads to work and school problems in these users.

Chak and Leung (2004) applied an online survey to 722 students who showed that respondents with a greater need to want to be connected to the internet, showed more shyness and little faith. They maintained the firm belief of having control over other people and they place their trust in luck to determine their own life course. In addition, they found that full-time students are more likely to be addicted to the Internet because they have free, unlimited access and a flexible schedule.

Internet addiction grows as they spend many hours connected to the computer, be it due to addiction to games or other topics that have already been mentioned. Addicted users show suicidal ideas, irritability, and affective disorders with antisocial characteristics. This is demonstrated by the work of Cruzado, Matos and Kendall (2006) who carry out a study of 30 patients diagnosed as addicted to the internet. Some had a history of family dysfunction; others had pulmonary tuberculosis and poor school performance. This last trait agrees with data collected by Sánchez-Carbonell et al., (2008), as well as similar characteristics found by Rial et al. (2015) of family dysfunction and low academic performance.

The use of the internet makes it easier for the individual to show himself as he is, as long as it anonymously (Cruzado et al., 2006; Jimenez, Pantoja, 2007; Balaguer, 2008; Beranuy et al., 2009; Echeburúa, 2016; Caro, Plaza, 2016). Likewise, it allows the individual to establish or maintain virtual relationships in a fluid way, which implies spending more time than expected using the internet (Young, 1998; Luengo, 2004; Sánchez-Carbonell et al., 2008; Balaguer, 2008; Beranuy et al., 2009; Carbonell et al., 2012; Pérez del Río, 2014; Araujo, 2016; Caro, 2017; Marín-Cipriano, 2018).

Alcohol and gambling have been the gateway to addiction. These activities are accompanied by a sense of pleasure because they generate adrenaline. Internet addiction is similar: it is pleasant and can be used by introverts as a mechanism to evade reality. By becoming immersed in the web, they satisfy their needs indirectly. However, being connected to the internet for a long time can lead to low self-esteem, therefore their way of relating in reality will be superficial and they are probably short-term or unstable relationships.

There is a tendency to think that substance use is implicit with the word addiction. However, when it comes to the use of technology, addiction leads to an activity, being more specific, a compulsion to carry out excessive use of the internet (Balaguer, 2008). In this idea Castillo et al.

(2008) applied a survey to 392 students, mostly women (73.9%), discovering that the surveyed population remains connected to the internet an average of 84.81 minutes a week and that the traits that stand out from those who mostly spend connected to the network are those that tend to introversion, thus avoiding social relationships directly.

Lam-Figueroa et al. (2011) have pointed out that internet addiction is characterized by a high or low involvement in the internet, that is, dependence on the internet and the lack of control in its use, which, depending on their personal needs, can lead them to be uncomfortable, exhausted or distressed.

Gender differences have also been identified in this phenomenon of internet addiction. Some studies have shown that men were those who reflected greater use of the internet (Yang, 2001; Muñoz-Rivas et al., 2003; Fargues et al., 2009; Beranuy et al., 2009; Matalinares et al., 2013; Shek, Yu, 2016; Marín-Cipriano, 2018). On the other hand, Puerta-Cortés and Carbonell (2014) discovered that women use the internet more. In addition, women showed that they use the mobile phone to communicate their emotions (Ling, 2002; Mante, Piris, 2002; Fargues et al., 2009; Beranuy et al., 2009). Other gender studies have shown that men tend to be more aggressive than women, both physically and verbally, hence the greater the aggressive behavior in adolescents, the greater the tendency to become addicted to the internet (Matalinares et al., 2013).

Various studies have agreed that men spend more time in online video games (Muñoz-Rivas et al., 2003; Tsouvelas, Giotakos, 2011; Matalinares et al., 2013; Puerta-Cortés, Carbonell, 2014; Vink et al., 2016), while women spend more time on social networks (Ling, 2002; Marín-Cipriano, 2018). However, their findings differ from the work of Araujo (2016) who showed that men showed a higher degree of obsession with being connected to social networks.

Another variable that has been analyzed in some studies is that which refers to the average age at which internet addiction occurs, which has been identified and is in the range of 14 to 24 years (Echeburúa, 2010; Rial et al., 2015; Araujo, 2016; Shek, Yu, 2016; Padilla, Ortega, 2017; Marín-Cipriano, 2018; Terán, 2019).

Internet addiction as clinical disorder

At present, it is clear that addictions are not limited to the uncontrollable use of substances, but there are behavior habits that seem to be harmless that, under certain circumstances, tend to become addictive and strongly interfere in daily life of affected people. Thus, addiction refers to the irrepressible urge that is often accompanied by loss of control (Shah et al, 2014). In effect, the primary element in addictive disorders is the lack of control, that is, the affected person has a lack of control over a certain behavior, which is initially usually pleasant but then gains ground within the preferences until culminating in mastering their daily activities.

Now, from a behavioral point of view, all addictive behaviors are initially activated by pleasure or euphoria, but as the behavior is perpetuated, said behavior becomes negative and thus guarantees the need not to experience discomfort (abstinence) that is experienced by not performing such behavior. A non-addict person can be connected to the web by functionality of their own behavior. However, an addicted person connects to soften or alleviate some emotional discomfort and thus obtain tension relief that culminates in affecting a personal, social, family or work level.

According to the frequency, intensity and even money invested, all normal behavior can become abnormal if we exceed these guidelines. There are some risk factors for internet addiction such as: depression, introversion, low self-esteem, social anxiety and shyness. The subjects most likely to present this type of problems are those who present some specific deficit in their relationship and communication skills. In this regard, Young (1998) supports it by demonstrating in her study, "Personality traits associated with their development" that dependents are usually people with a strong preference for solitary activities, who tend to restrict social outings. According to statistical analysis, they seemed less compliant with social conversation and more emotionally reactive towards others. This with the aim of knowing the personality traits through the use of the so-called *16 Personality Factor Inventory* (16PFI), to determine the pathological use of the Internet.

As our society evolves, studies on behavioral changes emerge, one of them is the study of addictions and in particular that of the internet. These studies seek to determine the risk factors that add to excessive use of the internet. Recent studies have shown that participating in online games increases the 64 % higher risk of addiction when combined with a greater openness to the experience according to the NEO-FFI openness subscale (Kuss, 2013).

It was also discovered that online purchases constitute a significant risk factor for internet addiction in 81 % (Kuss, 2013), having its origin in the absence of social interaction and the possibility of buying without being observed facilitates compulsive online buying behavior.

The globalized world has favored the use of the internet, which means that it is widely disseminated. This great tool, whose main objective is to make improvements in our daily lives, has also caused its use to be carried out for recreational purposes in an excessive and persistent way, which has led to an addiction. Hence, the importance of its study, since it has been considered an emerging pathology with great impact in our current century.

For this reason, the so-called Pathological Gambling where internet addiction disorder is included by the DSM-IV-TR, (Diagnostic and Statistical Manual of Mental Disorders, 2001) has become part of the new chapter on Addictions of the DSM-V, into a new subcategory called non-substance addictive disorders.

In the same idea, behavioral addiction can frequently be combined with one or more substance addictions; pathological gambling is generally associated with smoking and alcohol abuse. When behavioral addiction becomes acute, behaviors are triggered by emotions and impulses, with low cognitive control and poor self-criticism about them. It has already been mentioned that, indeed, addiction to internet games causes decision bias and deterioration in executive control (Zhou et al., 2012). From here we start to point out that people with internet addiction disorder, in the future will have mental health problems related to excessive computer use.

However, due to the great importance of the subject, the "Internet Addiction Diagnostic Questionnaire" (IADQ) has been developed as an initial detection instrument which is used for initial and rapid diagnosis (Young, 1998), and based on the DSM-IV guidelines. The diagnostic questionnaire developed by Young is the most widely used instrument to measure Internet addiction. It provides a modified cut-off point for the diagnostic criteria for pathological gambling in DSM-IV (Ko et al., 2005). Over time, modifications were made to the IADQ scale, which is why the 20-item IAT arises, which not only assesses dependency and compulsiveness, but also includes aspects related to personal, occupational and social functioning issues (Young, 1998).

In the vast majority of cases, people who suffer from an addiction do not follow a certain treatment, but there is evidence that people who request support are able to significantly improve their quality of life. Due to the delicacy of the subject in question and the implications it has on people's lives and how this can have an impact, it is recommended that the treatment be based on several psychotherapeutic strategies that are usually more effective than a single approach (Dong, Potenza, 2014). Recommended approaches include Cognitive Behavioral Therapy (CBT), Cognitive Enhancement Therapy (CET), Cognitive Bias Modifications (CBM), and Mindfulness-Based Stress Reduction (MBSR) methods (Dong, 2014). This must be personalized in each case and always seek to restore and improve each important area of the individual: physical and mental health, work, social and family relationships.

Nowadays, we can know the personal antecedents, the risk factors and the alarm signals when we find ourselves in a situation of internet addiction. As it is a subject of increasing importance, it is expected that the development of new techniques for better diagnosis and comprehensive treatment will continue. Past research serves as a tool to anchor ourselves and continue in the search for more data that will support us in prevention, to diagnose and be able to treat this condition from the field of medicine.

Finally, we point out that perhaps the most important thing is to consider that the intervention is not proper to the individual. We must also encourage the participation of their environment to decisively collaborate in the therapeutic process to improve the quality of life and obtain people with harmony and fullness.

3. Methodology

Non-experimental design study without manipulation of variables (X), cross-sectional, focused on determining the degree of addiction to the Internet. Therefore, it is approached from the hypothetical-deductive method, since it seeks to test the hypothesis which suggests that engineering students are addicted to the internet (Young, 1997). The type of study is descriptive, correlational and explanatory. The factorial structure that is obtained will be the basis to demonstrate that the data matrix is not an identity matrix, to be able to explain the variance of the matrix of components that yield the results, and if they differ by gender.

3.1. Population, sample and instrument

The participants are engineering students from a higher education institution in Tierra Blanca, Veracruz. The study had the authorization of the campus authorities and as a condition for the application of the instrument was that the student agreed to participate at all times. The total number of students was 306 who met the requirement of being enrolled in a school year and who were up to date with their contractual obligations before the school control and treasury office. In addition, they were informed that their identity would be guaranteed at all times, since the survey is anonymous and its purpose is strictly academic.

Young's (1997) internet addiction scale was used, which includes questions related to profile such as age and gender, as well as 20 response questions in Likert format with options: 1 rarely, 2 occasionally, 3 frequently, 4 often and 5 always. It was designed in electronic format (Google form) and distributed via email with the support of Professor Socorro Flores. Each student was asked to answer the survey, either on their cell phone, on their laptop or on any device where they could connect to the platform on which the survey was hosted.

3.2. Statistical procedure

Following the work of García-Santillán, (2017) the following is carried out: Bartlett's Sphericity test with KMO, the sample adequacy measure (MSA) and the goodness of fit index χ^2 with significance ($\alpha < 0.01$). Similarly, to validate the relevance of the EFA, the communalities are obtained, which is the proportion of the variance by indicator and the factorial weights, to identify the percentage of total variance. To evaluate the suitability of the factorial model, it is necessary to design the correlation matrix R , based on the data obtained.

The correlation matrix R shows the relationship between each pair of variables (r_{ij}) and its diagonal will be composed of 1 (ones). Hence, if there is no relationship between the variables h , then all the correlation coefficients between each pair of variables would be zero. Therefore, the population correlation matrix matches the identity matrix and the determinant will be equal to 1.

$$H_0 : |R| = 1, H_1 : |R| \neq 1$$

If the data come from a random sample from a multivariate normal distribution, then, under the null hypothesis, the determinant of the matrix is 1 and is displayed as follows:

$$B = - \left[n - 1 - \frac{1}{6(2p+5)} \right] \ln|R| \quad (1)$$

Under the null hypothesis, this statistic is asymptotically distributed through a χ^2 distribution with $p(p-1)/2$ degrees of freedom. In addition, the Kaiser-Meyer-Olkin (KMO) test is performed to compare the correlation coefficients and the partial correlation coefficients. This is the measure of sampling adequacy (KMO) and can be calculated for the set or for each variable (MSA).

$$KMO = \frac{\sum_{j \neq i \neq j} \sum_i r_{ij}^2}{\sum_{j \neq i \neq j} \sum_i r_{ij}^2 + \sum_{j \neq i \neq j} \sum_i r_{ij}^2(p)} \quad MSA = \frac{\sum_i r_{ij}^2}{\sum_i r_{ij}^2 + \sum_i r_{ij}^2(p)} ; i=1, \dots, p \quad (2)$$

Where: $r_{ij}(p)$ It is the partial correlation coefficient between the variables X_i and X_j in all cases.

Acceptation or Rejection of null hypothesis in EFA

The null hypothesis states: $H_0 \rho = 0$ has no correlation, while $H_a: \rho \neq 0$ has correlation, then the decision rule is: Reject H_0 if $\chi^2_{calculated} > \chi^2_{tables}$. It's given by the equation below:

$$\begin{aligned} X_1 &= a_{11}F_1 + a_{12}F_2 + \dots + a_{1k}F_k + u_1 \\ X_2 &= a_{21}F_1 + a_{22}F_2 + \dots + a_{2k}F_k + u_2 \\ &..... \\ X_p &= a_{p1}F_1 + a_{p2}F_2 + \dots + a_{pk}F_k + u_p \end{aligned} \quad (3)$$

Where $F_1 \dots F_k (K \ll p)$ are common factors; u_1, \dots, u_p they are specific factors and the coefficients $\{a_{ij}, i=1, \dots, p; j=1, \dots, k\}$ are factor loads. Assuming that the common factors have been standardized or normalized, $E(F_i) = 0, Var(f_i) = 1$ then the specific factors will have a mean equal to zero, so both factors will have a correlation $Cov(F_i, u_j) = 0, \forall i=1, \dots, k; j=1 \dots p$. with the following consideration: if the factors are correlated ($Cov(F_i, F_j) = 0, \text{ if } i \neq j; j, i=1, \dots, k$), then we would be facing a model with orthogonal factors, but if they are not correlated, it is a model with oblique factors. Therefore, the equation can be expressed as follows:

$$x = Af + u \quad \hat{U} X = FA' + U \quad (4)$$

Where:

Data matrix	Factorial load matrix	Factorial matrix
$x = \begin{pmatrix} x_1 \\ x_2 \\ \dots \\ x_p \end{pmatrix}, f = \begin{pmatrix} F_1 \\ F_2 \\ \dots \\ F_k \end{pmatrix}, u = \begin{pmatrix} u_1 \\ u_2 \\ \dots \\ u_p \end{pmatrix}$	$A = \begin{pmatrix} a_{11} a_{12} \dots a_{1k} \\ a_{21} a_{22} \dots a_{2k} \\ \dots \\ a_{p1} a_{p2} \dots a_{pk} \end{pmatrix}$	$F = \begin{pmatrix} f_{11} f_{12} \dots f_{1k} \\ f_{21} f_{22} \dots f_{2k} \\ \dots \\ f_{p1} f_{p2} \dots f_{pk} \end{pmatrix}$

With variance:

$$Var(X_i) = \sum_{j=1}^k a_{ij}^2 + \Psi_i = h_i^2 + \Psi_i; i = 1, \dots, p \quad (5)$$

Where: $h_i^2 = Var\left(\sum_{j=1}^k a_{ij} F_j\right) \dots \Psi_i = Var(u_i) \quad (6)$

This is the equation of the communalities and the specificity of the variable X_i , therefore the variance of each variable we may divided into two parts: a) in the communalities h_i^2 corresponding to the variance explained by the common factors and b) the specificity Ψ_i which is the specific variance of each variable. In this way, we obtain:

$$Cov(X_i, X_l) = Cov\left(\sum_{j=1}^k a_{ij} F_j, \sum_{j=1}^k a_{lj} F_j\right) = \sum_{j=1}^k a_{ij} a_{lj} \quad \forall i \neq l \quad (7)$$

Then, with the transformation of the determinant of the correlation matrix, we obtain the Bartlett's test of Sphericity, from the following equation:

$$d_R = -\left[n - 1 - \frac{1}{6}(2p + 5) \ln |R| \right] = -\left[n - \frac{2p + 11}{6} \right] \sum_{j=1}^p \log(\lambda_j) \quad (8)$$

$$\left[n - \frac{2p + 11}{6} \right] \log \left[\frac{1}{p - m} \left(\text{traz} R^* - \left(\sum_{a=1}^m \lambda_a \right) \right) \right]^{p-m} \quad (9)$$

$\frac{\prod_{a=1}^m \lambda_a}{|R^*|}$

With the EFA, the set of observed variables is reduced in a factor structure (Kline, 2000–2005), in order to the covariance of each item of the scale can be empirically identified (Yela, 1966). In addition, considering that it is a scale designed in Likert format, it is suggested to use Pearson's correlation for continuous variables, the Tetrachoric matrix (TCC) for dichotomous variables and a Polychoric correlation matrix (PCC) if the variables are composite, dichotomous or ordinal. Even, if they are all ordinal or if there is a combination of ordinal and continuous (Richaud, 2005; Ogasawara, 2011; Timmerman, Lorenzo-Seva, 2011). Finally, the analysis of variance (ANOVA) was used to verify if there is a difference in relation to gender.

4. Results and discussion

The data collected in the field study were analyzed to determine the validity and reliability of the instrument. For this, the internal consistency of the instrument was measured, which shows a Cronbach's alpha of .851 in all items of the scale. This is a very acceptable value according to the theoretical criteria suggested by Hair, Anderson & Tatham, (1979). The total participants were 306 students of engineering, 155 were male (50.7 %) and 151 females (49.3 %), whose ages were: 18 years old 52.3% (160), 19 years old 14.1 % (43), 20 years old 6.9 % (21), 21 years old 9.5 % (29), 22 years old 7.8 % (24) and the rest 9.5 % from 23 to 35 years old.

As we can see, **Figures 1** and **2** show the mean and standard deviation of total items of the scale, as well as the scores obtained from the 306 cases observed, according to Young's (1997) criteria.

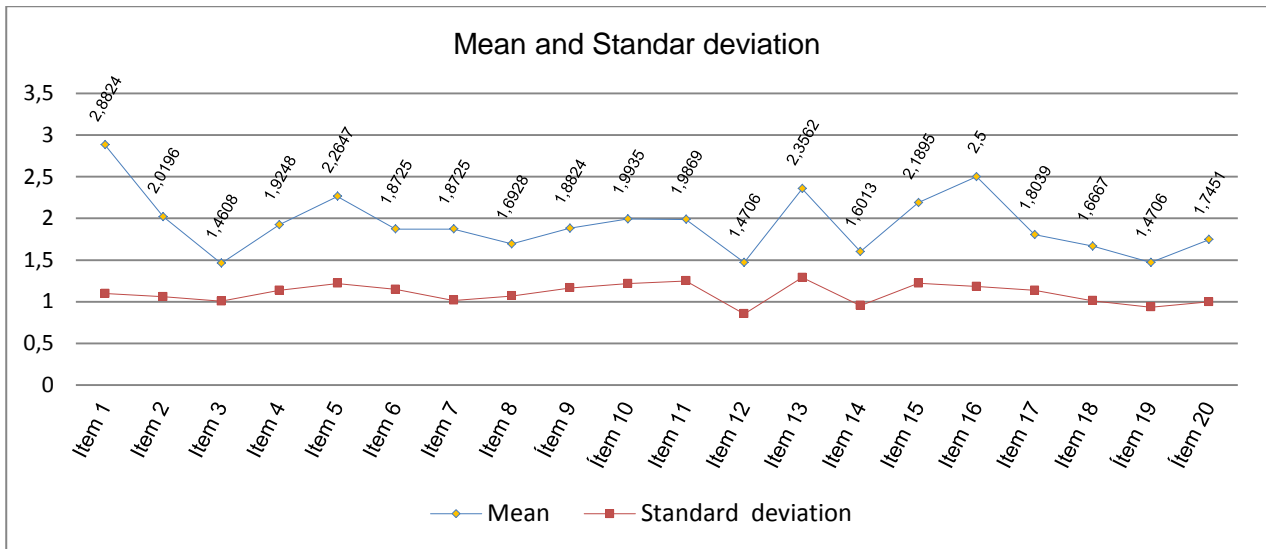


Fig. 1. Mean and standard deviation path (own)

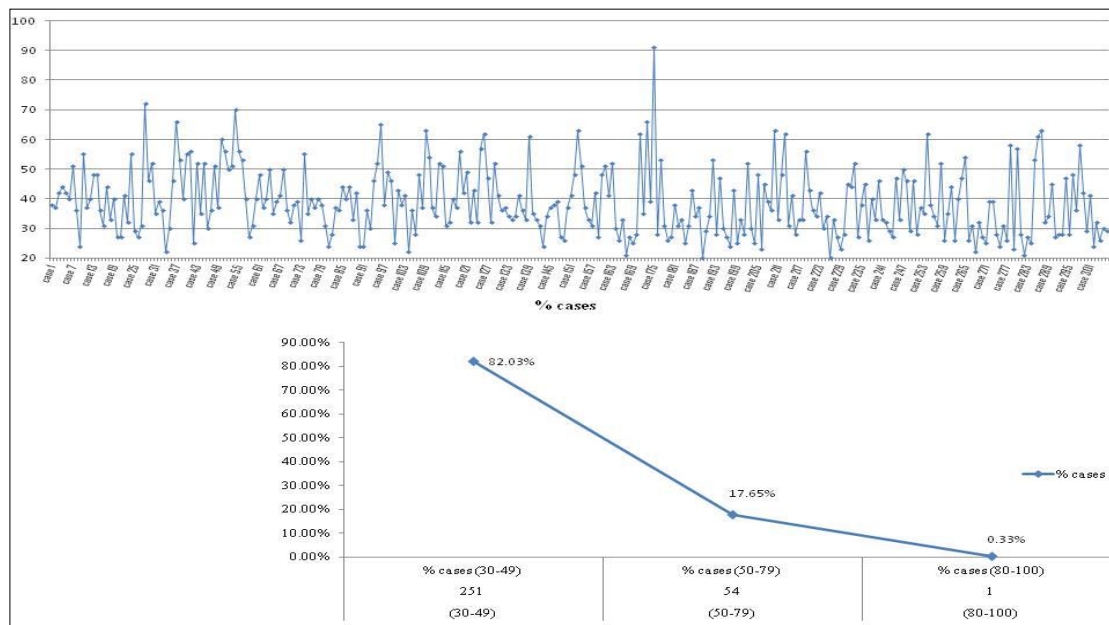


Fig. 2. Scores of the 306 cases observed (own)

As we can see in **Figure 1**, the mean values become more frequent among the options “rarely and occasionally”. Similarly, **Figure 2** shows the score of each of the 306 cases, which do not

present a serious situation of internet addiction, according to the criteria proposed by Young (1997) whose addiction ranges are: up to 29 points is normal user, average user (30-49 points), user with occasional or frequent problems (50-79 points) and user with major problems (80-100 points). In summary, 82.03 % (251 cases) are in the range of 20-49 points (normal ones are included), called average users, 17.65 % (54 cases) who are considered users with occasional problems and only a case that is severe according to the score obtained (0.33 %).

Table 1 shows the polychoric correlation matrix, of the 20 items of the scale used and Table 2 shows the result of the Bartlett test of sphericity with Kaiser and the Chi² goodness-of-fit test with sig. < 0.05.

Table 1. Polychoric correlation matrix

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10
V 1	1.000									
V 2	0.372	1.000								
V 3	0.227	0.287	1.000							
V 4	0.201	0.127	0.241	1.000						
V 5	0.361	0.442	0.306	0.257	1.000					
V 6	0.230	0.157	0.159	0.164	0.133	1.000				
V 7	0.203	0.392	0.147	0.168	0.295	0.027	1.000			
V 8	0.152	0.340	0.298	0.236	0.430	0.130	0.320	1.000		
V 9	0.203	0.384	0.420	0.330	0.421	0.076	0.283	0.368	1.000	
V 10	0.269	0.192	0.208	0.280	0.256	0.290	0.132	0.363	0.239	1.000

Table 1.b. Polychoric correlation matrix

	V11	V12	V13	V14	V15	V16	V17	V18	V19	V20
V 11	1.000									
V 12	0.372	1.000								
V 13	0.227	0.287	1.000							
V 14	0.201	0.127	0.241	1.000						
V 15	0.361	0.442	0.306	0.257	1.000					
V 16	0.230	0.157	0.159	0.164	0.133	1.000				
V 17	0.203	0.392	0.147	0.168	0.295	0.027	1.000			
V 18	0.152	0.340	0.298	0.236	0.430	0.130	0.320	1.000		
V 19	0.203	0.384	0.420	0.330	0.421	0.076	0.283	0.368	1.000	
V 20	0.269	0.192	0.208	0.280	0.256	0.290	0.132	0.363	0.239	1.000

Source: own

Table 2. Adequacy of the polychoric correlation matrix with KAISER

Adequacy of the polychoric correlation matrix	
Determinant of the matrix	= 0.000659168996615
Bartlett's statistic	= 2179.0 (df = 190; P = 0.000010)
Kaiser-Meyer-Olkin (KMO) test	= 0.85521 (good)
BC Bootstrap 95 % confidence interval of KMO =	(0.864 - 0.872)

Source: own

As we can see in [Table 1](#) the polychoric correlation matrix shows acceptable correlations, which gives evidence of not being an identity matrix. Therefore, it is pertinent to carry out the adequacy of the polychoric correlation matrix by contrasting the Bartlett's test of sphericity. The values obtained are: χ^2 of 2179.0 with 190 degrees of freedom and significance = 0.00 which is < 0.05 , KMO test of 0.85521 which in theoretical terms is good ([Timmerman, Lorenzo-Seva, 2011](#)).

This result allows rejecting H_0 , which states that the data matrix has no correlation, on the contrary, it was shown that it is a matrix with acceptable correlations; in addition the value of the calculated χ^2 exceeds the value of the χ^2 of tables. Once this requirement is covered, it is now possible to analyze the factorial structure of the database, so the adequacy of the sample and the variance are calculated using parallel analysis. Thus, [Table 3](#) shows the weights of the robust rotation (h , w) of each variable.

Table 3. Weights of robust rotation

Variable	h	w	Variable	h	w
V 1	1.4416	0.2970	V 11	1.4346	0.3004
V 2	1.4113	0.3117	V 12	1.8201	0.1124
V 3	2.0504	0.0000	V 13	1.3896	0.3223
V 4	1.7360	0.1534	V 14	1.5741	0.2323
V 5	1.2663	0.3824	V 15	1.3425	0.3453
V 6	1.7704	0.1366	V 16	1.6756	0.1828
V 7	1.6469	0.1968	V 17	1.5843	0.2273
V 8	1.6312	0.2045	V 18	1.5018	0.2676
V 9	1.5169	0.2602	V 19	1.7942	0.1250
V 10	1.6012	0.2191	V 20	1.5362	0.2508

Source: own

Where: h : average of the diagonal values in the asymptotic variance/covariance matrix for each variable. w : Robust weight value for each variable.

As shown in [Table 3](#), the variable with the least stable set of correlations – the one with large values of h – will have a weight (w) close to zero. Otherwise, if a variable shows a very stable set of correlations, then it will have a weight (w) of one. In this idea, the criterion is defined as follows: if w is $>$, then it will be the most important variable that defines the simple structure of the factorial solution. Now in [Table 4](#) the total variance explained is described.

Table 4. Total variance explained

Variable	Eigenvalue	Proportion of variance	Cumulative proportion of variance
1	6.691	0.335	0.335
2	1.416	0.071	0.405
3	1.278	0.064	0.469
4	1.187	0.059	0.529
5	1.091	0.055	0.583
6	0.955	0.048	0.631
7	0.866	0.043	0.674
8	0.819	0.041	0.715
9	0.737	0.037	0.752
10	0.680	0.034	0.786
11	0.653	0.033	0.819

12	0.529	0.026	0.845
13	0.516	0.026	0.871
14	0.470	0.024	0.894
15	0.441	0.022	0.916
16	0.425	0.021	0.938
17	0.395	0.020	0.957
18	0.362	0.018	0.976
19	0.315	0.016	0.991
20	0.175	0.009	1.000

Source (own)

The eigenvalues that describe the explanatory power of the assimilable variance extracted, which are described in Table 4, give the explanation of 63.1 % of the total variance of the studied phenomenon, which is represented by six components extracted under the factor criteria.

Now in Table 5, the result of the matrix rotated by the Varimax method, is described. The purpose was to obtain a better fit of the variables on one axis, in addition to reducing as much as possible the number of uncorrelated variables, which facilitates their interpretation. The items 05, 08, 13, 18 and 19 did not have loads greater than 0.5, therefore, are excluded. At the end, the six components are integrated as shown below.

Table 5. Rotated component matrix^a

Variables	Component					
	1	2	3	4	5	6
VAR00012	.774					
VAR00014	.666					
VAR00015	.524					
VAR00011	.517					
VAR00007		.748				
VAR00020		.701				
VAR00009			.788			
VAR00003			.573			
VAR00001				.785		
VAR00002				.523		
VAR00006					.764	
VAR00010					.582	
VAR00004					.512	
VAR00017						.688
VAR00016						.676

Extraction method: Principal component analysis. Rotation method: Varimax with Kaiser Normalization. ^a The rotation has converged in 5 iterations.

Source: own

As we can see, the six components described in table 5, were integrated as follow:

Component 1. This component combines (12, 14, 15, 11) the feeling of fear that life can be boring without internet, even empty and unhappy. In addition, the internet causes them to lose sleep due to being connected, to which is added the feeling of worry when they are offline and finally, they often anticipate when they will connect again, this is a feeling of addiction that is present in the mood and feeling of the student.

Component 2. The indicators that make up this component (7 and 20) indicate that they frequently check their email, putting other things that they need to do before them. They also feel depressed, moody, or nervous when they are offline, which is remedied once they get back on the internet.

Component 3. This component is made up of items 9 and 3, which describe the student's feeling about the annoyance they feel when being questioned about what they do while connected, they become defensive, they even prefer the emotion of being connected than intimacy with his couple.

Component 4. The indicators that make up this component (1, 2) reflect a more prolonged use of the internet, since the student remains connected more than he had planned, that is, the connection time is prolonged and that generates a carelessness in the Housework assigned at home.

Component 5. School work and students' grades are often affected by prolonged use of the internet; however, being online helps the student to relax and thus blocks disturbing thoughts that happen to them in life. Similarly, when they connect to the internet, this helps them establish new relationships online (6,10, 4).

Component 6. Finally, a component that is made up of items 17 and 16, in which the student frequently states that they are connected to the internet for a few more minutes, despite trying to reduce the time they spend online. This feeling seems to contrast between wanting to do things and having the decision to do them.

To test H1: The level of internet addiction of students is normal; the classification criterion of Young (1998) was used, based on the values of the internet addiction scale described in Table 6:

Table 6. Score and addiction level

Score	Addiction level
0-29	Normal
30-49	Mid level of addiction
50-79	Moderate level
80-100	Internet dependency

Source: own

As we can see, table 7 shows the scores for men and women. Both have mild addiction levels, slightly higher in men (28.8 %). The highest percentage was obtained in this range. Furthermore, we can see that a lower percentage has a moderate level. The t-test results and their significance (0.00) indicate that are significant. In other words, the level of internet addiction in students is not within a normal range, they present mid-level internet addiction.

Table 7. Score male and female and test t.

Score	Male	Female	Total	Interpretation
0-30	12.7%	13.1%	25.8%	Normal
31-49	28.8%	26.8%	55.6%	Mid level of addiction
50-79	8.8%	9.50%	18.3%	Moderate level
80-100	0.3%	0%	0.32%	Internet dependency
Total	50.6%	49.4%	100%	
	<i>t</i>	13.434		
	<i>Degree of freedom</i>	305		
	<i>Sig</i>	0.000		

Source: own

To test hypothesis H3: There is a difference in the level of Internet addiction in relation to the gender of the students. The Kruskal-Wallis test (by William Kruskal and W. Allen Wallis) was applied; this is a non-parametric method to test if a group of data comes from the same population. The results give evidence that there is no difference between men and women in internet addiction.

In the Table 8 entitled "Contrast statistic" the value of the H statistic is observed, which measures the level of Internet addiction in students in relation to gender, this is 0.013 with one degree of freedom and its significance (.910).

Therefore, we can say that, since the value of *p* (Asymptotic significance) is greater than 0.05, then the null hypothesis is not rejected and we may concluded that there is sufficient evidence to

suggest that the median of the students does not differ between the groups, with a significance level of 5 %.

Table 8. Contrast statistic Kruskal-Wallis test

Value H	df	Significance	Average score	
			Male	Female
0.013	1	.910	152.94	154.08

Source: own

Finally we have the summary of the results, which allow us to answer each research question and achieve each objective, based on hypothesis tests; hence the following is now discussed.

In relation to the *QR1* about: what is the level of addiction to the internet in engineering students?, we establish the purpose *O1*: Determine the level of internet addiction in engineering students. For this, we assumed that *H1*: The level of addiction to the internet in engineering students is normal.

According to the *t* test and the significance value described in [Table 7](#), it was found that the level of addiction to the internet of the surveyed students is not in the normal ranges; however the highest percentage showed a mild level of Internet addiction according to the Young scale (1998). Despite not being the normal level, it is not a serious level for which an alert state should be generated.

Furthermore, the factorial structure of six factors described in [table 5](#), coincides with other works such as the study by Wydanto and McMurrin (2004) and García-Santillán, (2020), who's reported a similar structure of six factors, although the integration of each factor differs in its indicators, even Young's seminal work (1998) in which reports the six-factor structure measured by the test (Internet Addiction Test). Therefore, [Table 9](#) shows a comparison of the findings reported by these reference studies, including Young's seminal referent versus the results obtained in this study.

Table 9. Factorial structures

Structure resulting from the empirical study					
Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
Saliency	Excessive use	Neglect work	Anticipation	Lack of control	Neglect social life
X12, X14, X15, X11	X7, X20	X9, X3	X1, X2	X6, X10, X4	X17, X16
Reported by García-Santillán (2020)					
Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
Saliency	Excessive use	Neglect work	Anticipation	Lack of control	Neglect social life
X12, X14, X15, X19, X8	X9, X18	X20, X7	X2, X1, X5	X6, X4	X17, X16
Seminal work of Young (1998)					
Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
Saliency	Excessive use	Neglect work	Anticipation	Lack of control	Neglect social life
X10, X12, X13, X15, X19	X1, X2, X14, X18, X20	X6, X8, X9	X7, X11	X5, X16, X17	X3, X4
Reported by Wydanto & McMurrin (2004)					
Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
Saliency	Excessive use	Neglect work	Anticipation	Lack of control	Neglect social life
X19, X13, X12, X15, X10	X2, X14, X20, X1, X18	X6, X8, X9	X11, X7	X17, X5, X16	X4, X3

Source: own

The factorial structures previously described in Table 9, which were obtained with the use of the exploratory factorial technique with extraction of components by the factor criteria, coincide in relation to the number of factors (six). However, the integration of the components of the study by García-Santillán (2020) differs from those reported by Wydanto & McMurrin (2004) as well as from the seminal proposal of Young (1998), since there is a significant difference in the integration of the scale items. For example, in the Salience factor that Young (1998) originally integrated with items X10, X12, X13, X15 and X19, in the result reported in this work, it is only comparable in items X12 and X15, same case in the Excessive factor use that only matches in item X20.

In this idea, the result of this work differs from the one recently demonstrated by Navarro-Ibarra, García-Santillán & Molchanova (2020), who carried out a study on college students in Sonora, Mexico. This state is located in the northern region of Mexico, is different in cultural traits versus the southeast region of the same Mexican country. The study focused on determining levels of internet addiction and whether there was a difference in relation to gender. To do this, the Young's IAT test (1998) to a sample of 463 students, was used. For data analysis, the EFA with the use of polychoric matrices for a better fit was used.

In their results they report a factorial structure of four factors that explain 50.35 % of the variance of the phenomenon; in addition they did not find evidence that supposes a difference in relation to gender. The results are homogeneous in men and women. In the four-factor structure, they are grouped as follows:

Factor 1	Factor 2	Factor 3	Factor 4
X15, X20, X12, X13, X10, X11, X9, X19	X2, X1, X8, X16, X6	X7, X3	X17, X18

With these results reported by Navarro-Ibarra et al., (2020), which differ from those cited in Table 9, we can see how complex it is to analyze the scale designed by Young (1998), using this factorial technique. In addition, other studies have shown different structures, for example the structure identified by Alavi, Eslami, Maracy, Najafi, Jannatifard and Rezapour (2010) who identified five factors called social problems, effects on performance, lack of control, pathological use of chat and neglect in education and occupational duties. Similar case reported by Guan, Isa, Hashim, Pillai and Singh (2012) who identify a structure of five factors.

Similar structure of four factors reported by Navarro-Ibarra et al. (2020), was also reported by Lee, Lee, Gyeong, Yu, Song and Kim (2013), Kaya, Denle and Young (2016), Samaha, Fawaz, Yahfoufi, Gebbawi, Abdallah, Baydoun, Ghaddar and Eid (2018), Ndasauka, Pitafi and Kayange (2019), the four factors were identified as prominence, conflict, tolerance, and mood modification.

On the other hand, the same scale has generated three-dimensional structures, such as those reported by Chang and Law (2008), Tsimtsiou, Haidich, Kokkali, Dardavesis, Young and Arvanitidou (2013), Lai, Mak, Cheng, Watanabe, Nomachi, Bahar, Young, Ko, Kim and Griffiths (2015), Mohammadsalehi, Mohammadbeigi, Jadidi, Anbari, Ghaderi and Akbari (2015) and Neelapajit, Pinyopornpanish, Simcharoen, Kuntawong, Wongpakaran and Wongpakaran (2018). Other works have reported two factors, such as the study by Barke, Nyenhuis and KronerHerwig (2012), Jelenchick, Becker and Moreno (2012), Fernández-Villa, Molina, García-Martín, Llorca, Delgado-Rodríguez and Martín (2015).

With a single factor, studies with good psychometric properties have been reported by Khazaal, Billieux, Thorens, Khan, Louati, Scarlatti, Theintz, Lederrey, Van Der Linden and Zullino (2008), Pontes, Patrao and Griffiths (2014), Dhir, Chen, Nieminen (2015), Panayides and Walker (2012), Waqas, Farooq, Raza, Javed, Khan, Ghumman, Naveed and Haddad (2018).

The different factorial structures obtained in the different studies is an indication of the complexity of the construct, hence the importance of expanding this type of study in different populations.

In relation to the QR2: Do the data collected for the empirical study constitute an identity matrix? It is established as purpose O2. Analyze if the data matrix is not an identity matrix, hence we assume H2: The data matrix is not an identity matrix.

The results of the data analysis, through the use of polychoric correlation matrices, did not provide evidence to demonstrate that the data matrix constituted an identity matrix as assumed by

the *H0* about the non-existence of correlations. On the contrary, it was found that there are acceptable correlations in the suggested theoretical terms, so *H2* is accepted. Furthermore, the values of the Bartlett's test of sphericity with Kaiser and the χ^2 test confirm this.

Finally to answer the *QR3*: Does the level of Internet addiction in engineering students differ by gender? The objective was *O3*: determine if the level of internet addiction in engineering students differs by gender. Hence we assume that *H3*: The level of internet addiction in engineering students differs by gender.

For these purposes, the corresponding hypothesis tests were carried out, and the results allowed us to assert that there is no difference in relation to gender in all the indicators of the Young (1998) scale on Internet addiction. Regarding this, it is important to point out that the percentage of participation of the respondents was 49.3 % women and 50.7 % men, which shows that the sample was balanced in relation to gender.

In this way, this work differs from other studies that have been consulted from the specialized literature, for example the studies of Yang (2001); Muñoz-Rivas, Navarro and Ortega (2003); Fargues et al. (2009); Beranuy et al. (2009); Matalinares et al. (2013); Shek and Yu (2016); Marín-Cipriano, (2018), who have reported evidence that shows that men use the internet more.

In addition, men tend to be more aggressive in verbal and physical aspects, in the study by Matalinares et al. (2013), they found that the more aggressive men, specifically in adolescents, the probability of becoming addicted to the internet, will be greater.

Another aspect related to the gender variable that has been empirically demonstrated is when they want to communicate emotions, in this aspect women are the ones who use the mobile phone more frequently than men, according to the works carried out by Ling (2002); Mante and Piris (2002); Fargues et al. (2009) and Beranuy et al. (2009).

6. Conclusion and recommendations

From the results of this empirical study, we can observe how complex the interpretation of the indicators of the Young scale (1998) is. On the one hand, the six factors proposed by the author are obtained; on the other hand, the interpretation given by the surveyed students makes the integration of the factors not be similar to the structure proposed by Young (1998). The complexity of these tests is associated with multicultural aspects of the regions, countries and in general of the context.

The factorial structures reported in different studies provide us the basis for this work. In addition, we may see how complex it is to analyze the different populations, both those have already been studied and others in the process of analysis, in a particular way, those that have begun to develop in Latin contexts.

In addition, the current situation derived from the health contingency, has contributed to the need for communication through digital platforms, and thus to the need to use the internet, from fixed devices at home, offices among other places, or in the mobile devices such as cell phones, called Smartphone's. This topic has generated the interest of researchers and academics studying the field of people's behavior, as well as organizations, such as the Center for Internet Addiction founded by Dr. Kimberly Young in 1995.

Future lines of research must be in the order of the same line of the internet addiction and its relationship with the current situation that we live today, derived from the COVID-19 epidemic. It's very important to develop, studies in the Latin contexts that will provide evidence that allows for the construction of a new structure of factors, which may be applied in general, in the populations of Latin students.

7. Acknowledgments

In memory of Dr. Kimberly S. Young, for the entire legacy she leaves us in the field of knowledge about internet addictions. Thank you

References

- Alavi et al., 2010 – Alavi, S.S., Eslami, M., Maracy, M.R., Najafi, M., Jannatifard, F., Rezapour, H. (2010). Psychometric properties of Young internet addiction test. *Journal of Behavioral Sciences*. 4(3): 183-189.
- Araujo, 2016 – Araujo, E. (2016). Indicadores de adicción a las redes sociales en universitarios de Lima. *Revista Digital de Investigación en Docencia Universitaria*. 10(2): 48-58.

Balaguer, 2008 – Balaguer, R. (2008). ¿Adicción a internet o adicción a la existencia? *Revista Digital Universitaria*. 9(8): 3-12.

Barke et al., 2012 – Barke, A., Nyenhuis, N., Kroner-Herwig, B. (2012). The German version of the internet addiction test: a validation study. *Cyberpsychology, Behavior, and Social Networking*. 15(10): 534-542. DOI: 10.1089/cyber.2011.0616

Becoña, 2006 – Becoña, E. (2006). Adicción a nuevas tecnologías. Vigo: Nova Galicia Edicions.

Beranuy et al., 2009 – Beranuy, M., Chamarro, A., Graner, C. y Carbonell, X. (2009). Validación de dos escalas breves para evaluar la adicción a Internet y el abuso de móvil. *Psicothema*. 21: 480-485.

Carbonell et al., 2012 – Carbonell, X., Fúster, H., Chamarro, A., y Oberst U. (2012). Adicción a internet y móvil: una revisión de estudios empíricos españoles. *Papeles del Psicólogo*. 33(2): 82-89.

Carbonell et al., 2012 – Carbonell, X., Fúster, H., Chamarro, A., Oberst, U. (2012). Adicción a internet y móvil: una revisión de estudios empíricos españoles. *Papeles del Psicólogo*. 33(2): 82-89.

Caro, 2016 – Caro, C. y Plaza, J. (2016). Intervención educativa familiar y terapia sistémica en la adicción adolescente a Internet: fundamentación teórica. *Revista Española de Orientación y Psicopedagogía (REOP)*. 27(1): 99-113.

Caro, 2017 – Caro, M. (2017). Adicciones tecnológicas: ¿Enfermedad o conducta adaptativa? *Medisur*. 15(2): 251-260.

Castillo et al., 2008 – Castillo, J., Terol, M., Nieto, M., Lledó, A., Sánchez, S., Aragón, M. y Sitges E. (2008). Uso y abuso de Internet en jóvenes universitarios. *Psiquiatría Interactiva*. 20(2): 131-142.

Chak, Leung, 2004 – Chak, K., Leung, L. (2004). Shyness and Locus of Control as predictors of Internet addiction and Internet use. *Cyberpsychology & Behaviour*. 7: 559-570.

Chang, Law, 2008 – Chang, M.K., Law, S.P.M. (2008). Factor structure for Young's Internet Addiction Test: A confirmatory study. *Computers in Human Behavior*. 24(6): 2597-2619. DOI: 10.1016/j.chb.2008.03.001

Cruzado et al., 2006 – Cruzado, L., Matos, L., y Kendall, R. (2006). Adicción a Internet: Perfil clínico y epidemiológico de pacientes hospitalizados en un instituto nacional de salud mental. *Revista Médica Herediana*. 17(4): 196-205.

Davis, 2001 – Davis, R. (2001). A cognitive-behavioral model of pathological Internet use. *Computers in Human Behavior*. 17: 187-195. DOI: 10.1016/S0747-5632(00)00041-8

De Gracia et al., 2002 – De Gracia, M., Vigo, M., Fernández, M., y Marco, M. (2002). Problemas conductuales relacionados con el uso de Internet: un estudio exploratorio. *Anales de Psicología*. 18: 273-292.

Dhir et al., 2015 – Dhir, A., Chen, S., Nieminen, M. (2015). Psychometric Validation of Internet Addiction Test With Indian Adolescents. *Journal of Educational Computing Research*. 53(1): 15-31. DOI: 10.1177/0735633115597491

Dong, Potenza, 2014 – Dong, G., Potenza, M.N. (2014). A cognitive-behavioral model of Internet gaming disorder: theoretical underpinnings and clinical implications. *Journal of psychiatric research*. 58: 7-11. <https://doi.org/10.1016/j.jpsychires.2014.07.005>.

Echeburúa et al., 1998 – Echeburúa, E., Amor, P.J. y Cenea, R. (1998). Adicción a Internet: ¿una nueva adicción psicológica? *Monografías de Psiquiatría*. 2: 38-44.

Echeburúa, 2010 – Echeburúa, E. (2010). Adicción a las nuevas tecnologías ya las redes sociales en jóvenes: un nuevo reto. *Adicciones*. 22(2): 91-96.

Echeburúa, 2016 – Echeburúa, E. (Ed.). (2016). Abuso de internet: ¿antesala para la adicción al juego de azar online? España: Ediciones Pirámide.

Echeburúa, Corral, 1994 – Echeburúa, E. y Corral, P. (1994). Adicciones psicológicas: más allá de la metáfora. *Clínica y Salud*, 5, 251-258.

Estallo, 2001 – Estallo, J.A. (2001). Usos y abusos de Internet. *Anuario de Psicología*. 32: 95-108.

Estévez et al., 2009 – Estévez, L., Bayón, C., De la Cruz, J. y Fernández-Liria, A. (2009). Uso y abuso de Internet en adolescentes. En E. Echeburúa, F.J. Labrador y E. Becoña (eds.). Adicción a las nuevas tecnologías en adolescentes y jóvenes (pp. 101-128). Madrid: Pirámide.

Fargues et al., 2009 – Fargues, M., Lusar, A., Jordania, C. y Sánchez, X. (2009). Validación de dos escalas breves para evaluar la adicción a Internet y el abuso del móvil. *Psicothema*. 21(3): 480-485.

Fernández-Villa et al., 2015 – Fernández-Villa, T., Molina, A.J., García-Martín, M., Llorca, J., Delgado-Rodríguez, M., Martín, V. (2015). Validation and psychometric analysis of the Internet Addiction Test in Spanish among college students. *BMC Public Health*. 15(953): 1-9. DOI: 10.1186/s12889-015-2281-5

García del Castillo, 2008 – García del Castillo, J.A., Tero, M.C., Nieto, M., Lledó, A., Sánchez, S., Martín-Aragón, M. y Sitges, E. (2008). Uso y abuso de Internet en jóvenes universitarios. *Adicciones*. 20: 131-142.

García-Santillán, 2017 – García-Santillán, A. (2017) Measuring set latent variables through exploratory factor analysis with principal components extraction and confirmatory analysis. *European Journal of Pure and Applied Mathematics*. 10(2): 167-198.

García-Santillán, 2020 – García-Santillán, A. (2020). Addiction towards internet: empirical evidence in high school students: a parametric analysis. *Journal of Psychological and Educational Research JPER*. 28(1): 97-124.

Goldberg, 1995 – Goldberg, I. (1995). IAD, in Cinti M. E.(a cura di) Internet Addiction Disorder un fenomeno sociale in espansione (pp. 6-7). [Electronic resource]. URL: <http://www.iucf.indiana.edu/brown/hyplan/addict.html>

Greenfield, 2009 – Greenfield, D.N. (2009). Tratamiento psicológico de la adicción a Internet y a las nuevas tecnologías. En E. Echeburúa, F.J. Labrador y E. Becoña (eds.), *Adicción a las nuevas tecnologías en adolescentes y jóvenes* (pp. 189-200). Madrid: Pirámide.

Griffiths, 1995 – Griffiths, M. (1995). Technological addictions. *Clinical Psychology Forum*. 76: 14-19.

Griffiths, 2000 – Griffiths, M. (2000). Does Internet and computer “addiction” exist? Some case study evidence. *Cyberpsychology & Behavior*. 3: 211-218.

Guan et al., 2012 – Guan, N.C., Isa, S.M., Hashim, A.H., Pillai, S.K., Singh, M.K.H. (2012). Validity of the Malay Version of the Internet Addiction Test: A Study on a Group of Medical Students in Malaysia. *Asia Pacific Journal of Public Health*. 27(2): 2210-2219. DOI: 10.1177/1010539512447808

Hair et al., 1979 – Hair, J., Anderson, R., Tatham, R. (1979). *Multivariate Data Analysis: With Readings*. Tulsa, Oklahoma: PPC Books. Published by Prentice Hall PTR.

Jelenchick et al., 2012 – Jelenchick, L.A., Becker, T., Moreno, M.A. (2012). Assessing the psychometric properties of the Internet Addiction Test (IAT) in US college students. *Psychiatry Research*. 196(2-3): 296-301. DOI: 10.1016/j.psychres.2011.09.007

Jiménez, 2007 – Jiménez, L. y Pantoja, A. (2007). Autoestima y relaciones Interpersonales en sujetos adictos a Internet. *Psicología-Segunda Época*. 26(1): 78-89.

Johansson, 2004 – Johansson, A. y Götestam, K.G. (2004). Internet addiction: characteristics of a questionnaire and prevalence in Norwegian youth (12-18 years). *Scandinavian Journal of Psychology*. 45: 223-229.

Johnson, 1993 – Johnson, B. (1993). A developmental model of addictions and its relationship to twelve step program of Alcoholics Anonymous. *Journal of Substance Abuse Treatment*. 10(1): 23-34.

Kaya et al., 2016 – Kaya, F., Delen, E., Young, K.S. (2016). Psychometric properties of the Internet Addiction Test in Turkish. *Journal of Behavioral Addictions*. 5(1): 130-134. DOI: 10.1556/2006.4.2015.042

Khazaal et al., 2008 – Khazaal, Y., Billieux, J., Thorens, G., Khan, R., Louati, Y., Scarlatti, E., Theintz, F., Lederrey, J., Van Der Linden, M., Zullino, D. (2008). French Validation of the Internet Addiction Test. *CyberPsychology & Behavior*. 11(6): 703-706. DOI: 10.1089/cpb.2007.0249

Kline, 2000 – Kline, P. (2000). *Handbook of Psychological Testing* (2^a ed.). New York: Routledge.

Kline, 2005 – Kline, R. (2005). *Structural equation modeling*. New York: Guilford Press.

Ko et al., 2005 – Ko, C.-H., Yen, J.-Y., Chen, C.-C., Chen, S.-H., Yen, C.-F. (2005). Proposed Diagnostic Criteria of Internet Addiction for Adolescents. *The Journal of Nervous and Mental Disease*. 193(11): 728-733. DOI: 10.1097/01.nmd.0000185891.13719.54

Kuss et al., 2014 – Kuss, D., Shorter, G., Rooij, A., Mheen, D., Griffiths, M. (2014). The Internet addiction components model of personality: Establishing construct validity via a nomological network. *Computers in Human Behavior*. 39: 312-321.

Kuss, 2013 – Kuss, D.J. (2013). Internet gaming addiction: current perspectives. *Psychol Res Behav Manag*. 6: 125-137. DOI: <https://doi.org/10.2147/PRBM.S39476>

Lai et al., 2015 – Lai, C.M., Mak, K.K., Cheng, C., Watanabe, H., Nomachi, S., Bahar, N., Young, K.S., Ko, H.C., Kim, D., Griffiths, M.D. (2015). Measurement Invariance of the Internet Addiction Test Among Hong Kong, Japanese, and Malaysian Adolescents. *Cyberpsychology, Behavior, and Social Networking*. 18(10): 609-617. DOI: 10.1089/cyber.2015.0069

Lam-Figueroa et al., 2011 – Lam-Figueroa, N., Contreras-Pulache, H., Mori-Quispe, E., Nizama-Valladolid, M., Gutiérrez, C., Hinostroza-Camposano, W., Torrejón, E., Hinostroza-Camposano, R., Coaquira-Condori, E., Hinostroza-Camposano, W. (2011). Adicción a Internet: Desarrollo y validación de un instrumento en escolares adolescentes de Lima. *Revista Peruana de Medicina Experimental y Salud Pública*. 28(3): 462-469.

Lee et al., 2013 – Lee, K., Lee, H.K., Gyeong, H., Yu, B., Song, Y.M., Kim, D. (2013). Reliability and Validity of the Korean Version of the Internet Addiction Test among College Students. *Journal of Korean Medical Science*. 28(5): 763-768. DOI: 10.3346/jkms.2013.28.5.763

Ling, 2002 – Ling, R. (2002). Chicas adolescentes y jóvenes adultos varones: dos subculturas del teléfono móvil. *Estudios de Juventud*. 57(2): 33-46.

Luengo, 2004 – Luengo, A. (2004). Adicción a Internet: Conceptualización y propuesta de Intervención. *Revista Profesional Española de Terapia Cognitivo Conductual*. 2: 22-52.

Mante, 2002 – Mante, E. y Piris, D. (2002). El uso de la mensajería móvil por los jóvenes en Holanda. *Estudios de Juventud*. 57(2): 47-58.

Marín-Cipriano, 2018 – Marín-Cipriano, C. (2018). Adicción a internet y funcionalidad familiar en universitarios de Lima Norte. *Revista de Investigación y Casos de Salud*. 3(1): 1-8.

Matalinares et al., 2013 – Matalinares, M., Arenas, C., Díaz, G., Dioses, A. (2013). Adicción a la internet y agresividad en estudiantes de secundaria del Perú. *Revista de investigación en Psicología*. 16(1): 75-93.

Mohammadsalehi et al., 2015 – Mohammadsalehi, N., Mohammadbeigi, A., Jadidi, R., Anbari, Z., Ghaderi, E., Akbari, M. (2015). Psychometric Properties of the Persian Language Version of Yang Internet Addiction Questionnaire: An Explanatory Factor Analysis. *International Journal of High Risk Behaviors & Addiction*. 4(3): 1-6. DOI: 10.5812/ijhrba.21560

Muñoz-Rivas, Navarro, 2003 – Muñoz-Rivas, M.J., Navarro, M.E. y Ortega, N. (2003). Patrones de uso de Internet en población universitaria española. *Adicciones*. 15: 137-144.

Muñoz-Rivas, Navarro, 2013 – Muñoz-Rivas, M., Navarro, E. y Ortega, N. (2003). Patrones de uso de Internet en población universitaria española. *Adicciones*. 15(2): 137-144.

Navarro-Ibarra et al., 2020 – Navarro-Ibarra L., García-Santillán A., Molchanova V.S. (2020). Addiction Levels Toward the Internet: Empirical Evidence in College Students at Instituto Tecnológico de Sonora, México. *European Journal of Contemporary Education*. 9(2): 378-393. DOI: 10.13187/ejced.2020.2.378

Ndasauka et al., 2019 – Ndasauka, Y., Pitafi, A., Kayange, G.M. (2019). Psychometric properties of Young's Internet Addiction Test (IAT) in Urdu language. *Asian Journal of Psychiatry*. 40: 39-44. DOI: 10.1016/j.ajp.2019.01.011

Neelapajit et al., 2018 – Neelapajit, A., Pinyopornpanish, M., Simcharoen, S., Kuntawong, P., Wongpakaran, N., Wongpakaran, T. (2018). Psychometric properties of a Thai version internet addiction test. *BMC Research Notes*. 11(69): 1-6. DOI: 10.1186/s13104-018-3187-y

Ogasawara, 2011 – Ogasawara, H. (2011). Asymptotic expansions of the distributions of the polyserial correlations coefficients. *Behaviormetrika*. 38(2): 153-168.

Padilla, 2017 – Padilla, C. y Ortega, J. (2017). Adicción a las redes sociales y sintomatología depresiva en universitarios. CASUS. *Revista de Investigación y Casos en Salud*. 2(1): 47-53.

Panayides, Walker, 2012 – Panayides, P., Walker, M.J. (2012). Evaluation of the Psychometric Properties of the Internet Addiction Test (IAT) in a Sample of Cypriot High School Students: The Rasch Measurement Perspective. *Europe's Journal of Psychology*. 8(3): 327-351. DOI: 10.5964/ejop.v8i3.474

Pérez del Río, 2014 – Pérez del Río, F. (2014) ¿El ocaso de la adicción a internet? Reflexiones sobre el origen, desarrollo y declive de un trastorno. *Revista Española de Drogodependencias*. 39(2): 82-91.

Pontes et al., 2014 – Pontes, H.M., Patrao, I.M., Griffiths, M.D. (2014). Portuguese validation of the Internet Addiction Test: An empirical study. *Journal of Behavioral Addictions*. 3(2): 107-114. DOI: 10.1556/JBA.3.2014.2.4

- Puerta-Cortés, y Carbonell, 2014 – Puerta-Cortés, D., y Carbonell, X. (2014). El modelo de los cinco grandes factores de personalidad y el uso problemático de Internet en jóvenes colombianos. *Adicciones*. 26: 54-61.
- Rial et al., 2015 – Rial, A., Golpe, S., Gómez, P. y Barreiro, C. (2015). Variables asociadas al uso problemático de internet entre adolescentes. *Salud y drogas*. 15(1): 25-38.
- Richaud, 2005 – Richaud, M. (2005). Desarrollos del análisis factorial para el estudio de ítems dicotómicos y ordinales. *Revista Interdisciplinaria*. 22(2): 237-251.
- Samaha et al., 2018 – Samaha, A.A., Fawaz, M., Yahfoufi, N.E., Gebbawi, M., Abdallah, H., Baydoun, S.A., Ghaddar, A., Eid, A.H. (2018). Assessing the Psychometric Properties of the Internet Addiction Test (IAT) Among Lebanese College Students. *Frontiers in Public Health*. 6(365): 1-7. DOI: 10.3389/fpubh.2018.00365
- Sánchez-Carbonell et al., 2008 – Sánchez-Carbonell, X., Beranuy, M., Castellana, M., Chamarro, A. y Oberst, U. (2008). La adicción a Internet y al móvil: ¿moda o trastorno? *Adicciones*. 20: 149-160.
- Sánchez-Carbonell et al., 2008 – Sánchez-Carbonell, X., Beranuy, M., Castellana, M., Chamarro, A., y Oberst, U. (2008). La adicción a Internet y al móvil, ¿moda o trastorno? *Adicciones*. 20(2): 149-160.
- Shah Alam et al., 2014 – Shah Alam, Syed, Hazrul Nik Hashim, Nik Mohd., Ahmad, Maisarah, Che Wel, Che Aniza, Mohd Nor, Sallehuddin, Asiah Omar, Nor (2014). Negative and positive impact of internet addiction on young adults: Empirical study in Malaysia. *Intangible Capital*. 10(3): 619-638.
- Shek, Yu, 2016 – Shek, D., Yu, L. (2016). Adolescent Internet Addiction in Hong Kong: Prevalence, Change, and Correlates. *J Pediatr Adolesc Gynecol*. 29(1): 22-30. DOI: 10.1016/j.jpag.2015.10.005
- Terán, 2019 – Terán, A. (2019). Ciberadicciones. Adicción a las nuevas tecnologías (NTIC). En: AEPap (ed.). Congreso de Actualización Pediatría. Madrid: Lúa Ediciones 3.0, 131-141.
- Timmerman, Lorenzo-Seva, 2011 – Timmerman, M.E., Lorenzo-Seva, U. (2011). Dimensionality Assessment of Ordered Polytomous Items with Parallel Analysis. *Psychological Methods*. 16: 209-220. DOI: 10.1037/a0023353
- Tsimtsiou et al., 2014 – Tsimtsiou, Z., Haidich, A. B., Kokkali, S., Dardavesis, T., Young, K.S., Arvanitidou, M. (2014). Greek version of the Internet Addiction Test: a validation study. *The Psychiatric quarterly*. 85(2): 187-195. DOI: <https://doi.org/10.1007/s11126-013-9282-2>
- Tsouvelas, Giotakos, 2011 – Tsouvelas, G., Giotakos, O. (2011). Internet use and pathological Internet engagement in a sample of college students. *Psychiatriki*. 22(3): 221-230.
- Vink et al., 2016 – Vink, J., Van Vbeijsterveldt, T., Huppertz, C., Bartels, M., Boomsma, D. (2016). Heritability of compulsive Internet use in adolescents. *Addiction Biology*. 21(2): 460-468. DOI: 10.1111/adb.12218
- Waqas et al., 2018 – Waqas, A., Farooq, F., Raza, M., Javed, S.T., Khan, S., Ghumman, M.E., Naveed, S., Haddad, M. (2018). Validation of the Internet Addiction Test in Students at a Pakistani Medical and Dental School. *Psychiatric Quarterly*. 89: 235-247. DOI: 10.1007/s11126-017-9528-5
- Widyanto, McMurrin, 2004 – Widyanto, L., McMurrin, M. (2004). The psychometric properties of the Internet addiction test. *CyberPsychology & Behavior*. 7: 443-450.
- Yang, 2001 – Yang, C. (2001). Sociopsychiatric characteristics of adolescence who use computers to excess. *Acta Psychiatrica Scandinavica*. 104(3): 217-222.
- Yela, 1966 – Yela, M. (1966). Los tests y el análisis factorial. En B. Szekeli (Ed.), *Los Tests* (pp. 153-178). Buenos Aires: Kapelusz.
- Young, 1998 – Young, K. (1998). Internet addiction: The emergence of a new clinical disorder. *CyberPsychology & Behavior*. 1(3): 237-244.
- Young, 1998 – Young, K.S. (1998). Internet Addiction Test (IAT) Manual. [Electronic resource]. URL: <http://netaddiction.com/internet-addiction-test/>.
- Young, Rodgers, 1998 – Young, K.S., Rodgers, R.C. (1998). The relationship between depression and Internet addiction. *Cyber Psychology & Behavior*. 1(1): 25-28.
- Zhou et al., 2012 – Zhou, Z.H., Yuan, G.Z., Yao, J.J. (2012). Cognitive biases toward Internet game-related pictures and executive deficits in individuals with an Internet game addiction. *PLoS ONE*. 7: e48961.10.1371/journal.pone.0048961

Appendix 1

INTERNET ADDICTION TEST

Name _____ Male _____ Female _____
Age ___ Years Online _____ Do you use the Internet for work? _____ Yes _____ No

This questionnaire consists of 20 statements. After reading each statement carefully, based upon the 5-point Likert scale, please select the response (0, 1, 2, 3, 4 or 5) which best describes you. If two choices seem to apply equally well, circle the choice that best represents how you are most of the time during the past month. Be sure to read all the statements carefully before making your choice. The statements refer to offline situations or actions unless otherwise specified.

0 = Not Applicable

1 = Rarely

2 = Occasionally

3 = Frequently

4 = Often

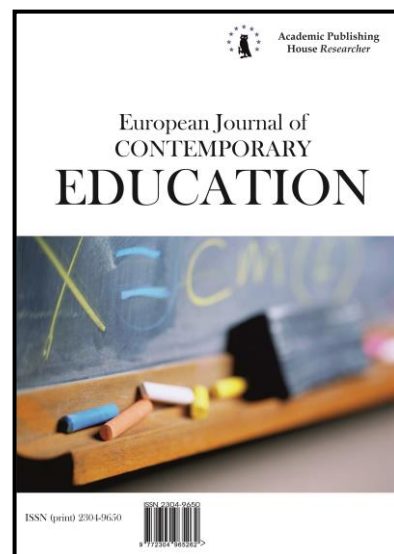
5 = Always

1. _____ How often do you find that you stay online longer than you intended?
2. _____ How often do you neglect household chores to spend more time online?
3. _____ How often do you prefer the excitement of the Internet to intimacy with your partner?
4. _____ How often do you form new relationships with fellow online users?
5. _____ How often do others in your life complain to you about the amount of time you spend online?
6. _____ How often do your grades or school work suffer because of the amount of time you spend online?
7. _____ How often do you check your email before something else that you need to do?
8. _____ How often does your job performance or productivity suffer because of the Internet?
9. _____ How often do you become defensive or secretive when anyone asks you what you do online?
10. _____ How often do you block out disturbing thoughts about your life with soothing thoughts of the Internet?
11. _____ How often do you find yourself anticipating when you will go online again?
12. _____ How often do you fear that life without the Internet would be boring, empty, and joyless?
13. _____ How often do you snap, yell, or act annoyed if someone bothers you while you are online?
14. _____ How often do you lose sleep due to being online?
15. _____ How often do you feel preoccupied with the Internet when off-line, or fantasize about being online?
16. _____ How often do you find yourself saying "just a few more minutes" when online?
17. _____ How often do you try to cut down the amount of time you spend online and fail?
18. _____ How often do you try to hide how long you've been online?
19. _____ How often do you choose to spend more time online over going out with others?
20. _____ How often do you feel depressed, moody or nervous when you are off-line, which goes away once you are back online?



Copyright © 2021 by Academic Publishing
House Researcher s.r.o.
All rights reserved.
Published in the Slovak Republic
European Journal of Contemporary Education
E-ISSN 2305-6746
2021. 10(2): 358-374
DOI: 10.13187/ejced.2021.2.358
www.ejournal1.com

IMPORTANT NOTICE! Any copying, reproduction, distribution, republication (in whole or in part), or otherwise commercial use of this work in violation of the author(s) rights will be prosecuted in accordance with international law. The use of hyperlinks to the work will not be considered copyright infringement.



Using Methods and Means of the Augmented Reality Technology When Training Future Teachers of the Digital School

Aleksandr V. Grinshkun ^{a,*}, Marina S. Perevozchikova ^b, Elena V. Razova ^b, Irina Yu. Khlobystova ^c

^a Moscow City University, Moscow, Russian Federation

^b Vyatka State University, Kirov, Russian Federation

^c Glazov State Pedagogical Institute named after V.G. Korolenko, Glazov, Russian Federation

Abstract

The problem which is studied is due to the need to solve the contradiction between the needs of society for the quality of training future teachers of the digital school regarding to formation of skills related to innovative technologies, communicative competences, the ability to work in the information environment and insufficient elaboration of the methodological base for training graduates that satisfies this requirements.

The purpose of the study is to theoretically substantiate and experimentally verify the need to apply methods and means of the augmented reality technology when training future teachers of the digital school.

The research methodology is the analysis and generalization of scientific works on the problems and prospects of using the augmented reality (AR) technology in the university, formation of the professional competence of the future teacher of the digital school. Mind Mapping 3D, Google Lens, augmented reality browsers, WallaMe service are used as software implementation tools. The experiment is presented using the example of assessing changes in levels of skills that make up the essence of the professional competence of the future teacher of the digital school.

Research results. The authors clarified the potential of the augmented reality technology, the advantages and disadvantages in terms of development professional competences of future specialists (training program 44.03.05 Pedagogical education (two training program specializations). The options for using the AR technology to improve the quality of education, formation of digital literacy and development of personal qualities are identified. Specific materials on the use of methods, means of the augmented reality technology are proposed on the example of

* Corresponding author

E-mail addresses: aleksandr@grinshkun.ru (A.V. Grinshkun), ms_perevozchikova@vyatsu.ru (M.S. Perevozchikova), razova.ev@gmail.com (E.V. Razova), hloirina@mail.ru (I.Yu. Khlobystova)

the discipline “Theory and methods of teaching computer science”. The assessment of the impact of AR services on the quality of mastering fundamental scientific theories by students, the level of solving professionally-oriented tasks is carried out.

In the conclusion, findings confirming that the use of methods and means of the augmented reality technology helps to improve the quality of training of future teachers of the digital school are formulated.

Keywords: professional competence, information literacy, personal qualities, communication, educational space, quality of education.

1. Introduction

1.1. The relevance of the problem

The future digital school teacher in the context of modern requirements for the quality of higher education, for the level of formation of digital skills for successful professional activity, should have such universal qualities as information literacy, creativity, communication, the ability to work in the virtual educational space, readiness for changes, and creation of something new. Formation of relevant skills within the framework of university education is complicated by a number of software, technical and methodological problems (Soboleva et al., 2018). The solution of these difficulties is of particular importance for training students of pedagogical training programs (Kalyanova, 2019). In the educational organization of higher education the teacher of the future learns to correlate the task, a means of action (a technique, a rule, an algorithm) and new knowledge that students, in future under his/her guidance, can acquire (Vázquez-Cano et al., 2020). In addition, it is important for a teacher to be a creator, a researcher in order to successfully fulfill duties.

Formation of the noted competences and the required personal qualities of the student of the pedagogical training program occurs mainly due to development of a variety of innovative technologies, means that activate knowledge and activity in the digital environment. In other words, the range of possible tools of the professional-teacher, his/her “portfolio”, is expanding. However, the question of the expediency of using these tools, the choice of the most effective one, corresponding to both the capabilities of the teacher and the individual needs of the student is still open.

Thus, as T.A. Kulikova, N.A. Poddubnaya note, intensive development of digital technologies forms a qualitatively new educational space of the university and requires taking into account the influence of innovative methods and means on formation of professional competences of students of pedagogical training programs (Kulikova, Poddubnaya, 2020).

At the same time, augmented reality (AR), as an innovative technology in the context of the digitalization of society, strives to become widespread in education and become a technology of social significance (Obdalova, Odegova, 2018). This follows from the passport of the federal project of the national program "Digital Economy", one of the goals of which is formation of a network of digital transformation centers of universities and development of students in accordance with personal trajectories using innovative technologies (Pasport natsional'noi...). The information educational space, as noted by M.V. Voronina, Z.O. Tretyakova, E.G. Krivonozhkina, S.I. Buslaev, G.G. Sidorenko, in the context of challenges of the future and professional training of the graduate in-demand, is focused on ensuring that students can immediately check their theoretical knowledge in the course of active practical, experimental activities (Voronina et al., 2019). Virtual classrooms and three-dimensional laboratories appear, where, according to D.B. Padilla, E. Vázquez-Cano, M.B. Morales Cevallos, E.L. Meneses, high-quality visualization of simulated objects and phenomena is required (Padilla et al., 2019). For example, after receiving theoretical information on geometry, students begin to build a three-dimensional virtual model, become participants of a knight's campaign or tournament, decrypt symbols of the Templars in ancient castles. In addition, a network of guided virtual excursions is developing, in the role of which robots and 3D objects are (Obdalova, Odegova, 2018).

In this regard the maximum didactic possibilities, as noted by P. Piriyaawong, are provided by the augmented reality technology (Piriyaawong, 2020). Indeed, the education system, as revealed in the work of A. Vidal-Balea, O. Blanco-Novoa, P. Fraga-Lamas, M. Vilar-Montesinos, T.M. Fernández-Caramés, gets unique chances to make a relatively safe historical journey through time and space, to realize a chemical experience, to make a dive, a cosmic discovery, etc. (Vidal-Balea et al., 2020). Augmented reality tools are actively used in the field of

health care and sports, in mathematical disciplines, in the work of cultural institutions (Geng, Yamada, 2020). In addition, the prospects for visualizing processes based on fundamental theoretical data, enhancing cognition, and supporting implementation of principles of visibility and understanding are expanding (Sarkar et al., 2020).

Qualitative formation of professional competence (mastery of pedagogical technologies, solving professional problems, control of work activity), as it is emphasized by K.V. Cherkasov, N.S. Chistyakova, V.V. Chernov, is difficult to reconstruct in an educational institution (Cherkasov et al., 2017). However, the use of augmented reality methods and means when training future teachers makes it possible to model interaction in the information educational environment at a qualitatively new level.

At the same time, this digital technology, with all its undoubted advantages and positive impact on scientific and technical development and the didactic process, contains additional educational risks in the spectrum of its tools. As E.M. Bonsignore rightly notes, it is impossible to deny the influence of information interaction in the virtual augmented environment on the psychological formation of the individual (Bonsignore, 2016). Trolling, outing and fraping are all new ways to negatively influence the consciousness of the personality. Each of these psychological phenomena, according to A. S. Williams, F. R. Ortega, requires additional studies in science and the pedagogical theory (Williams, Ortega, 2020). For example, as F.K.M. Arif, N.Z. Zubir, M. Mohamad, M.M. Yunus point out, the constant appeal to modern technologies and their inclusion in the educational process can lead to oversaturation: students get used to everything interactive, and they become uninterested in traditional teaching aids (Arif, 2019).

As other organizational and pedagogical difficulties M. Fan, A.N. Antle, J.L. Warren point out: balance and feasibility of using innovative technologies to support cognitive activity when solving practice-oriented tasks, project management, and organization of teamwork are important (Fan et al., 2020).

Thus, there is the problem of determining the influence of the AR technology on the quality of training future teachers, on formation of digital literacy, on motivation and cognitive interest, on the quality of mastering the fundamental scientific theory by students, and on professional self-development. The solution to this problem involves an additional study of the potential of the augmented reality technology, taking into account all components of the professional competence of the future teacher of the digital school, the norms and requirements for his/her labor activity.

The hypothesis of the research is the inclusion of students of pedagogical training programs in the cognitive activity, supported by methods and means of the augmented reality technology, contributes to formation of qualities and competences that determine their future professional activity in the digital environment.

1.2. Research goals and objectives

The purpose of the study was determined from the need to apply methods and means of the augmented reality technology to improve the quality of training future teachers of the digital school.

Research objectives:

- to reveal the essence of the phenomenon of "augmented reality" in the context of new challenges to the higher education system and requirements for the professional activity of the teacher;
- analyze the experience of using augmented reality resources in training and select applications that match the research goals best;
- to identify advantages and disadvantages of augmented reality both from the standpoint of formation of the professional competence of the future teacher of the digital school, and from the standpoint of development of personal qualities;
- describe the use of the augmented reality technology when training future teachers of the digital school by the example of work with the specific application;
- experimentally confirm effectiveness of the proposed educational and cognitive activity for formation of qualities and competences of the teacher, which determine his/her future professional activity in the digital environment.

2. Relevance

2.1. Analysis of Russian scientific and pedagogical literature

The use of the augmented reality technology in the cognitive activity of students is an important direction in development of the didactic system (Cherkasov et al., 2017). K.V. Cherkasov, N.S. Chistyakova, V.V. Chernov note that global digital transformation has a significant impact on the needs of society, business, government regarding professions in demand in the future. However, in practice, schools and universities often train graduates without using innovative technologies and trends of the world education.

As A.V. Ivanova notes, scientists are actively studying problems of identifying pedagogical conditions that ensure effectiveness of formation of professional competences and personal qualities of future specialists for teaching various disciplines (Ivanova, 2018).

The peculiarities of training specialists in demand for successful fulfillment of their professional duties in the digital environment were studied by M. Rumyantsev, I. Rudov. They reasonably state that there has not been a period in development of modern education comparable to the current changes in terms of rates and quality characteristics (Rumyantsev, Rudov, 2016).

E.V. Soboleva, E.G. Galimova, Z.A. Maydangalieva, K.K. Batchayeva conducted an experimental study of interaction of students in the information environment, its structure and role for formation of results of developmental learning (Soboleva et al., 2018). The authors study the following problems: what forms of cooperation and information interaction are most consistent with the content of the cognitive activity to acquire new knowledge; what the role of cooperation with peers in formation of modes of action (i.e. skills) is. They formulated new difficulties that teachers face when organizing such cognitive activity in the digital environment. Based on the results, a conclusion about effectiveness of interaction in the virtual educational environment to improve the quality of teaching and learning was made.

L.M. Kalyanova, based on the content of the current standards, believes that it is necessary to focus not only on the transfer of knowledge, but also on the acquisition of digital skills when training (Kalyanova, 2019). According to the conclusions of O.A. Obdalova, O.V. Odegova, the most important thing is to organize practice for the active use of knowledge and skills in practice by means of digital technologies within the framework of the system-activity approach demanded by the modern school (Obdalova, Odegova, 2018). Appropriate technologies (in particular, the augmented reality technology) are especially important when training students of pedagogical training programs.

L.M. Kalyanova concludes that specialists demanded by society must be able to solve non-standard tasks, situational practice-oriented tasks in the virtual, augmented world. At the same time, the desire to be successful (positive goals) is, in her opinion, the driving force in cognition (Kalyanova, 2019). The key feature of professionally oriented teaching of students of pedagogical training programs is integration of the motivational sphere of the person of labor (professional values, professional aspirations and motives, professional goal-setting, etc.) and the operational sphere (professional identity, professional abilities, learning, techniques and technologies as components of professional skill and creativity, etc.).

V.V. Kotenko believes that in order to achieve competences necessary/demanded by society, students should be involved in cognitive activities to solve practice-oriented and professional tasks in virtual educational spaces (Kotenko, 2020).

A.L. Zhuravlev, T.A. Nestik determine that the main tasks of training the modern graduate should be development of the ability to solve unfamiliar problems using digital technologies, quickly navigate large amounts of information, and make decisions in situations of uncertainty (Zhuravlev, Nestik, 2019).

A.V. Ivanova describes the first attempts to create interactive devices that allow interacting with the simulated reality (Ivanova, 2018). K.V. Cherkasov, N.S. Chistyakova, V.V. Chernov give examples of the use of the augmented reality technology in various types of human activities. The possibility of using this technology in the educational environment for the purpose of visual modeling of educational materials supplementing it with visual information was shown (Cherkasov et al., 2017). At the same time, students develop spatial representations, imagination, and three-dimensional design skills. Scientists prove that appropriate methods and means allow optimizing labor costs and time resources for transmission, assimilation of fundamental theoretical facts, and catalyzing the process of cognition.

T.A. Kulikova, N.A. Poddubnaya formulate the problem of the need to form readiness of the future teacher to use virtual and augmented reality technologies in the context of digitalization of education. The relevance of the problem under the study comes from the social order and the requirements of the digital economy (Kulikova, Poddubnaya, 2020). The authors proposed a general technology for forming readiness of the future teacher to use virtual and augmented reality applications. However, now there are only general recommendations for this technology. An integrated methodological system for specific AR services and applications is not presented.

M.V. Voronina, Z.O. Tretyakova, E.G. Krivonozhkina, S.I. Buslaev, G.G. Sidorenko have the other solution of the problem of using the augmented reality technology in education (Voronina et al., 2019). They consider particular issues of the active use of AR applications for design activities in the course of descriptive geometry, engineering and computer graphics. As a conclusion, the scientists point to the lack of scientifically based and proven materials for teaching students using AR.

2.2. Analysis of foreign studies

P. Piriyaawong justifies that the ongoing process of digitalization of education makes special requirements for improving the methodological system of the higher educational institution and supporting formation of professional competences (Piriyaawong, 2020). As vectors for development of the digital educational environment, maximally focused on supporting formation of professional competences of the competitive and in-demand graduate, foreign researchers distinguish: improving the quality of education, formation of the mobile personality capable of adapting to rapidly changing realities of the surrounding world, including software-technical sphere (Vázquez-Cano et al., 2020). In the arsenal of mentors, as described in detail by P. Sarkar, K. Kadam, J.S. Pillai, there are not only interactive resources, gaming educational platforms, cloud services, but also augmented and virtual reality technologies (Sarkar et al., 2020). At the same time, the use of appropriate software in the digital educational space of the university, according to A.S. Williams, F.R. Ortega, changes not only the forms of presentation and processing of information, but also the very way, style of interaction between participants of the information process (Williams, Ortega, 2020).

New means of the augmented and virtual reality, as the researchers argue, can and should be used to develop the communicative qualities of the person (Radkowski et al., 2015).

This means that development of the information environment of educational institutions should imply the use of new developments in the field of digital technologies, such as VR Thrills: Roller Coaster 360 (Cardboard Game), VR Space, Second Life, PhysicsPlayground, etc. (Raisamo et al., 2019). Their use, according to N. Nguyen, T. Muilu, A. Dirin, A. Alamäki, contributes to solving the problems of supporting motivation and involvement of students, enhancing cognition, inclusion in collaboration and monitoring attendance (Nguyen et al., 2018).

F. Marcel emphasizes that formation of professional competence necessarily includes development of communicative qualities of the person by means of modern information technologies (Marcel, 2019). The latter circumstance is especially relevant for studying at university. As J. Martín-Gutiérrez, CE Mora, B. Añorbe-Díaz, A. González-Marrero justify, the process of mastering professional skills in the digital educational environment of the university can be optimized by using augmented reality applications along with traditional learning technologies (Martín-Gutiérrez et al., 2017). For students, the educational process can often be a tedious routine. Having set the goal of training the graduate who best suits challenges of the future, educators-innovators first of all try to instill in the student love for the future work activity, a desire to master it at a high professional level (Marín-Díaz et al., 2020). In this context, the use of modern technologies, and this is proved by S. Lu, Y. Liu, M. Lin, F. Lu, allows diversifying the didactic process with non-standard activities and elements of the game, which captivates the student, concentrates attention on learning (Lu et al., 2019). If students understand the need to study one or another fundamental scientific theory, they can motivate themselves to study its laws and facts (Bacca et al., 2019). Augmented reality in learning can be viewed as an element of surprise pedagogy. From the teaching practice of E. Abad-Segura, we can note that augmented reality allows organizing the study of theoretical material in a fascinating way, which is rather "boring" for a student: rules, formulas, geometric constructions (Abad-Segura, 2020).

T. Liao analyzed various means of the augmented reality (Liao, 2020). F. Marcel singles out exactly those that have the didactic potential for university studies (Marcel, 2019).

At the moment, researches on the problems and prospects of introducing VR and AR into professional training of specialists are carried (Vázquez-Cano et al., 2020). In particular, many of them note that at present, higher education institutions use AR and VR mainly training natural sciences (Vidal-Balea et al., 2020).

In order to warn teachers who are actively seeking to enrich their software and hardware arsenal, M. Fan, A.N. Antle, J.L. Warren draw attention to psychological factors and risks of using new digital tools in terms of supporting personality development (Fan et al., 2020). Indeed, along with the undoubted didactic potential, information technologies for teaching, upbringing, and personal development, the impending danger that the digital school teacher should see and understand should be highlighted. The active immersion of the student in the space of computer games, the value of the rating in virtual interaction can become a more powerful argument for the student's personality than the advice of teachers, parents, friends from the real world (Arif, 2019).

The analysis of the literature makes it possible to reasonably assert that the teacher of the digital school should have a clear understanding of the need to adapt used rules of ensuring information security into new digital technologies including those based on augmented reality. So, despite the wide range of didactic possibilities of the augmented reality technology for teaching, there are a number of objective factors that should be taken into account when choosing appropriate methods and tools (Martín-Gutiérrez et al., 2017). In addition, students should be passionate about the very process of cognition, preparation for the future professional activity, and not only about the external emotional attractiveness of innovative technologies (Bacca et al., 2019).

Thus, in most of the studies analyzed, researchers note: incorrect assessment and lack of understanding of possibilities of using augmented reality in education; incorrect concept of ergonomic characteristics of modern virtual and augmented reality hardware in education; poor elaboration of the psychological and pedagogical base for design, implementation and use of AR teaching aids.

Due to the fact that formation of the professional competence of the highly qualified and competitive specialist is a priority of the modern educational space, there is an objective need to study the didactic potential of the augmented reality technology, taking into account the peculiarities of professionally oriented training of the future teacher of the digital school.

3. Materials and methods

3.1. Theoretical and empirical methods

To obtain theoretical generalizations, the analysis of scientific works on the problems of using the augmented reality technology in education and professional training of highly qualified specialists was used.

The main research methods were the system-activity, communicative and competence approaches. The system of the activity is considered in the environment of virtual communication, supported by means of augmented reality: use of digital service tools to provide learning material by the teacher; use of functionalities of the technology in the cognitive activity by students; organization of interaction between teachers and students (Prikaz Mintruda...).

The communicative approach, as a research method, allows: to determine the directions and intensity of communication of the participants in the didactic process, used by means of the augmented reality technology; to describe conditions for implementation of information interaction in the space of augmented reality.

The analysis of the provisions of the standard for the professional activity of the teacher, the requirements for the results of mastering training programs 44.03.05 Pedagogical education (two training program specializations) made it possible to determine the competences and personality qualities, formation of which is the most important, taking into account challenges of the time and employers' requests for the quality of higher education.

A special group is made up of empirical methods (observation, analysis of the results of work with an AR resource) to obtain up-to-date information on changes in the level of skills that form the basis of the professional competence. A special entrance and final testing was developed and carried out, including questions on the topics of the school subject Computer Science (25 questions), on the methodology of teaching Computer Science (25 questions) and on work with the condition of the problem (25 questions). The students of the experimental group used Google

Lens, augmented reality browsers, online fitting rooms, and the WallaMe service as software tools to present the results of the cognitive activity.

Statistical processing of the research results was performed using the Pearson χ^2 (chi-square) test.

3.2. The research base

Assessment of effectiveness of using methods and means of the augmented reality technology for training future teachers of the digital school and formation of skills that form the basis of their professional activities was carried out during the pedagogical experiment.

The research was conducted on the basis of Vyatka State University within the framework of teaching the discipline "Theory and Methods of Teaching Computer Science". 74 fourth-year students (60 % of girls and 40 % of boys, which is due to the specifics of the pedagogical training program) took part in it. The training program is 44.03.05 Pedagogical education (two training program specializations). The average age of the respondents was 22 years.

The sample was not random. To fulfill the rules of probabilistic selection, one and the same teacher was in charge of practical activities of all students. This teacher also formulated systems of educational tasks, directed information interaction in the process of solving professional and practice-oriented tasks by students. Working with digital resources (in particular, augmented reality services) was performed in the same classrooms, on the same hardware and software. The materials for the test were developed by the authors in accordance with the current higher education standard in the field of training.

3.3. Stages of research

The research was carried out in three stages.

At the first stage of the experiment, general assessment of the existing level of theoretical knowledge and scientific terms in the field of training was carried out. The level of skills that form the basis of the teacher's professional competence was determined. As part of the entrance control event, students were asked to do testing on the topics of the school subject Computer Science (25 questions), on the methodology of teaching Computer Science (25 questions) and on working with the condition of the problem (25 questions). A total of 75 tasks were of the following types: correlate meanings, fill in the missing word, remove unnecessary words, choose the correct statement.

For the correct and complete solution of each task, the student received 2 points. Total was 150 points. With the help of the results of the entrance testing, we managed to collect the required initial data about the students. Then the participants were divided: 37 in the experimental group and 37 in the control group. The division was made in such a way as to guarantee that in each group there are students having the same skills and personality traits, which form the basis of the professional competence of the future teacher of the digital school, and their equal distribution.

Skills of working with digital technologies were also tested. The results of the cognitive activity were presented using LearningApps, interactive worksheets, cloud services, Learnis, etc.

The second stage of the research was devoted to determining the directions of the educational and cognitive activity, firstly, supported by methods and means of the augmented reality technology; secondly, working as effectively as possible for the conscious active development of fundamental scientific theory for the training program, for formation of digital literacy, for professional self-development. The relevant activities were accompanied by work in virtual educational spaces, using mobile applications, augmented reality browsers and QR codes.

The third stage of the study covered the experienced training and using methods and means of the augmented reality technology for formation of the professional competence of future teachers of the digital school.

4. Results

4.1. Clarification of the essence of basic concepts

By Augmented Reality (AR) we mean an environment with direct or indirect addition of the physical space with digital information in real time through computer devices (tablets, smartphones, gadgets and software for them). Summarizing the analyzed experience, we conclude that:

1. Augmented reality is the inclusion of audio and video components in the real world through computer simulation.
2. Augmented reality allows replacing a flat image in teaching materials with a 3D model.

3. Augmented reality integrates new data directly into the real physical space.

Examples of augmented reality: a parallel facial color line showing the location of the object; arrows indicating the distance from the place to the object; the "drawn" flight path of the object; mixing of real and fictional objects in computer virtual worlds, etc. By means of augmented reality you can read information about the environment. For example, using QR codes information about a point of interest (historical information, photos and audio guides) can be received.

The following advantages that realize the educational potential of the augmented reality technology for training future teachers of the digital school should be noted: enrichment of the didactic process with the help of multimedia information; adaptation to the specific learning needs of each student; supporting the opportunity to prepare communicative practical activity through immediacy and interactive nature of technology; supporting learning in practice, solving tasks and situations of professional communication; assistance in transforming the role of teachers and trainees; opportunities for learning outside the classroom.

Problems limiting the use of methods and means of the augmented reality technology for training future teachers of the digital school are the following: the lack of holistic educational programs on the use of AR and VR in education. Most of them are used when teaching natural sciences (biology, medicine). The high cost of developing training materials and equipment for demonstrating AR should be noted. The average retail price of a set of augmented reality devices reaches 40-50 thousand rubles. At the same time, it is possible to demonstrate educational materials in augmented reality mode on laptops, tablets and other devices. In addition, there are costs associated with the retraining of specialists, as well as changes in the training programs for future teachers of educational institutions.

It is necessary to highlight the negative factors of the impact of augmented reality:

- distracting character. For example, a large amount of various information in the field of vision of the student overloads the perception and the nervous system;
- threats of data theft. On the one hand, the use of programs that implement augmented reality increases the speed of information processing and activates the interaction of network users. On the other hand, information transmitted over the network reveals details of the IP address, location, device type, user access rights, etc. Augmented reality must gain access to some personal data – geolocation, purchase history, financial details, so if an attacker uses such a channel, the consequences will be immediate;
- not every student or teacher can afford the means that implement the augmented reality technology.

Further, the essence of the concept of "professional competence of the future teacher of the digital school" was made more specific in the context of enriching the educational environment with the augmented reality technology.

A high level of the professional competence of the future digital school teacher: correctly applies scientific terminology; independently analyzes the research object based on deep knowledge; knows theories, concepts, functional capabilities of the software environment and gives them a critical assessment; shows in work elements of scientific knowledge, creativity, independence; clearly identifies the goals and objectives of the activity; logically, consistently and reasonably defend point of view and choice of the environment functionality; selects information sources that are adequate to the goals of the project, taking into account the maximum efficiency of communication; proposes and implements the method for verifying the accuracy of information; competently, correctly and comprehensively answers all additional questions; does not make mistakes in the technical presentation of the results; knows how to present and defend work in a team.

The average level of the professional competence of the future digital school teacher: knows scientific terminology; owns the functionality of the software environment, but does not use it effectively in all situations; knows main theories, concepts, but cannot always give them a critical assessment; in most of work shows elements of scientific knowledge; adheres to the goals and objectives of professional activity; cannot always defend decision with arguments; demonstrates skills of creative independent thinking; extracts information from one or more sources and organizes it; interprets information in the context of work; competently, logically correctly answers most of the additional questions; makes one or two non-critical errors in the technical presentation of the results; not in all cases can present and defend work in a team.

The low level of the professional competence of the future teacher of the digital school: shows an insufficiently complete volume of concepts, knowledge from the field of computer science, cybernetics, etc.; uses terminology, but cannot always answer additional questions about the research object; does not know how to navigate theories, concepts and functionality of the software environment; makes meaningful mistakes when working with educational material; cannot reason decisions; does not understand the lack of information or uses the proposed method to obtain information from one source; makes a simple conclusions when researching, but does not cope with tasks for making a series of conclusions; when reporting the results makes technical mistakes; refuses to present and defend work in a team.

4.2. Educational and cognitive activities on using methods and means of the augmented reality technology when training future teachers of the digital school

To achieve the goal of this study it was proposed to expand the traditional training methods of the theory and methodology of teaching computer science using capabilities of augmented reality applications, that is, the inclusion of the student in the process of independent interaction with visually vivid and three-dimensionally presented models.

In the holistic methodological system for training future teachers of the digital school, we single out the following components: the goals of studying the AR technology, place in the course, motivational component, content, software, methods and control.

The objectives of studying the technology of augmented reality within the framework of the course "Theory and methods of teaching Computer Science" are defined as follows:

1. To form an idea of the augmented reality technology as a technology for achieving new educational results, which determines a high level of professional training of the future teacher and functions and direction of his/her labor activity.
2. To form an idea of the complex of software and hardware for development of interactive digital content.
3. To teach to reasonably choose software tools for solving professional/practice-oriented tasks of the future professional activity in the digital school;
4. To study the basic functionalities and learn how to apply them in the course of practical activities.

The motivational component is determined based on the specifics of the educational topic of the school subject Computer Science, the study of which is supported by the appropriate AR-technology software tool. For example, when studying the topic "Device and architecture of the computer" in the lessons of computer disciplines. As a motivation, the following option can be offered: the use of 3D objects of augmented reality instead of real parts, each student has the opportunity to get acquainted with a separate computer device, to get an idea of its technological structure and functional capabilities.

The place in the course and the content are also determined by the characteristics of the study of the topic in the school computer science course. For example, the topic "Computer structure and architecture" is studied concentrically (propaedeutic level, in basic school (core of the course) and deepening lines).

Propedeutical level: safety rules at the computer, understanding of the main blocks of the computer, information processes.

The core of the course: the study of input-output devices, processor, memory; trunk-modular principle of operation.

Deepening lines: representation of information in computer memory, number systems, etc.

Software tools: Google Lens, Mind Mapping 3D, QR code generation apps, augmented reality browsers, online fitting rooms, WallaMe app.

Methods: modeling, project method, demonstration, laboratory work (frontal and independent; according to instructions and in commenting mode); excursion; work with simulators.

At the stage of control, a prerequisite is the solution of a system of educational practice-oriented tasks corresponding to fields of the future labor activity. For example:

1. To offer software tools that support work with smart cards in augmented reality (at least three).
2. To analyze and reasonably select an AR application for building a map "Device and computer architecture".

3. To design problematic learning situations for future professional activities in which the use of such a card will contribute to the educational goals of the digital school.

The following were used as the augmented reality software for teaching in the experimental group:

1. IigSpace. With this application you can turn each model, zoom in, disassemble it into parts. Such activities allowed students to consider in detail the main blocks, device and architecture of computers.

2. Google Lens. This application scans everything that the smartphone camera is aimed at. With the help of it, students travel along oval bus lines.

3. Mind Mapping 3D. This application is for creating three-dimensional mind maps that contain links to various educational resources: web pages and file attachments. During training students used tools to visualize concepts, thoughts and ideas; share the structure of Word documents, images, files, presentations on the big screen using Chromecast; collected resources for the project, organized links, and quotes.

On the topic "Device and architecture of the computer" the resulting mental map included the main blocks (input devices, output devices and the system unit). Through discussion and teamwork examples of I/O devices were identified. An independent study included the task to clarify/concretize what elements the system unit consists of, their functionality and purpose. It was proposed to add historical timing for additional assessment.

4. The augmented reality browser Layer, which allows you to "see through walls" and show the selected points of interest, regardless of whether they are in the line of sight. Students adjusted the degree of "range" of the layer in its settings, for example, by introducing a limit of 1 kilometer instead of 5. The number of objects became smaller. In another case, on the contrary, it was necessary to show that there are already enough of them now so that one could experiment with all this augmented reality.

5. Online fitting rooms to show the use of the digital technology in everyday life. For example, the Ecco website, which supports the goal of finding the perfect shoes for the user online. To do this, the students downloaded the Ecco Fitting Room application to their smartphones and followed a short video instruction. The leg scan process takes only a few minutes. After that, the application creates a visual 3D model of the leg, taking into account the fullness, the height of the rise and other measurements. The app is available on IOS and Android and supports family sharing, i.e. it can be used by up to 6 people at a time.

6. WallaMe application. For example, quests and games were held repeatedly, which consisted of looking for answers on the wall using this mobile application. In order to create own "wall of augmented reality", the following steps must be performed: open the camera by clicking on the "+" icon; take a photo; perform one of the possible actions: insert a ready-made image, draw own picture or write a text; confirm the performed action; open the message so that everyone can see it.

During the game an additional reality was "superimposed" on the walls, which contained images and symbols that the students were looking for and deciphering. Thus, the playful nature of the study contributed to the memorization of new words, the resolution of communication situations, the activation of cognition.

7. The HP Reveal platform was used to create a variety of visual aids to make class activities more interesting and fun. The tools of the environment supported the study of complex theoretical facts. On the topic "Device and architecture of the computer", when doing homework, future teachers created fragments of lessons. When pointing the smartphone camera at the task, the other participants in the experiment started a video lesson in which the speaker explains the material or the principle of the solution. When studying occupational health and safety, tags were placed in a classroom corner, a laboratory, when scanning them other participants could get acquainted with the rules of working at the computer.

The study of scientific terms was facilitated by working with a dictionary on the wall. On the stand in the classroom labels or concepts, the definitions for which can be seen (heard) on the smartphone screen were placed. Students could independently record a video in which they explained the meanings of terms for classmates. Those, in turn, using the application viewed them on the screen of their gadget.

The developed materials are aimed at users who are just starting to include elements of augmented reality in the educational process. As part of the course “Theory and Methods of Teaching Computer Science”, students studied historical facts, basic terms, examples of applications for augmented reality. As the main advantages of the proposed option for using augmented reality technology for training of future teachers of the digital school, we note: the ability to organize concentric references to topics, structuredness and filling in accordance with the school curriculum, practice-orientedness of the system of educational tasks, feedback, access to all methodological developments.

4.3. Experimental assessment

4.3.1. The ascertaining stage of the experiment

At the first stage of the experiment, to assess the input conditions, materials of specially organized testing were used, taking into account the priorities of the digital society, the requirements of the standard for the teacher labor activity. In total, the control event contained 75 tasks: 25 on the course Computer Science, 25 on the course Methods of Teaching Computer Science, 25 on working with the condition of the professional/practice-oriented task. For the correct and complete solution of each task, the student received 2 points.

Here is an example of a task on the Theory and Methodology of Teaching Computer Science: “Choose the correct statement characterizing the essence of innovative technology: Yandex.Disk is the world's first service for unlimited subscription to virtual reality applications, including educational; using Maya, any user can create virtual reality without professional programming knowledge; AR function in Search allows you to view and interact with 3D objects directly from Search and place them in their own space, which gives a sense of scale and detail; HTML – allows you to design 3D models for engineering graphics”.

An example of a task on the school subject Computer Science: “Match the type of hardware and its definition.

The first list: Personal computer; Mobile phone; Smart-TV; PlayStation.

The second list: a device for receiving and displaying graphics, sound; an electronic device designed and built for video games; an electronic device intended to be operated by one user; a tool designed to work in the networks of mobile operators”.

An example of a task for working with the task condition: the task is “Selection of array elements by criterion (recalculate, output, add)”. Select from the list of tasks those that do not correspond to this type: find the sum of grades for the term, determine the number of unsatisfactory grades, and calculate the arithmetic mean for the subject.

Thus, for completing the control event the students could score 150 points. The marks were set as follows: “excellent”, if students scored 140 points or more; “good” if the number of points scored was in the range from 101 to 139 points; “satisfactory” for the interval from 76 to 100. In all other cases, the student got “unsatisfactory”. The mark “excellent” corresponded to the high level of the professional competence of the future teacher of the digital school, “good” and “satisfactory” – to average, in other cases the level was defined as low.

As a result of the entry control event, almost the same initial level of preparedness of the students-participants in the pedagogical experiment was revealed. We can consider them as a total sample of 74 people. Thus, the experimental (37 students) and control (37 students) groups were formed. Characterizing the sample, we note that 60 % of girls and 40 % of boys are in the experimental group.

4.3.2. Forming stage of the experiment

At the forming stage of the experiment norms and requirements of the current standard for the labor activity of the teacher in the digital school were analyzed. The provisions of the current state federal educational standards determine that within the framework of professional competences the student must be able to advise and use fundamental knowledge in the field of computer science in professional activities; have skills related to information and communication technologies, formed by communicative competence, the ability to work in a team ([Prikaz Mintruda...](#)). The labor activity of the digital school teacher is characterized by: work planning; flexibility of mind, the ability to look at the object of knowledge from different angles; persistence; openness of perception to the search for new solutions; ability to comprehend, critical assessment of the results.

To implement these requirements, support labor functions, the following types of tasks were used: situational-motivational (encourage the search for new knowledge); support tasks (set the direction for development of the plot, conditions); borderline (serve as a basis for further research, connect the points of the trajectory of the student's development from "existing knowledge to new knowledge"). The solution of all presented tasks corresponds to the specifics of future professional activities.

Then the control group studied the course "Theory and Methodology of Teaching Computer Science" using traditional methods and software (presentations, teaching materials, audio recordings, etc.). Mind maps were created using Xmind, quests were implemented using the Learnis environment, and sticker boards were used to memorize terms. Results of the cognitive activity were also discussed in the group.

For the experimental group, methods and means of the augmented reality technology were used. Thus, students of pedagogical training programs were actively involved in cognition, experiment and information interaction. Some of the educational solutions based on AR applications are presented by them at international conferences (for example, the X International Conference-Competition "Innovative Information and Pedagogical Technologies in the IT Education System" and noted by experts.

4.3. 3. Control stage of the experiment

At the control stage of the experiment, a repeated measurement was carried out – testing consisted 75 tasks, for each of which 2 points were given. The quality of training and the level of formation of the professional competence of the future teacher of the digital school was determined according to the criteria described earlier.

Examples of the final control testing tasks.

The question on the theory and methodology of teaching computer science: "From the list of scientists who have contributed to the informatization of education, cross out the names of those who are not the author of school textbooks on computer science and ICT. The list: A.P. Ershov, A.G. Gein, V.G. Zhitomirsky, I.V. Robert, A.G. Asmolov, K.K. Kolin, A.A. Kuznetsov".

The question on the school subject Computer Science: "Compare the object of the real world with its possible information models.

Object: Construction company, Cat, Saturn, Country house, Clinic patient, Flower, Chemical element, Kirov.

The information model: Verbal description of the plant, House plan, Review on the official website, Animal photo, Mendeleev's table, Globe, City map, Medical card".

The question on working with the condition of the task. When completing the task, the student received 11 points. From the proposed formulations of the tasks, choose the one that can lead to such a result.

1. How much information is contained in the message: "PlayStation".
2. Wanting to help friends, the student carefully whispers the answer to his neighbor: "Chlorine". The last student wrote "Bor" in the reply. Only the first student received a point for this answer. How and how many times has information been distorted?
3. Create a program that generates a character string consisting of N stars ($5 \leq N \leq 25$).

The statistical analysis of the reliability of the results of the pedagogical experiment was carried out using the χ^2 (chi-square) Pearson test.

Let us formulate the hypothesis:

H₀: the level of skills that form the basis of the professional competence of the future teacher of the digital school, after the inclusion of the methods and means of augmented reality in the educational and cognitive activity of students, remained unchanged.

H₁: the level of skills that form the basis of the professional competence of the future digital school teacher has increased.

The results of the measuring activity before and after the experiment for the students of the control and experimental groups are presented in [Table 1](#).

Table 1. The results of the test

Level	The number of tested (people)			
	Experimental group (37 students)		Control group (37 students)	
	Before	After	Before	After
High	3	10	3	5
Average	16	23	17	18
Low	18	4	17	14

We calculate the value of the criterion statistics before ($\chi^2_{obs.1}$) and ($\chi^2_{obs.2}$) the experiment using the online resource <http://medstatistic.ru/calculators/calchit.html>. Let's choose the significance level $\alpha = 0,05$. In this case, $c = 3$, which means that the number of degrees of freedom $\nu = c - 1 = 2$. According to the distribution tables χ^2 for $\nu = 2$ and $\alpha = 0,05$, the critical value of the statistics is 5,99. Thus, we obtain: $\chi^2_{obs.1} < \chi^2_{crit}$ ($0,06 < 5,99$), and $\chi^2_{obs.2} > \chi^2_{crit}$ ($7,83 > 5,99$). Consequently, H_0 is rejected and hypothesis H_1 is accepted. In other words, the use of the augmented reality technology when training future teachers of the digital school contributes to an increase in the quality of education and formation of personality traits that form the basis of professional competence.

5. Discussion

The sample of students was not probabilistic, since the experimental and control groups were formed in such a way as to guarantee the presence in each group of students having similar skills and personality traits, which form the basis of the professional competence of the future teacher of the digital school, and their identical distribution. For diagnostics, the results of the input control were taken into account. The selection of participants for the experiment and the sample size are justified by the specifics of the study: the study of the theory and methodology of teaching computer science, the use of augmented reality for educational purposes is included in the training program for a limited number of specialities. Throughout the experiment, practical activities for solving professionally oriented problems, supported by AR applications, were carried out by the same teacher, using the same software in special classrooms. The implementation took into account the basic didactic principles, the functionality of augmented reality tools.

As the practice has shown, currently there is an opportunity to work with ready-made developments and AR applications, which does not require any additional knowledge, time and funds to create them. Most of free applications have a simple and convenient interface that even a beginner can easily use (without any instructions). AR apps can be used to explore a variety of educational topics, intensifying the educational process. Additional conditions are being created for development of qualities and competences that are most in demand in the modern information society.

In general, the dynamics of values by the levels of the professional competence testifies to a qualitative improvement in the indicators of learning and formation of the monitored personality traits in the experimental group (see [Figure 1](#)).

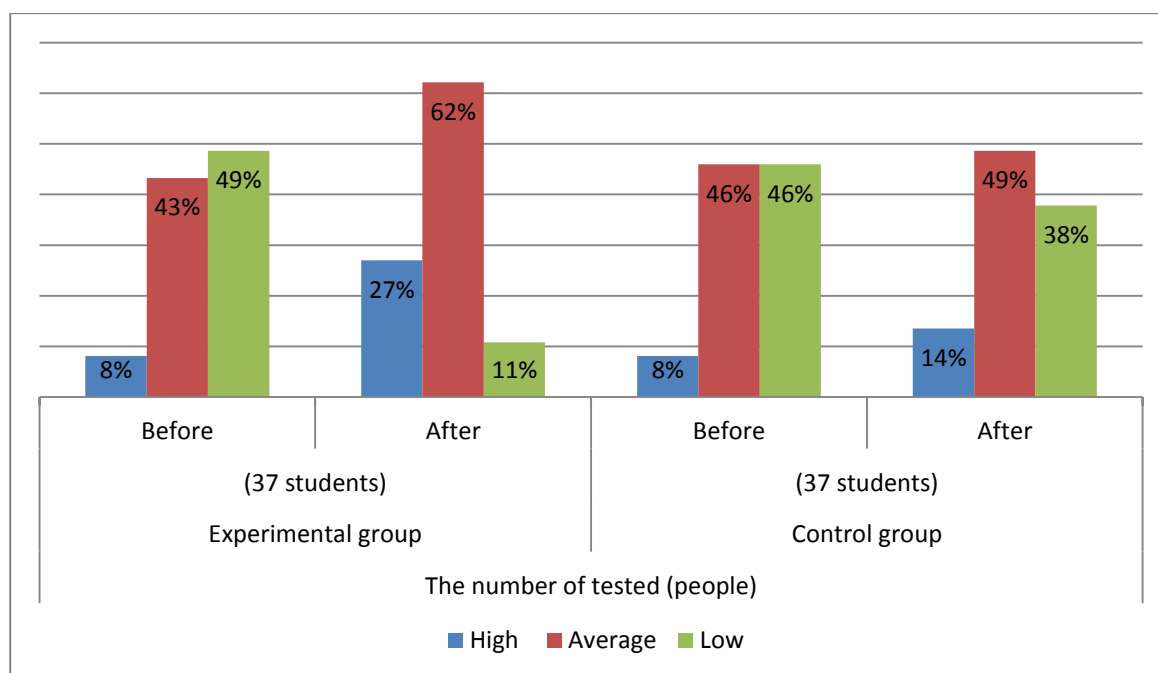


Fig. 1. Dynamics of changes in the level

Performing the quantitative analysis of the above results, we can conclude that after the completion of the experiment, 27 % of the students in the experimental group had a high level of skills that form the basis of computational thinking, while initially this percentage was 8 %. The share of students, the level of computational thinking of whose was initially determined to be low, decreased qualitatively from 49 % to 11 %. It can be argued that most of these participants are those respondents who initially had an average level, i.e. made mistakes in solving tasks of the future labor activity.

The dynamics of changes in the control group is less significant. So, only for 14 % of students in the control group at the control stage of the experiment, the level of skills that form the basis of the professional competence of the future teacher of the digital school turned out to be high. This percentage was also originally 8 %. The share of students, the level of professional competence of whose was initially determined to be low, decreased qualitatively from 46 % to 38 %.

So, when preparing the future teacher for the digital school, the augmented reality technology can and should be used as an auxiliary tool to increase the visibility and interactivity of the subject being studied, to support the study and understanding of fundamental scientific theories in the course of solving professionally oriented tasks. However, one should understand and minimize negative factors of the impact of new digital means on personal development. Thus, the digital school teacher becomes a highly qualified specialist and maximally prepared for challenges of the future.

6. Conclusion

The study presents the solution to the problem caused by the need to resolve the contradiction between society requirements for the quality of training the future teacher of the digital school and the insufficiently developed methodological system for using the augmented reality technology when training graduates that meets these requirements.

The obtained results allowed us to draw the following conclusions regarding the assessment of the impact of the augmented reality technology on formation of students' professional competence.

1. The existing opportunity to work with ready-made developments and AR applications allows to effectively simulate virtual educational spaces without requiring the teacher to have special additional knowledge, time and funds to create them.

2. AR applications contribute to motivation, development of the cognitive interest, and improvement of the quality of professional training by increasing information flows of interaction

between participants in the didactic process. There is a transformation of the role of teachers and trainees.

3. The AR technology supports principles of visibility, accessibility, completeness and interactivity for formation of figurative thinking and spatial imagination (3D visualization, adaptation to the specific needs of each user).

4. The AR environment makes it possible to implement feedback mechanisms at a qualitatively different level, since augmented reality superimposes computer-generated visual, audio and tactile signals on the person's natural field of vision, auditory and tactile background, respectively. Navigational data, remote projection allow supporting epistemological processes.

5. The distracting nature of the AR technology. A large amount of information appears in the field of view of the student, which overloads the perception and the nervous system. In the course of the study, there are negative factors of influence on the psychological component of the student's personality (increased excitability, emotional burnout, headaches), increased risks of violation of confidentiality and data integrity. For many people augmented reality means were perceived as opportunities to manipulate another object, to realize aggression.

6. When using AR resources, new threats of data theft appear.

7. Not every student or teacher can afford means that implement the augmented reality technology.

The carried out experiment confirmed the undoubted advantages of the augmented reality technology for enhancing learning and improving the quality of training future teacher of the digital school.

As methodological recommendations for teachers planning to include this technology in the learning process we note: the need to regulate the use of AR resources; alternation of activities, traditional methods and teaching aids with innovative; inclusion of physical education and elements of neuro-gymnastics; instructing students on safe work with network and virtual resources. Thus, it is important not only to form the professional competence. It is necessary to teach students objective analytics and assessment of information coming to them from the AR space; analysis of possible threats arising from the use of the augmented reality technology.

The results of the research can be used in scientific and methodological work for development of didactic traditions in the field of forming the professional competence and also for development of digital literacy, information culture of the individual in general.

References

[Abad-Segura, 2020](#) – *Abad-Segura, E.* (2020). Sustainability of educational technologies: An approach to augmented reality research. *Sustainability (Switzerland)*. 12(10). DOI: 10.3390/su12104091

[Arif, 2019](#) – *Arif, F.K.M., Zubir, N.Z., Mohamad, M., Yunus, M.M.* (2019). Benefits and challenges of using game-based formative assessment among undergraduate students. *Humanities and Social Sciences Reviews*. 7(4): 203-213. DOI: <https://doi.org/10.18510/hssr.2019.7426>

[Bacca et al., 2019](#) – *Bacca, J., Baldiris, S., Fabregat, R., Kinshuk, K.* (2019). Framework for designing motivational augmented reality applications in vocational education and training. *Australasian Journal of Educational Technology*. 35(3): 102-117. DOI: 10.14742/ajet.4182

[Bonsignore, 2016](#) – *Bonsignore, E.M.* (2016). Playing for Real: Designing Alternate Reality Games in Learning Contexts. *Digital Repository at the University of Maryland*. DOI: <https://doi.org/10.13016/M2HN4C>

[Cherkasov et al., 2017](#) – *Cherkasov, K.V., Chistyakova, N.S., Chernov, V.V.* (2017). Primenenie dopolnnoi real'nosti v obrazovanii [The use of augmented reality in education]. *Problemy pedagogiki. Nauki ob obrazovanii*. 1(24): 40-41. [in Russian]

[Fan et al., 2020](#) – *Fan, M., Antle, A.N., Warren, J.L.* (2020). Augmented reality for early language learning: A systematic review of augmented reality application design, instructional strategies, and evaluation outcomes. *Journal of Educational Computing Research*. 58(6): 1059-1100. DOI: <https://doi.org/10.1177/0735633120927489>

[Geng, Yamada, 2020](#) – *Geng, X., Yamada, M.* (2020). An augmented reality learning system for japanese compound verbs: Study of learning performance and cognitive load. *Smart Learning Environments*. 7(1). DOI: <https://doi.org/10.1186/s40561-020-00137-4>

Ivanova, 2018 – Ivanova, A.V. (2018). Tekhnologii virtual'noi i dopolnnoi real'nosti:vozmozhnosti i prepyatstviya primeneniya [Virtual and augmented reality technologies: opportunities and barriers of using]. *Strategicheskie resheniya i risk-menedzhment. Komp'yuternye i informatsionnye nauki*. 3(108): 88-107. [in Russian]

Kalyanova, 2019 – Kalyanova, L.M. (2019). Motivation research and development of educational and cognitive activity of technical university students. *International Journal of Innovative Technology and Exploring Engineering*. 9(1): 3730-3734. DOI: <https://doi.org/10.35940/ijitee.A4802.119119>

Kotenko, 2020 – Kotenko, V.V. (2020). Problemy i vozmozhnosti primeneniya tekhnologii dopolnnoi i virtual'noi real'nosti v prepodavanii inostrannogo yazyka [Problems and possibilities of using technologies of augmented and virtual reality in teaching a foreign language]. *Uchenye zapiski universiteta im. P.F. Lesgafta. Nauki ob obrazovanii*. 3(181): 252-257. DOI: [10.34835/issn.2308-1961.2020.3.p252-258](https://doi.org/10.34835/issn.2308-1961.2020.3.p252-258)

Kulikova, Poddubnaya, 2020 – Kulikova, T.A., Poddubnaya, N.A. (2020). Formirovanie gotovnosti budushchego uchitelya k ispol'zovaniyu tekhnologii virtual'noii dopolnnoi real'nosti v usloviyakhtsifrovizatsii obrazovaniya [Formation of future teacher's readiness for use of virtual and augmented reality technologies in the conditions of education digitalization]. *Vestnik Severo-Kavkazskogo federal'nogo universiteta*. 3(78): 172-177. [Electronic resource]. URL: <https://www.elibrary.ru/item.asp?id=43895876> [in Russian]

Liao, 2020 – Liao, T. (2020). Standards and their (recurring) stories: How augmented reality markup language was built on stories of past standards. *Science Technology and Human Values*. 45(4): 712-737. DOI: <https://doi.org/10.1177/0162243919867417>

Lu et al., 2019 – Lu, S., Liu, Y., Lin, M., Lu, F. (2019). Evaluating reading material formats on children learning in science education. *International Journal of Information and Education Technology*. 9(2): 99-104. DOI: <https://doi.org/10.18178/ijiet.2019.9.2.1181>

Marín-Díaz et al., 2020 – Marín-Díaz, V., López-Perez, M., Fernández-Robles, B. (2020). Rafodium: A social nets about augmented reality created in google+. [Rafodium: Una red social sobre realidad aumentada creada en Google +] Pixel-Bit. *Revista De Medios y Educacion*. 59: 225-240. DOI: <https://doi.org/10.12795/pixelbit.69626>

Marcel, 2019 – Marcel, F. (2019). Mobile augmented reality learning objects in higher education. *Research in Learning Technology*. 27. DOI: [10.25304/rlt.v27.2133](https://doi.org/10.25304/rlt.v27.2133)

Martín-Gutiérrez et al., 2017 – Martín-Gutiérrez, J., Mora, C.E., Añorbe-Díaz, B., González-Marrero, A. (2017). Virtual technologies trends in education. *Eurasia Journal of Mathematics, Science and Technology Education*. 13(2): 469-486. DOI: <https://doi.org/10.12973/eurasia.2017.00626a>

Nguyen et al., 2018 – Nguyen, N., Muilu, T., Dirin, A., Alamäki, A. (2018). An interactive and augmented learning concept for orientation week in higher education. *International Journal of Educational Technology in Higher Education*. 15(1). DOI: [10.1186/s41239-018-0118-x](https://doi.org/10.1186/s41239-018-0118-x)

Obdalova, Odegova, 2018 – Obdalova, O.A., Odegova, O.V. (2018). Mezhkul'turnaya i mezh'yazykovaya kommunikatsiya kak novaya real'nost' v kontekste globalizatsii [Intercultural and interlingual communication as a new reality in the context of globalization]. *Vestnik Tomskogo gosudarstvennogo universiteta. Filosofiya. Sotsiologiya. Politologiya. Yazykoznanie i literaturovedenie*. 44. DOI: [10.17223/1998863X/44/7](https://doi.org/10.17223/1998863X/44/7) [in Russian]

Padilla et al., 2019 – Padilla, D.B., Vázquez-Cano, E., Morales Cevallos, M.B., Meneses, E.L. (2019). Use of augmented reality apps in university classrooms [Uso de apps de realidad aumentada en las aulas universitarias]. *Campus Virtuales*. 8(1): 37-48. [Electronic resource]. URL: www.scopus.com

Pasport natsional'noi... – Pasport natsional'noi programmy "Tsifrovaya ekonomika Rossiiskoi Federatsii" (utv. prezidiumom Soveta pri Prezidente RF po strategicheskomu razvitiyu i natsional'nym proektam, protokol ot 24.12.2018 N 16). [Electronic resource]. URL: <http://government.ru/info/35568/> [in Russian]

Piriyasurawong, 2020 – Piriyasurawong, P. (2020). Scaffolding augmented reality model to enhance deep reading skill. *TEM Journal*. 9(4): 1760-1764. DOI: <https://doi.org/10.18421/TEM94-58>

Prikaz Mintruda... – Prikaz Mintruda Rossii ot 18.10.2013 N 544n (red. ot 05.08.2016) "Ob utverzhenii professional'nogo standarta "Pedagog (pedagogicheskaya deyatel'nost' v sfere doskol'nogo, nachal'nogo obshchego, osnovnogo obshchego, srednego obshchego obrazovaniya)

(vospitatel', uchitel')" (Zaregistrovano v Minyuste Rossii 06.12.2013 N 30550). [Electronic resource]. URL: http://www.consultant.ru/document/cons_doc_LAW_155553/ (date of access: 16.03.2020). [in Russian]

[Radkowski et al., 2015](#) – Radkowski, R., Herrema, J., Oliver, J. (2015). Augmented Reality-Based Manual Assembly Support With Visual Features for Different Degrees of Difficulty. *International Journal of Human-Computer Interaction*. 31(5): 337-349. DOI: <https://doi.org/10.1080/10447318.2014.994194>

[Raisamo et al., 2019](#) – Raisamo, R., Rakkolainen, I., Majaranta, P., Salminen, K., Rantala, J., Farooq, A. (2019). Human augmentation: Past, present and future. *International Journal of Human Computer Studies*. 131: 131-143. DOI: <https://doi.org/10.1016/j.ijhcs.2019.05.008>

[Rumyantsev, Rudov, 2016](#) – Rumyantsev, M., Rudov, I. (2016). Project Activities of the Chair for Digital Humanities and Modern Trends in the Development of Information Technology. *Journal of Siberian Federal University. Humanities & Social Sciences*. 9(7): 1668-1673. DOI: <https://doi.org/10.17516/1997-1370-2016-9-7-1668-1673>

[Sarkar et al., 2020](#) – Sarkar, P., Kadam, K., Pillai, J.S. (2020). Learners' approaches, motivation and patterns of problem-solving on lines and angles in geometry using augmented reality. *Smart Learning Environments*. 7(1). DOI: <https://doi.org/10.1186/s40561-020-00124-9>

[Soboleva et al., 2018](#) – Soboleva, E.V., Galimova, E.G., Maydangalieva, Z.A., Batchayeva, K.K. (2018) Didactic value of gamification tools for teaching modeling as a method of learning and cognitive activity at school. *Eurasia Journal of Mathematics, Science and Technology Education*. 14(6): 2427-2444. [Electronic resource]. URL: <https://10.29333/ejmste/89843> (date of access: 01.09.20).

[Vázquez-Cano et al., 2020](#) – Vázquez-Cano, E., Marín-Díaz, V., Oyarvide, W.R.V., López-Meneses, E. (2020). Use of augmented reality to improve specific and transversal competencies in students. *International Journal of Learning, Teaching and Educational Research*. 19(8): 393-408. DOI: [10.26803/ijlter.19.8.21](https://doi.org/10.26803/ijlter.19.8.21)

[Voronina et al., 2019](#) – Voronina, M.V., Tretyakova, Z.O., Krivonozhkina, E.G., Buslaev, S.I., Sidorenko, G.G. (2019). Augmented reality in teaching descriptive geometry, engineering and computer graphics-systematic review and results of the russian teachers' experience. *Eurasia Journal of Mathematics, Science and Technology Education*. 15(12): 1-17. DOI: [10.29333/ejmste/113503](https://doi.org/10.29333/ejmste/113503)

[Vidal-Balea et al., 2020](#) – Vidal-Balea, A., Blanco-Novoa, O., Fraga-Lamas, P., Vilar-Montesinos, M., Fernández-Caramés, T.M. (2020). Creating collaborative augmented reality experiences for Industry 4.0 training and assistance applications: Performance evaluation in the shipyard of the future. *Applied Sciences (Switzerland)*. 10(24): 1-23. DOI: <https://doi.org/10.3390/app10249073>

[Williams, Ortega, 2020](#) – Williams, A.S., Ortega, F.R. (2020). Understanding gesture and speech multimodal interactions for manipulation tasks in augmented reality using unconstrained elicitation. *Proceedings of the ACM on Human-Computer Interaction*. 4. Article No. 202. DOI: <https://doi.org/10.1145/3427330>

[Zhuravlev, Nestik, 2019](#) – Zhuravlev, A.L., Nestik, T.A. (2019). Sotsial'no-psikhologicheskie posledstviya vnedreniya novykh tekhnologii: perspektivnye napravleniya issledovaniy [Socio-psychological consequences of introduction of new technologies: promising research areas]. *Psikhologicheskii Zhurnal*. 40(5): 35-47. DOI: <https://doi.org/10.31857/S020595920006074-7> [in Russian]



Copyright © 2021 by Academic Publishing
House Researcher s.r.o.
All rights reserved.
Published in the Slovak Republic
European Journal of Contemporary Education
E-ISSN 2305-6746
2021. 10(2): 375-394
DOI: 10.13187/ejced.2021.2.375
www.ejournal1.com

IMPORTANT NOTICE! Any copying, reproduction, distribution, republication (in whole or in part), or otherwise commercial use of this work in violation of the author(s) rights will be prosecuted in accordance with international law. The use of hyperlinks to the work will not be considered copyright infringement.



Development and Implementation of Integrated Curriculum in Management Studies

Algis Junevicius ^a, Ona Juneviciene ^b, Gabriele Cepeliauskaite ^{a,*}, Rasa Daugeliene ^a

^a Kaunas University of Technology, Lithuania

^b Kaunas University of Applied Sciences, Lithuania

Abstract

Global economic and social challenges in the World require fundamental changes in quality assurance in higher education institutions at the national and international level. Higher education institutions are encouraged to adjust study programs, which would meet the current requirements and needs of the labor market and individuals. Integrated curriculum is one of the measures, which could transform traditional educational paradigm and contribute to higher quality and relevance of learning and teaching. Therefore, this article addresses development and implementation issues of the integrated curriculum with the aim to provide the concept of integrated study program and discuss the opportunities for its application in educational institutions. The theoretical part of the paper gives a brief review of the meaning of the concept of integrated curriculum, the basis for development of such study programs and the connection of such curriculum with requirements of the labor market. Accordingly, the practical part presents the findings of empirical research about the implementation of integrated curricula in Kaunas University of Applied Sciences. The results of the study revealed integrated curriculum meets the students' expectations when the assessment of such programs is ensured constantly.

Keywords: integrated curriculum, integrated curriculum implementation, curriculum development, concept development, curriculum integration models, curriculum design.

1. Introduction

The Bologna process has created a single European Higher Education Area (EHEA) highlighting the importance of the programs based on learning outcomes. They ensure higher quality of learning and provide the possibility to apply more individualized learning techniques as well as to create preconditions to compare the quality of curricula on an international scale. The importance of updating the study content and the curriculum reform as well as a student-

* Corresponding author

E-mail addresses: Gabriele.cepeliauskaite@ktu.lt (G. Cepeliauskaite), algis.junevicius@ktu.lt (A. Junevicius), ona.juneviciene@go.kauko.lt (O. Juneviciene), rasa.daugeliene@ktu.lt (R. Daugeliene)

centered approach alongside with students learning outcomes was highlighted in several communications issued by the ministers of higher education of the countries of the Bologna process. In the conference of 2009 in Leuven/Louvain-la-Neuve, the results of the first decade of the Bologna process were summarized and the guidelines for a new decade were established ([The Bologna process, 2009](#)). The new priorities of the EHEA were identified in the Communication “The Bologna process 2020 – EHEA in the new decade”. The conference stated that the focus of attention should be transferred from the organization of the study process and development of academic subjects to the student, to his/her needs and abilities, which are determined by the labor market and by the agreement of all partners of the study process. The schools of higher education are to focus on the program quality of all the study stages. Flexible learning paths, diversity of higher learning systems perfectly meet the changing reality of the modern world. During the decade until the year 2020, the European higher education had to make an essential contribution to creating a really innovative knowledge-based Europe. Globalization and rapid development of technologies is a great challenge producing new opportunities for higher education, which means a wide range of suppliers of education services, different students and innovative learning techniques. Integrated curriculum is designed to develop the necessary skills for the changing labor market and to help the students become active and responsible citizens.

The Motion for a European Parliament Resolution on Follow-up on the implementation of the Bologna Process as of 2015 also stressed that to overcome new challenges, the student-centered teaching and learning are necessary, which sometimes failed to be recognized as an important part of the structure of the European scientific degrees and were not properly integrated in the university programs. The educational paradigm should be transferred from *what is taught to what the students are to learn*. Social aspects of the process are considered the most neglected features of the European higher education areas. In that respect, the role of higher education is to provide the students with the necessary knowledge, abilities, competence and opportunities to develop them throughout their professional career. A regular dialogue with employers, implementation of the competence-based programs and watch of the graduates’ career development should be maintained in order to enhance the employment possibilities ([Motion for a European Parliament Resolution, 2015](#)).

The importance of study quality improvement is highlighted in the report of the Education, Audiovisual and Culture Executive Agency (EACEA) of the European Commission “The European Higher Education Area in 2018: Bologna Process Implementation Report ([European Commission/EACEA/Eurydice, 2018](#))”. The report stresses the importance of graduate employment, which still remains a significant problem in some parts of Europe, and lack of relationship between higher education institutions and the employers in curricular planning. Accordingly, higher education institutions should ensure that in each stage of education the students acquire competences, which are necessary for integration in the labor market. They should pursue that goal by intensifying the dialogue with the business sector and by applying the most appropriate model for combining theoretical and practical disciplines. The Report (2018) also highlights the importance of flexibility in higher education. It refers to different ways of enabling individuals to follow educational paths adapted to their needs. This section focuses on one aspect of flexibility in higher education, namely flexible modes of delivery of higher education programs. Students may study for more innovative degrees by following a learning path in two different subject areas.

Previously mentioned political documents call the European higher education institutions to modernize curriculum referred to as the main study unit, apply the study outcome-based approach, define and describe qualifications of the specialists. Scientists extensively analyze advantages and disadvantages of the integrated curriculum on the institutional, national and international levels. However, current scientific findings reveal lack of empirical evidence to prove a success of integrated curricular ([Drake et al., 2015](#); [Wall, Leckie, 2017](#); [Gürkan, 2020](#)). Therefore, this paper looks deeply into the concept of the integrated curriculum and discusses the opportunities for its application in higher educational establishments by analyzing the case study of Kaunas University of Applied Sciences. The paper provides the answers to the three main research questions: 1) How can integrated curriculum be defined? 2) What are the specific features of integrated curriculum?, and 3) What essential characteristics should be highlighted for their identification, construction and implementation?

The paper is distinguished into two parts – theoretical and practical, which are based on different methods. In the theoretical analysis authors use logical method, systematic analysis and

generalization method. Logical method is used for making a substantiated generalization of the collected facts and formulating transitional as well as final conclusions of the research. The method of systematic analysis was applied for systemic evaluation of the models used for the development of integrated curriculum. Together with the logical method, the generalization method was used which helped to identify general and major features and characteristics of mechanisms analyzed in this paper. The theoretical part was expanded by empirical study of Kaunas University of Applied Science, which is based on the quantitative research method – questionnaire survey. Subsequently, the results of the implementation of integrated curricular are presented comparing two research stages. Finally, the authors discuss the theoretical and practical implications of the findings and provide the answers to the research questions.

The Conception and Models of Curriculum

The outcomes of the global financial and economic crisis make the society strive for sustainable recovery and growth. Dynamic and flexible European higher education needs innovations based on integration of studies and research on all levels. Consequently, the interest for integrated curriculum is increasingly growing not only on the institutional, but also on the international levels. However, defining integrated curriculum has been a topic of discussion since the turn of the 20th century and in 2020 this paradox is still relevant (Drake, 2007). Drake et al. (2015), Wall, Leckie (2017) stressed the lack of a clear definition and empirical evidence of success of integrated curriculum. Moreover, the recent findings of Gürkan (2020) study on the preparation, implementation and effects of integrated curricular also revealed the same issues stating that there is no common understanding of what an integrated curriculum is, even if there are a number of various definitions in the theory. Also, the author argued that solid empirical research of success of integrated approaches are needed (Gürkan, 2020). There are more additional questions many curriculum developers still raise, such as: 1) How to exactly define the integrated curriculum, interdisciplinary relations and their basis, should it be knowledge or skills? 2) What are the links of disciplines with the requirements of the labor market? and 3) What outcomes should be achieved in studying a particular curriculum? According to these questions, the answers can be found in the concepts of the integrated curriculum.

Scientists use many different definitions for integrated curriculum (Jacobs, 1989; Fogarty, Pete, 2009; Mathison, Freeman, 1997; Drake, 2007; Badley, Henry, 2009; Drake et al., 2015). In general, integrated curricular can be defined as connection of multiple content enhancing learning from one subject to another (Fletcher et al., 2018) that ensures student learning through higher-level thinking processes (Wall, Leckie, 2017) and improves understanding of knowledge usability in daily life (Bintz, Monobe, 2018; Hammond, 2017). Mathison, Freeman (1997) in analyzing the integrated curriculum suggest that “interdisciplinary/integrated/integrative approaches are not simply attempts to combine two or more knowledge bases, but also to do so in ways that are more inquiry oriented, hands-on, and connected to the real world”. Jacobs (1989) defines interdisciplinary as “a knowledge view and curricular approach that consciously applies methodology and language from more than one discipline to examine a central theme, issue, problem, topic, or experience”. Badley and Henry (2009), however, stresses integration connections between two or more disciplines. According to the authors, “integration involves curriculum or instruction that combines, draws upon or encourages students to see connections between the contents of two or more academic disciplines” (Badley, Henry, 2009). Drake et al. (2015) stress that “interdisciplinary programs tend to go for the “big picture” in order to incorporate multiple disciplines”, however, many of the programs called “integrated” do not reflect the real essence of integrated programs. Therefore, it should be noted that curriculum integration takes a variety of forms, including the course integration, cross-curriculum integration, school-wide integration and career academies. That is confirmed by Jacobs (1989), Drake and Burns (2004), Klein (2010), Meeth (1978) and other authors who single out multidisciplinary, interdisciplinary and transdisciplinary curriculum from integrated curriculum. The scientists, however, fail to adopt a unified opinion to define the core of the integrated curriculum. That concept does not occur in the documents regulating higher education. Very often authors identify connections as the main feature of the integrated curriculum. But what is the nature of these connections? Are they interdisciplinary connections or connections between the academic world and the world of work, or between knowledge and skills, or between the aim of the curriculum and

the learning outcomes? According to Bloom (2006), the approach that there exists an in-depth expansive learning, has been dominating up to now, and the confusion about the importance of integration may hinder its efficient and increasingly spreading implementation.

Often the definitions of integrated curriculum used as the synonyms of the integrated curriculum are interdisciplinary study programs which come across the subjects, focus on the comprehensive everyday problems or extensive studies of the main areas and combine different segments of the program into a meaningful link. In the integrated curriculum, several subjects are combined in one single project where the students deal with the important issues of the labor market as well as develop practical abilities. It can be argued that the integrated curriculum is a holistic approach to teaching, learning and designing study content, where conceptions, content, skills and aspects of more meaningful teaching are combined. Practically, there exist several models of curriculum integration. The authors in analyzing the aspects of designing, implementation and assessment of curriculum propose different levels and models of curriculum development which are to be consistently followed.

The researchers and practitioners propose different levels of program creation in analyzing the development of integrated curriculum. Jacobs (1989) proposed curriculum development of six levels (Discipline – based Content design, Parallel Discipline Design, Complementary Disciplines courses, Interdisciplinary courses, Integrated-Day Model, Complete program). Fogarty and Pete (2009) single out 10 levels of curriculum development in dealing with the improvement of integrated curriculum. Beginning within single disciplines (the fragmented, connected and nested models), author continuing with models that integrate across several disciplines (the sequenced, shared, webbed, threaded and integrated models) and closed this line with the immersed and networked models (Fogarty, Pete, 2009). Harden (2000) described the models of curriculum development, implementation and assessment as stairs consisting of 11 steps. In the first four steps (called Isolation, Awareness, Harmonization, Nesting) study disciplines and modules are specified. While rising up along other six steps (Temporal coordination, Sharing, Correlation, Complementary, Multidisciplinary, Interdisciplinary), integration of several individual subjects is stressed and interdisciplinary connections are intensified. When on the last, i.e. the eleventh step, referred to as the Transdisciplinary step, the students take greater responsibility for the integration process, the resources for implementation being provided. In this case the learning focus is the field of knowledge as exemplified in the real world. This idea is supported by Drake (2007), who argues that “students develop life skills as they apply interdisciplinary and disciplinary skills in a real-life context”. According to Loepf (1999), there exist three most popular integrated curriculum models applied in higher schools. The first is the so-called interdisciplinary model. Another model was named as a “problem-based” model, the core of which is the posed problem (i.e. economic, social or technological) dealt with by integrating several disciplines. In the third, theme-based model, several different subjects or themes occur through the entire curriculum and are addressed integrally. The importance of such models is recognized by Meeth (1978). The author suggests that “Interdisciplinary integration is the practice of connecting several disciplines to one problem, issue, or theme from life”. Interdisciplinary integration involves relating whole to part, part to whole, and part to part. The main characteristics of these models are represented in Table 1.

Table 1. Characteristics of integrated curriculum models (prepared by the authors, 2021)

Multidisciplinary Integration	Interdisciplinary Integration	Transdisciplinary Integration
Aim of the curriculum is to acquire knowledge in individual subjects without integration.	Aim of the curriculum is to develop holistic thinking and to integrate knowledge in several disciplines.	Aim of the curriculum is to abandon disciplinary approach and step beyond the borders of not only disciplines but also beyond those of science fields.
Disciplines are paralleled.	Equal disciplines are integrated.	Individual disciplines disappear.
The themes of individual subjects are used to deal	Complex problems are analyzed.	Situations of the real world of work are used in the study process.

with the problem to be analyzed.		
Students deal with individual themes in several subjects.	Students are motivated to see relations and connections across individual disciplines.	Students integrate knowledge and seek goals by means of individual techniques and personal abilities.
Teachers use this approach organizing standards from the disciplines around a theme.	Teachers organize the curriculum around common learnings across disciplines and emphasize students' interdisciplinary skills and concepts.	Teachers organize curriculum around student questions and concerns and use main teaching and learning method project-based learning.

Multidisciplinary approach can be defined as coexistence of disciplines, when a common problem is addressed; however, different disciplines fail to really influence one another, the acquired knowledge and methods remaining within the framework of individual disciplines. Interdisciplinary integration makes itself evident as an interaction and integration of equal disciplines created in research and studies by means of active cooperation between researchers and teachers to deal with complex problems while acquiring a holistic understanding of those problems. In transdisciplinary integration the disciplines tend to merge, fundamental and practical knowledge is combined, representatives of different disciplines and members of non-academic community cooperate to deal with complex problems of business and/or society.

The core and preferential treatment of integrated curriculum lie in the fact that they are theme-based and reflect the requirements of the labor market. They are “thorny”, problem-based, the problems being routinely dealt with by professionals. Being authentic, the problems of the real world are transferred to the classes of the academic environment, individual works and team-based situational training. The example of participation in the debates on the relation between fast food consumption and obesity can serve as an example of the model of a concrete integrated curriculum, the problem being discussed in the classes of biology, a foreign language, marketing, consumers' behavior or business economics. The theme gains a new meaning and relevance when the students understand that they themselves can be involved in the problem mentioned. There is a need to actively show students how different subject areas influence their lives, and it is critical that students realize the strength of each discipline perspective in a connected way.

Conception and Models of Curriculum analysis revealed that the integrated curriculum provides opportunities for students to explore not only the content of the subject, but also to identify links between individual subjects and themes, to develop their capacity of thinking and promote imagination and creativity. Employers keep saying that they prefer specialists who are innovative, creative, with aptitude for critical thinking and with collaboration skills. These skills, according to Meeth (1978), are developed in integrated curriculum-based studies. When it comes to fostering those skills in the classroom, integrated study is an extremely effective approach, helping students develop multifaceted expertise and grasp the important role interrelationships can play in the real world. According to the opinion of the authors of this paper, the integrated curriculum in social sciences should be problem-based and seeking learning outcomes as well as developing extensive competences. The model chosen by the model developers is not of the greatest importance; however, it is very important that the goals set by the curriculum and the complex learning outcomes are achieved.

Implementation of the Integrated Curriculum

Integration is one of the core of educational strategies in modern studies. In the discussions on practical application of integrated curriculum, however, the authors fall into two opposing groups: some are in favor of the integrated curriculum and work hard for their implementation, while others oppose integrated curriculum, thus giving priority to conventional subject-based study

programs. According to the authors, the problem occurs due to the fact that both, the program developers and their implementers, are not really aware of the program conceptions and stages of their design. They have not performed a thorough analysis of the integrated curriculum models. Shifting to the integrated curriculum calls for a systemic reform. Naturally, development and realization of the integrated curriculum involve a lot of academic preparation, i.e. the schools have to get to know the stages of the integrated curriculum brought forward by the researchers, analyze the models, assess the teachers' competences and discuss the set learning outcomes and etc. The integrated curriculum should be implemented by studying multiple areas in units which can be combined according to themes or practical assignments. The techniques, however, following which the integration is carried out, are varied. Bloom (2006) proposes moving from a very rigid program towards a flexible individualized one. Figure 2 represents the process of curriculum implementation and a degree of integration (darkened area). A conceptual approach to integration implies further combination of different subjects as well as a declining influence of teachers and growing influence of students on the ongoing integration processes.

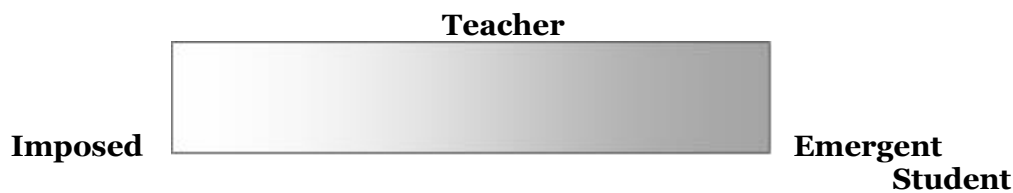


Fig. 1. A curricular continuum from imposed (mandated) to emergent (Bloom, 2006)

Implementation of integrated curriculum is a complicated process. Naturally, the question arises: what is the use of the integrated teaching/learning and what are the preconditions for successful implementation? The precondition of success is, above all, the awareness of learning philosophy, smart methodology as well as a comprehensible implementation strategy. The developers of the programs themselves have to understand the sense of the integrated curriculum, to study specific features of design and only then engage the teachers in the planning process. It is easier to increase the number of integrated modules gradually, when there is an agreement on the study aims, the resources, volume, the time and when teaching materials for the program are provided.

Another precondition for implementation is improvement of the teachers' competence. The teacher's improvement is to precede the student's "growth". Improvement should be holistic, integral, experience-based and engaging the teachers and students in interactive dialogues, teaching and learning workshops. Such engagement combines the potential of both teachers and students and is supposed to form a solid foundation for efficient improvement of teachers' competences. In implementing the integrated student-centered curriculum, development of the staff's competence is necessary (Clark, 1997). Realization of the integrated curriculum is a challenge for both teachers and students, because it involves the highest level of understanding integration and connections with the labor market. Thus, the role and class work of the teacher change, i.e. he/she shifts from the "central" figure into a person "showing the way" (Clayton et al., 2010; Cook, 2009). These changes in the first place cause some difficulties for the teachers. They have to engage the students in in-depth studies and enable them to make connections between subject areas and topics. Jacobs (1989) states that "the interdisciplinary model of teaching enables students to see the links between subject areas (e.g. the relationship between literature and history or mathematics and science)". Some teachers tend to oppose the programs and the change, because they lack understanding of their conception and are not really interested in the core of those programs. Some teachers have delivered the same subjects for years and prepared a lot of practical assignments, consequently, they are not ready for fundamental change. Constantly they tend to identify themselves with their subjects and are not willing to cross the borders of their comfort. The reason for this behavior is the lack of knowledge of the innovative teaching approaches and fear that the students will gain less, compared to studying different subjects separately. A great many of teachers fail to understand the very essence of the integrated curriculum; also, they are not comfortable enough to combine different subjects to implement the integrated curriculum. They need to be stimulated for collaborative work to develop models and get prepared for work.

To implement the curriculum, support from the academic community is absolutely necessary. A couple of enthusiastic teachers are not able to achieve good results. The move in one classroom or with one single module may come to nothing. Change is necessary in all the culture of the academic institution. The philosophy of any innovation should be thoroughly analyzed and spread over all learning community in various forms, i.e. in formal meetings, forums or informal discussions. According to Cook (2009), implementation of the integrated curriculum calls for not only competent teachers, but also for a strong devoted leader. The main role of the leader is to provide conditions to develop leadership ideas and give impetus for their realization. The leader alone, however, cannot make essential changes without the assistance of the positively thinking academic community open to systemic transformations.

With the mentioned characteristics provided in the theoretical part, Kaunas University of Applied Sciences was one of the first to implement an integrated curriculum for the field of management in 2011. The aims of those programs were the following:

- to integrate the aim, content and learning outcomes of the curriculum;
- to modernize the study process;
- to recognize different teaching/learning styles;
- to create partnership between teachers, students and employers;
- to motivate students for individual work and for taking over some share of responsibility.

The integrated curriculum of the field of management science at the University is implemented in stages. In the first stage the developers of the curriculum got acquainted with the curriculum conceptions and international practice of application. In the second stage the teachers took part in the refresher courses of developing integrated curriculum and shared experience with the employers. In the third stage, integrated individual assignments for several disciplines were developed in three curriculum of the field of management (business management, sales management and food business management). Methodological aids for students to deal with integrated tasks were prepared. In the fourth stage, following the piloted practical implementation of integrated studies, the Faculty of Business established project groups and in collaboration with the employers worked out two integrated curricula, i.e. Sports Management and Logistics. Later on it was prepared and implemented in others study programs, such as International Business, Sales and Marketing and etc. The University teachers and students, who are engaged in the curriculum, claim that the studies are interesting and attractive because the tasks can be performed creatively, the knowledge acquired from different subjects can be integrated and the problems can be solved by means of innovative measures. The involvement of several teachers in estimating integrated assignments often cause interesting and fruitful discussions leading to innovative solutions. This experience revealed that combining academic subjects can result in in-depth learning and a better understanding of interrelationship between them. The ability to integrate knowledge in different subjects is exhibited in preparing independent integrated courses and final projects, which address economic, management and socio-cultural problems of business enterprises. The integrated curriculum is favored by the university teachers and students.

2. Methodology

In regard to the problems discussed in the paper, the empirical research was carried out to measure the efficiency of the integrated curriculum in Kaunas University of Applied Sciences. The relevance of the research is determined by the opportunities of improving the content of the study program and the quality of its implementation at the University of Applied Sciences in order to achieve good quality results. For the empirical study, questionnaire survey was chosen as a research method, which is flexible for gathering quantitative data. The method was applied in order to investigate more respondents in a short time. Collection of quantitative and qualitative data and reversibility assurance of submitted questionnaires were also important factors. Moreover, for the assessments of the integrated study programs, the questionnaires were based on theoretical concepts analyzed in a theoretical part of the study ([Appendix Table 1](#), [Table 2](#)). The assessments were performed in two research stages according to four criteria: 1) structure and content of the curriculum, 2) organization of the study process, 3) quality of integrated projects and 4) assessment of students' academic achievements. The questionnaires included closed-ended,

open-ended questions and Likert scale questions (first stage – Appendix Table 1, second stage – Appendix Table 2).

According to the development of integrated curriculum in different study programs in Kaunas University of Applied Sciences, the empirical data was collected in two research stages. The first assessment was organized in 2016, collecting data from Sports Management, which was the first program, where integrated curriculum was applied. Therefore, the respondents of the survey were second-third-course students (total n=27, second course n=19, third course n=8). The questionnaire of the first survey is provided in Table 2. It is necessary to point out that the first survey was carried out in order to assess the programs, where integrated curriculum was applied. Subsequently, the second assessment of programs was organized on a wider scale in 2019, involving the programs, where integrated curriculum was applied later (first-second year students of Logistics (first course n=41), Sports Management (second course n=16), Food Industry Business Management (first course n=18), Sales and Marketing (total n=28, first course n=15, second course n=13), Business Management (total n=69, first course n=32, second course n=37)). Therefore, the amount of respondents increased.

Comparing the first and the second research stages, the questionnaire in the second assessment was developed and extended by additional questions, but the main criteria remained the same. The results of the assessment are presented in four charts according to set criteria: 1) assessment of structure and content of the curriculum, 2) assessment of study process organization, 3) assessment of integrated projects content and 4) assessment of students' academic achievements. To assess the research results, a five-score scale (1 is the lowest score, 5 – the highest) was used.

Statistical analysis was conducted in two different ways. The analysis of the first survey was performed by using IBM SPSS Statistics 21 software. Mean, Standard Error (SE), Standard Deviation (SD) and 95 % Confidence Intervals (95 % CI) were found by using Descriptive Statistics function (Explore).

It is necessary to point out that in this study CI is chosen to confidence level set at 95 %. Taking into consideration that CI is *<... a range of values for a variable of interest constructed so that this range has a 95 % probability of including the true value of the variable...>*, therefore, 95 % CI corresponds to hypothesis testing with $P < 0.05$ (Gupta, 2012).

The analysis of the second survey (secondary data) was carried out from aggregated averages of the courses assuming a single distribution. Weighted averages were computed accounting for different sample sizes in a data set. First, for each questionnaire item SE was assumed to be represented by SD of sampling distribution of different courses' averages and was computed by using STDEV.S function in MS Excel, while SD for each sample (course) for a given questionnaire item was found using SE formula (SE = standard error, s = the standard deviation for your sample and n is the number of items in your sample):

$$SE = \frac{\sigma}{\sqrt{n}}$$

In the second stage, for the total aggregated sample the combined SD was counted by using the formula:

$$s = \sqrt{\frac{(n_1-1)s_1^2 + (n_2-1)s_2^2 + n_1(\bar{y}_1 - \bar{y})^2 + n_2(\bar{y}_2 - \bar{y})^2}{n_1 + n_2 - 1}}$$

Confidence Intervals (95 % CI) were found by using formula: Mean \pm (1.96) x (SE).

Appendix Table 3 presents the results of the first survey. Appendix Tables 4 and 5 present the results of the second survey.

3. Results

Results of Empirical Study in Kaunas University of Applied Sciences

The results of the first research stage (2016) revealed that the students, involved in the assessment of the integrated curriculum (Figure 2), gave the highest score to the following aspects. The most positive rating was received in 1.1 concerning integrated curriculum as a provision of better preparation for professional activity (M=3.67, 95 % CI [3.25, 4.08]). The integrated assignments, which promote more comprehensive study of combined general and special subjects

(1.4.), was rated with a score of 3.41, 95 % CI [2.98, 3.84]. The utility of disciplines (1.5.) was assessed by 3.32, 95 % CI [2.89, 3.56]. The question about mutually agreed subjects (1.3.) in the course received the lowest average score, $M=2.96$, 95 % CI [2.57, 3.35]. The result could be argued because of the novelty of integrated curriculum implementation.

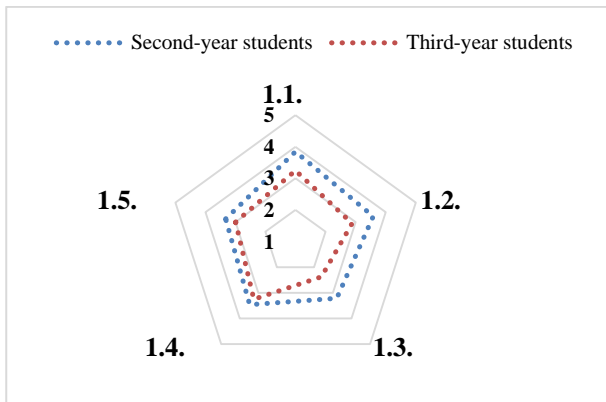


Fig. 2. Assessment of structure and content of the curriculum (prepared by the authors, 2016)

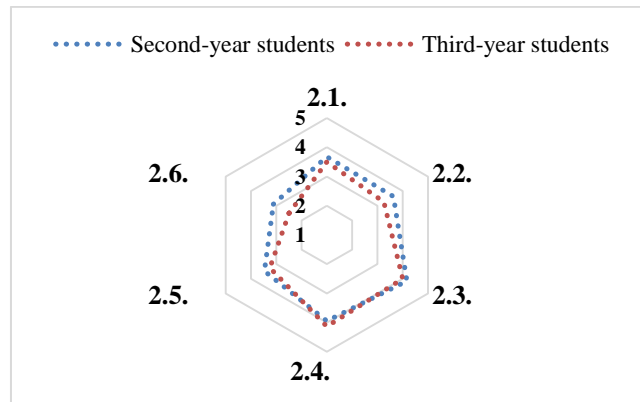


Fig. 3. Assessment of study process organization (prepared by the authors, 2016)

The assessment of study process (Figure 3) proved the success in study process organization, which became more interesting (2.3.) ($M=4.11$, 95 % CI [3.79, 4.43], and diverse (2.4.) ($M=4.95$ % CI [3.71, 4.29]). According to the students, the integrated curriculum provides higher motivation for good results, the studies tend to become more advantageous and attractive, when real situations and problems from the labor market are addressed. However, from students' perspective, the lowest score was identified in works' distribution throughout the semester (2.6.), $M=2.93$ points, 95 % CI [2.52, 3.34]. It is necessary to point out that students tend to believe that integrated curriculum contributes more to better students understanding about different subjects (2.2.) ($M=3.52$, 95 % CI [3.17, 3.87]). The results differed in assessing the motivation to study (2.5.) – the second-year students gave 3.47 points, 95 % CI [2.89, 3.97], when the third-year students – 3.25 points, 95 % CI [2.66, 3.84].

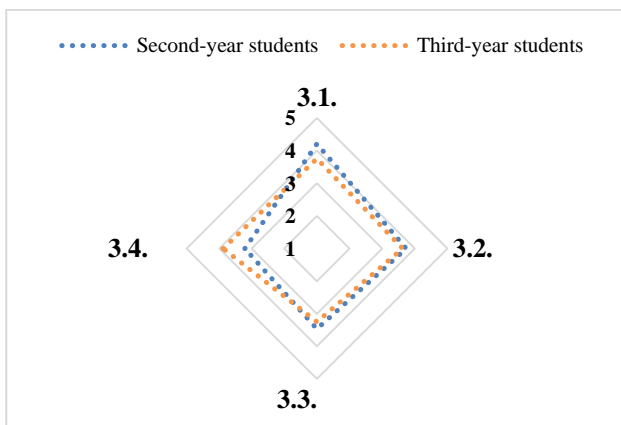


Fig. 4. Assessment of integrated projects content (prepared by the authors, 2016)

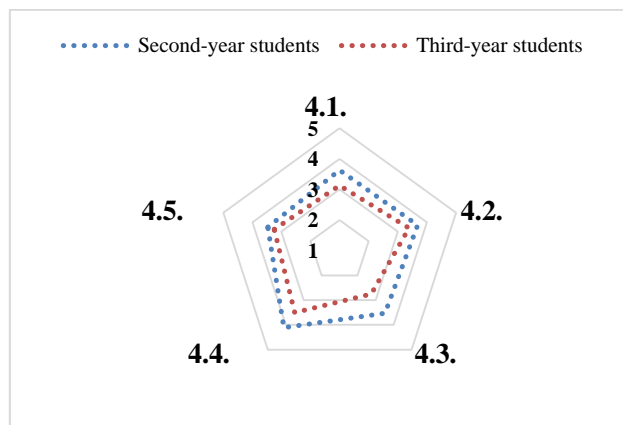


Fig. 5. Assessment of students' academic achievements (prepared by the authors, 2016)

In assessing integrated projects (Figure 4), the question concerning preparation of integrated projects (3.2.), which promotes more systemic studies, was assessed by 3.70, 95 % CI [3.42, 3.99]. In other cases, the opinions differed again. The assumption that integrated programs produce higher quality of works (3.1.), was assessed by 4.21 points, 95 % CI [3.95, 4.47] by the second-year students, while the third-year students' assessment was 3.75 points, 95 % CI [2.88, 4.62]. A great

many students noted that in studying integrated subjects the interest for integrated projects was promoted (3.4.) (M= 3.40, 95 % CI [2.98, 3.84]). The respondents were also positive about the other two program areas, i.e. the study process and the student achievements. In the final part – assessment of students’ academic achievements (Figure 5) – students agreed that the knowledge and skills are assessed in a complex way (4.1.) (M= 3.48, 95 % CI [3.21, 3.76]) and positive evaluations encourage consistent studies during a semester (4.4.) (M=3.93, 95 % CI [3.58, 4.27]). However, it is important to note that third-year students were less satisfied with integrated curricular implementation at the University than second-year students.

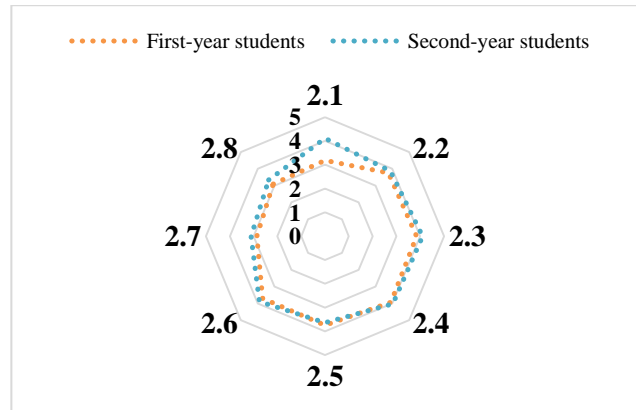
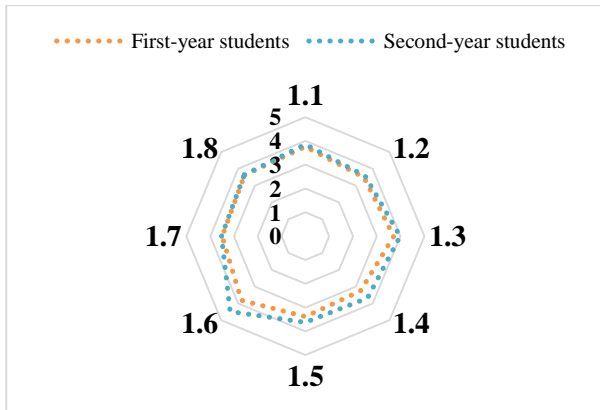


Fig. 6. Assessment of structure and content of the curriculum (prepared by the authors, 2019)

Fig. 7. Assessment of study process organization (prepared by the authors, 2019)

After the first results, the analyzed study programs were developed and integrated curriculum was applied to other study programs. Accordingly, the second research stage of the assessment was carried out in 2019. The assessment of integrated project content revealed that students felt positive about the structure and content of integrated curricular programs (Figure 6). Integrated curriculum was appreciated the most due to the optimal structure of 4 study subjects (1.6.), M=4.09, 95 % CI [4.04, 4.14]. Modular study programs, which were more interesting (1.3.) (M=3.81, 95 % CI [3.80, 3.83]) and help better prepare for professional activities (1.1.) (M=3.79, 95 % CI [3.76, 3.82]), also received high average scores. Moreover, both groups – first-year and second-year students – agreed that while studying in such programs they acquired broader competences (1.8.) (M= 3.60, 95 % CI [3.58, 3.62]) and felt more motivated to achieve learning outcomes (1.2.) (M=3,56, 95 % CI [3.54, 3.58]). The results of the second process organization assessment (Figure 7) proved the usefulness of understanding different subjects (2.2.) (M=3,83, 95 % CI [3.81, 3.86]) and diversity of study subjects (2.4.) (M=3.95, 95 % CI [3.93, 3.97]). However, there was a difference in comparing students’ opinions about teaching. First-year students agreed less with the statement about unified lecturers team (2.7.) (M=2.97, 95 % CI [2.32, 3.63]) and the amount of optimal teaching courses (2.1.) (M=3.29, 95 % CI [2.61, 3.97]) than third-year students (2.7. (M=3.12, 95 % CI [2.82, 3.42]); 2.1. (M=4.09, 95 % CI [3.73, 4.45])). Other aspects, which include motivation to study (2.5.) and ECTS (2.6.), received over the 3.6 points from both groups.

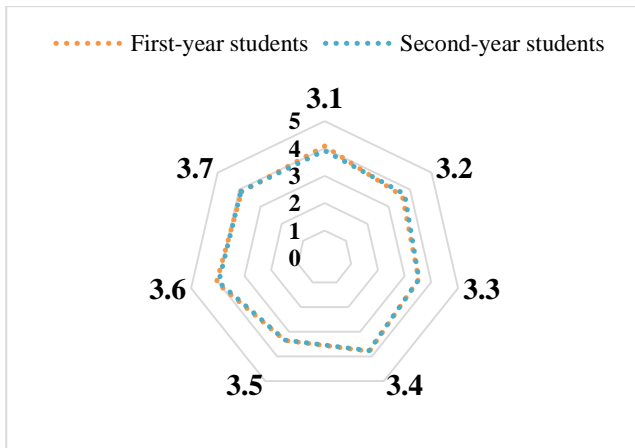


Fig. 8. Assessment of integrated projects content (prepared by the authors, 2019)

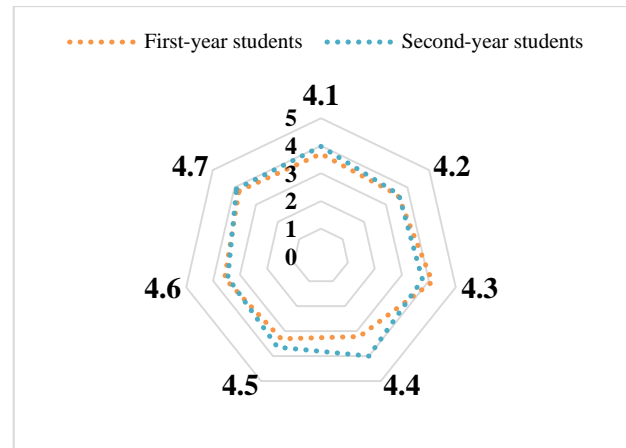


Fig. 9. Assessment of students' academic achievements (prepared by the authors, 2019)

The results of integrated projects assessment were very similar comparing the first-year and the second-year students' answers (Figure 8). Students strongly agreed that integrated projects could be prepared in higher quality because of reduced number of independent works (3.1.), $M=4.02$, 95 % CI [4.00, 4.03]. It is also closely linked to the responsibility for final results and working in a team (3.6.) ($M=4.04$, 95 % CI [4.02, 4.06]), planning (3.7.) ($M=3.92$, 95 % CI [3.91, 3.93]) skills development and creativity (3.4.) ($M=3.81$, 95 % CI [3.79, 3.82]). In assessing the final criteria of achievements, students preferred integrated project, as a final work, more than exams (4.3.), $M=3.98$, 95 % CI [3.96, 4.01] (Figure 9). It is necessary to point out that the most critical aspect in the assessment of this fourth criteria was the optimal size of the integrated project group (4.4.), $M=3.54$, 95 % CI [3.51, 3.57]. According to the results, second-year students agreed that three students in a group is an optimal number ($M=4$, 95 % CI [3.66, 4.34]), when first-year students were more critical about the number ($M=3.26$, 95 % CI [2.67, 3.85]). Moreover, students gave 3.91 points (95 % CI 3.87, 3.94) to complexity (4.1.) and 3.82 points (95 % CI [3.80, 3.85]) to objectivity of the assessment (4.7.). Also, students felt more positive than negative about a clear evaluation system (4.5.) ($M=3.49$, 95 % CI [3.44, 3.53]), which encouraged consistent working throughout the semester (4.6.) ($M=3.58$, 95 % CI [3.56, 3.60]).

In addition, the two research stages of integrated curriculum assessment in Kaunas University of Applied Sciences revealed more positive students' opinion about their study programs. It is necessary to point out that none of the assessed aspects of the criteria received the highest score of 5 as well as the lowest – 1. In the second research stage results increased. The difference could be determined by many reasons. After discussing the results of the first assessment, which helped to identify the issues in the Sports Management Program, other study programs were improved. The structures of the courses were more harmonized (subjects were integrated into them), the definite structure of the final assessment of courses was created and presented to the students, more practical tasks, related to the labor market, were integrated into integrated projects. In addition, students of the Logistics study program, which was the most popular among students in Lithuania in the Universities of Applied Science, found the integrated study program much more interesting (encouraging students to work independently, developing teamwork skills, helping students prepare more systematically for professional activities than students of other programs). The most positive answers received from the second-year students in both surveys, however, the third-year students' were less satisfied about integrated curriculum. During the first survey, the structure and content of curriculum and students' academic achievements received the lowest average scores. The second stage revealed more positive results in these criteria, which were developed after receiving the results of the first survey.

Moreover, the research results confirmed that the integrated curriculum responds to the innovative requirements of 21st century education and best meets the students' expectations. Here, the students' abilities of making connections, adapting to changes and knowing how to learn are

developed. Transdisciplinary learning in developing projects or carrying out integrated independent assignments lead to the students' preparedness for practical application of knowledge. Modern graduates need knowledge of working in a team and ability to collaborate on a local and global scale. Also, it is necessary to develop the necessity of long-life learning, thus experiencing the joy of self-awareness.

4. Conclusion

The integrated curriculum responds to the provisions of the Bologna Process 2020. Their implementation leads to changes in the educational process reflected in the transition from teaching towards student-centred learning. The education paradigm should be transferred from what is taught to what the student is to learn. The problem-based integrated curriculum pursuing learning outcomes set by the program and training specialists with various competences is a response to the modernization of education. The preconditions for successful implementation of the integrated curriculum are awareness of the teaching philosophy, a solid methodology as well as a clear-cut program implementation strategy. Overall changes in the academic culture of the institution are necessary. All academic community of the institution and representatives of the business community are to be engaged in the development and implementation of the integrated curriculum. The empirical study revealed that integrated curricular is favorable for students. It is characterized by flexibility, which creates opportunities for assessment (weaknesses identification), development and renewal. The results of empirical study also proved the fact that it is necessary to ensure a constant assessment of integrated curriculum programs in order to identify problematic areas, according to the set criteria, and develop programs in the most appropriate way.

References

- [Badley, Henry, 2009](#) – *Badley, K., Henry, S. (2009). Resisting curriculum integration: do good fences make good neighbors? *Issues in Interdisciplinary Studies*. (27): 113-137.*
- [Bintz, Monobe, 2018](#) – *Bintz, W.P., Monobe, G. (2018). Interdisciplinary curriculum: Using poetry to integrate reading and writing across the curriculum. *Middle School Journal*. 3(49): 36-48. DOI: <https://doi.org/10.1080/00940771.2018.1439667>*
- [Bloom, 2006](#) – *Bloom, J. (2006). Selected concepts of curriculum, [Electronic resource]. URL: <https://fliphtml5.com/ihie/xarz/basic> (date of access: 09.09.2020).*
- [Clark, 1997](#) – *Clark, Ed. (1997). Designing and Implementing an Integrated Curriculum, Brandon, VT: Holistic Education Press.*
- [Clayton et al., 2010](#) – *Clayton, M., Hagan, J., Ho, P.S., Hudis, P.M. (2010). Designing Multidisciplinary Integrated Curriculum Units. Connect Ed: The California Center for College and Career. [Electronic resource]. URL: <https://eric.ed.gov/?id=ED509847> (date of access: 09.09.2020).*
- [Cook, 2009](#) – *Cook, S.C. (2009). Making connections: Implementing an Integrated Thematic Instruction Curriculum Model to Assist Teachers of at-Risk Middle School Students. Doctoral thesis.*
- [Drake et al., 2015](#) – *Drake, S.M., Savage, M.J., Reid, J.L., Bernard, M.L., Beres, J. (2015). An Exploration of the Policy and Practice of Transdisciplinarity in the IB PYP Programme. [Electronic resource]. URL: <https://www.ibo.org/globalassets/publications/ib-research/pyp/an-exploration-of-the-policy-and-practice-of-transdisciplinarity-in-the-pyp-final-report.pdf>*
- [Drake, 2007](#) – *Drake, S.M. (2007). Creating Standards-Based Integrated Curriculum: Aligning Curriculum, Content, Assessment, and Instruction, USA: Corwin Press.*
- [Drake, Burns, 2004](#) – *Drake, S., Burns, R. (2004). Meeting Standards Through Integrated Curriculum. USA: Association for Supervision and Curriculum Development.*
- [European Commission, 2018](#) – *European Commission/EACEA/Eurydice (2018). The European Higher Education Area in 2018: Bologna Process Implementation Report. [Electronic resource]. URL: https://op.europa.eu/en/publication-detail/-/publication/2fe152b6-5efe-11e8-ab9c-01aa75ed71a1/language-en?WT.mc_id=Selectedpublications&WT.ria_c=677&WT.ri_f=706&WT.ria_ev=search (date of access 15.09.2020).*
- [Fletcher et al., 2018](#) – *Fletcher, E.C., Warren, N.Q. and Hernández-Gantes, V.M. (2018). Preparing high school students for a changing world: College, career, and future ready learners, *Career and Technical Education Research*. 1(43): 77-97. DOI: <https://doi.org/10.5328/cter43.1.77>*

[Fogarty, 2009](#) – *Fogarty, R.J., Pete, B.M.* (2009). How to integrate the curricula. USA: Corwin Press.

[Gupta, 2012](#) – *Gupta S.K.* (2012). The relevance of confidence interval and P-value in inferential statistics. *Indian journal of pharmacology*. 44(1): 143-144. DOI: <https://doi.org/10.4103/0253-7613.91895>

[Gürkan, 2020](#) – *Gürkan, B.* (2020). Transdisciplinary Integrated Curriculum: An Analysis of Teacher Experiences through a Design Model within the Framework of IB-PYP. *Participatory Educational Research*. 1(8): 176-199. DOI: <http://dx.doi.org/10.17275/per.21.10.8.1>

[Hammond, 2017](#) – *Hammond, D.J.* (2017). An investigation into the impact of an integrated curriculum on learning in the primary school. Doctoral thesis. Durham: Durham University.

[Harden, 2000](#) – *Harden, R.M.* (2000). The integration ladder: a tool for curriculum planning and evaluation. *MEDICAL EDUCATION-OXFORD*. 7(34): 551-557. DOI: <https://doi.org/10.1046/j.1365-2923.2000.00697.x>

[Jacobs, 1989](#) – *Jacobs, H.H.* (1989). Interdisciplinary Curriculum: Design and Implementation. USA: Association for Supervision and Curriculum Development.

[Klein, 2010](#) – *Klein, J.* (2010). A taxonomy of interdisciplinarity. In R. Frodeman, J.T. Klein, C. Mitcham, J.B. Holbrook (eds.). *The Oxford Handbook of Interdisciplinarity* (pp. 15-31). Oxford: Oxford university press.

[Loepp, 1999](#) – *Loepp, F.* (1999). Models of Curriculum Integration. *The Journal of Technology Studies*. 2(25): 21-25. DOI: <https://doi.org/10.21061/jots.v25i2.a.6>

[Mathison, Freeman, 1997](#) – *Mathison, S., Freeman, M.* (1997). The logic of interdisciplinary Studies. [Electronic resource]. URL: <https://files.eric.ed.gov/fulltext/ED418434.pdf> (date of access: 20.09.2020).

[Meeth, 1978](#) – *Meeth, L.* (1978). Interdisciplinary Studies: A Matter of Definition. *Change: The Magazine of Higher Learning*. 7(10): 10. DOI: <https://doi.org/10.1080/00091383.1978.10569474>

[Motion for a European Parliament Resolution, 2015](#) – Motion for a European Parliament Resolution on Follow-up on the Implementation of the Bologna Process (2015). [Electronic resource]. URL: <http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//TEXT+REPORT+A8-2015-0121+0+DOC+XML+Vo//EN#title1> (date of access: 26.09.2020).

[The Bologna Process, 2020](#) – The Bologna Process 2020 – The European Higher Education Area in the new decade. Communiqué of the Conference of European Ministers Responsible for Higher Education, Leuven and Louvain-la-Neuve, 28-29 April 2009. [Electronic resource]. URL: http://ehea.info/media.ehea.info/file/20090223-Ostend/54/2/BFUG_Board_CZ_19_4_draft_communique_200209_594542.pdf (date of access: 20.09.2020).

[Wall, Leckie, 2017](#) – *Wall, A., Leckie, A.* (2017). Curriculum integration: An overview, *Current Issues in Middle Level Education*. 1(22): 36-40.

Appendix

Table 1. The statements for integrated curricular assessment based on four selected criteria: the first stage (prepared by the authors, 2016)

1.	Structure and content of the curriculum	2.	Organization of the study process
1.1	Modular study program helps students to better prepare for professional activities.	2.1	Teaching of two modules per semester is optimal.
1.2	The structure of the course is understandable.	2.2	By studying the modules, students have a better understanding of the usefulness of different subjects.
1.3	The course consists of mutually agreed subjects.	2.3	The study process is more interesting.
1.4	Integrated tasks encourage more in-depth study of combined general and professional subjects.	2.4	The study process is more diverse.

1.5	In a modular study program, the usefulness of different subjects is more noticeable.	2.5	The modular system is more motivating to study.
		2.6	In the modular study program, the integrated projects are evenly distributed throughout the semester.
3.	Quality of integrated project	4.	Students' academic achievements
3.1	The reduced number of independent works in the modular system allows to prepare higher quality course works.	4.1	In the modular system, students' knowledge and skills are assessed in a complex way.
3.2	The preparation of integrated projects forces a more systematic study of subjects.	4.2	Theoretical knowledge is assessed by studying individual subjects in the module.
3.3	The preparation of integrated, multi-subject projects improves the theoretical material.	4.3	A clear system for evaluating a course work performed in the module.
3.4	There is a growing interest in working independently.	4.4	The requirement to receive positive evaluations from all subjects in the module encourages a consistent study of the module throughout the semester.
		4.5	The participation of all lecturers teaching the module in the assessment of integrated work ensures an objective assessment of study achievements.

Table 2. The statements for integrated curricular assessment based on four selected criteria: the second stage (prepared by the authors, 2019)

1.	Structure and content of the curriculum	2.	Organization of the study process
1.1	Modular study program helps students to better prepare for professional activities.	2.1	Teaching of two modules per semester is optimal.
1.2	Modular study program helps students to better achieve learning outcomes.	2.2	By studying the modules, students have a better understanding of the usefulness of different subjects.
1.3	The modular study program is unusual but interesting.	2.3	The study process is more interesting.
1.4	The structure of the course is clear and understandable.	2.4	The study process is more diverse.
1.5	The course consists of mutually coordinated study subjects.	2.5	The modular system is more motivating to study.
		2.6	15 ECTS per course is optimal.
1.6	The optimal structure of the course consists of a maximum of 4 study subjects.	2.7	In modular study programs lecturers work as a unified team.
1.7	Developed integrated tasks encourage more in-depth study of combined general and professional subjects.	2.8	In the modular study program, the course works are evenly distributed throughout the semester.
1.8	Integrated curriculum studies help students to acquire broader competencies, which are necessary for the labor market.		

3.	Quality of integrated project	4.	Students' academic achievements
3.1	The reduced number of independent works in the modular system allows to prepare higher quality course works.	4.1	In the modular system, students' knowledge and skills are assessed in a complex way.
3.2	The preparation of integrated projects forces a more systematic study of subjects.	4.2	Theoretical knowledge is assessed by studying individual subjects in the course.
3.3	The preparation of integrated, multi-subject projects improves the theoretical material.	4.3	Assessment of the course in the preparation of integrated projects is more effective than passing the exam.
3.4	The preparation of integrated project encourages students' creativity.	4.4	There should be no more than 3 students in the group of integrated project.
3.5	There is a growing interest in working independently.	4.5	A clear system for evaluating a course work performed in the module.
3.6	While studying the course, students develop team skills and responsibility for work results.	4.6	The requirement to receive positive evaluations from all subjects in the module encourages a consistent study of the module throughout the semester.
3.7	While studying the course, students develop their planning skills.	4.7	The participation of all lecturers teaching the module in the assessment of integrated project ensures an objective assessment of study achievements.

Table 3. Mean rates, Standard Error (SE), Standard Deviation (SD), 95 % Confidence Interval (95 % CI) of the first survey questions (Q) of Sports Management (SM) second (n=19) and third (n=8) year students (prepared by the authors, 2021)

Q.	The second-year students of SM (n=19)				The third-year students of SM (n=8)				Total (n=27)			
	Mean	SE	SD	95 % CI	Mean	SE	SD	95 % CI	Mean	SE	SD	95 % CI
1.1.	3.84	0.245	1.068	3.33 4.36	3.25	0.313	0.886	2.51 3.99	3.67	0.199	1.037	3.25 4.08
1.2.	3.58	0.116	0.507	3.33 3.82	2.88	0.227	0.641	2.34 3.41	3.37	0.121	0.693	3.12 3.32
1.3.	3.21	0.181	0.787	2.83 3.59	2.38	0.420	1.188	1.38 3.37	2.96	0.189	0.979	2.57 3.35
1.4.	3.47	0.258	1.124	2.93 4.02	3.25	0.366	1.035	2.38 4.12	3.41	0.209	1.083	2.78 3.8
1.5.	3.32	0.217	0.946	2.86 3.77	3.00	0.189	0.535	2.55 3.45	3.32	0.163	0.847	2.89 3.56
2.1.	3.68	0.265	1.157	3.13 4.24	3.50	0.327	0.926	2.73 4.27	3.63	0.208	1.079	3.20 4.06
2.2.	3.63	0.232	1.012	3.14 4.12	3.25	0.164	0.463	2.86 3.64	3.52	0.172	0.893	3.17 3.87
2.3.	4.16	0.191	0.834	3.76 4.56	4.00	0.267	0.756	3.37 4.63	4.11	0.154	0.801	3.79 4.43
2.4.	3.95	0.195	0.848	3.54 4.36	4.13	0.125	0.354	3.83 4.42	4	0.141	0.734	3.71 4.29
2.5.	3.47	0.234	1.020	2.98 3.97	3.25	0.250	0.707	2.66 3.84	3.41	0.179	0.931	3.04 3.78
2.6.	3.11	0.252	1.100	2.57 3.64	2.50	0.267	0.756	1.87 3.13	2.93	0.199	1.035	2.52 3.34
3.1.	4.21	0.123	0.535	3.95 4.47	3.75	0.366	1.035	2.88 4.62	4.07	0.141	0.729	3.79 4.36
3.2.	3.74	0.185	0.806	3.35 4.13	3.63	0.183	0.518	3.19 4.06	3.70	0.139	0.724	3.42 3.99
3.3.	3.47	0.208	0.905	3.04	3.25	0.164	0.463	2.86	3.40	0.153	0.797	3.09

				3.91				3.64				3.72
3.4.	3.21	0.271	1.182	2.64 3.78	3.88	0.227	0.641	3.34 4.41	3.40	0.209	1.083	2.98 3.84
4.1.	3.63	0.157	0.684	3.30 3.96	3.13	0.227	0.641	2.59 3.66	3.48	0.135	0.700	3.21 3.76
4.2.	3.68	0.134	0.582	3.40 3.96	3.38	0.183	0.518	2.94 3.81	3.59	0.110	0.572	3.37 3.82
4.3.	3.53	0.177	0.772	3.15 3.90	2.75	0.491	1.389	1.59 3.91	3.3	0.198	1.031	2.89 3.70
4.4.	4.11	0.215	0.937	3.65 4.56	3.50	0.189	0.535	3.05 3.95	3.93	0.168	0.874	3.58 4.27
4.5.	3.47	0.177	0.772	3.10 3.85	3.25	0.491	1.389	2.09 4.41	3.41	0.187	0.971	3.02 3.79

Table 4. Weighted mean rates, Standard Error (SE), Standard Deviation (SD), 95 % Confidence Interval (95 % CI) of the second survey questions (Q) of the first (n=106) (LO – logistics, FIBM – Food Industry Business Management, SaM – Sales and Marketing, BM – Business Management) and second (n=66) year students (prepared by the authors, 2021)

Q	Means on the first-year students (n=106)				Total (n=106)				Means of the second-year students (n=66)			Total (n=66)			
	LO (n=41)	FIBM (n=18)	SaM (n=15)	BM (n=32)	Weighted mean	SE	SD	95 % CI	SaM (n=13)	SM (n=16)	BM (n=37)	Weighted mean	SE	SD	95 % CI
1.1.	3.88	3.44	4	3.72	3.77	0.242	2.494	3.30 4.25	4.23	3.5	3.81	3.82	0.366	2.976	3.10 4.54
1.2.	3.68	3.22	3.47	3.56	3.54	0.195	2.008	3.15 3.92	3.54	3.5	3.65	3.59	0.078	0.631	3.44 3.74
1.3.	3.63	3.72	3.8	3.72	3.70	0.069	0.715	3.56 3.83	4.15	3.75	4.05	4.00	0.208	1.691	3.59 4.40
1.4.	3.46	2.72	3.33	3.56	3.35	0.377	3.881	2.61 4.08	3.54	3.81	3.7	3.70	0.136	1.103	3.43 3.96
1.5.	3.66	2.22	4	3.62	3.45	0.789	8.120	1.91 5.00	3.69	3.44	3.73	3.65	0.157	1.277	3.34 3.96
1.6.	3.88	3.06	4.01	4.28	3.88	0.525	5.410	2.85 4.91	4.54	4.56	4.32	4.42	0.133	1.082	4.16 4.68

3.2.	3.1.	2.8.	2.7.	2.6.	2.5.	2.4.	2.3.	2.2.	2.1.	1.8.	1.7.
3.51	4.02	3.12	3.2	3.85	3.39	3.85	3.8	3.76	3.51	3.59	3.61
3.83	4.28	2.83	2.5	3.39	3.72	3.72	3.61	3.39	2.78	3.39	3.17
3.6	4	3.07	2.67	3.73	4.13	4.13	4.2	4	3.01	3.93	3.8
3.59	4.06	3.31	3.09	3.84	3.72	4	3.78	3.91	3.43	3.56	3.4
3.60	4.07	3.12	2.97	3.75	3.65	3.91	3.82	3.78	3.29	3.60	3.50
0.138	0.129	0.198	0.334	0.215	0.303	0.178	0.250	0.269	0.347	0.226	0.271
1.418	1.329	2.034	3.436	2.217	3.119	1.835	2.574	2.768	3.568	2.329	2.794
3.33	3.82	2.73	2.32	3.33	3.06	3.56	3.33	3.25	2.61	3.15	2.97
3.87	4.33	3.51	3.63	4.17	4.24	4.26	4.31	4.30	3.97	4.04	4.03
3.85	4	3.77	3.23	4	3.85	4.23	4.23	3.92	4.3	3.85	3.62
3.56	3.81	2.88	2.94	3.94	3.5	3.81	3.94	3.69	3.94	3.5	3.31
3.81	3.95	3.38	3.16	3.73	3.57	4.03	4.14	4.03	4.08	3.57	3.62
3.76	3.93	3.34	3.12	3.83	3.61	4.02	4.11	3.93	4.09	3.61	3.54
0.157	0.098	0.446	0.151	0.142	0.185	0.210	0.148	0.173	0.181	0.185	0.179
1.277	0.800	3.624	1.229	1.152	1.505	1.707	1.206	1.409	1.474	1.505	1.454
3.45	3.73	2.46	2.82	3.56	3.25	3.60	3.82	3.59	3.73	3.25	3.19
4.07	4.12	4.21	3.42	4.11	3.97	4.43	4.40	4.27	4.45	3.97	3.90

4.7.	4.6.	4.5.	4.4.	4.3.	4.2.	4.1.	3.7.	3.6.	3.5.	3.4.	3.3.
3.98	3.76	3.54	3.61	3.83	3.78	4.07	3.9	4.05	3.37	3.8	3.51
3.83	3.33	3.56	3.17	4.28	3.56	3.67	3.78	3.83	3.39	3.83	3.5
3.6	3.6	2.6	3.2	4.27	3.33	3.27	3.8	4.13	3.2	3.73	3.4
3.78	3.63	3.53	2.88	4.16	3.56	3.84	4.03	4.22	3.44	3.78	3.69
3.84	3.63	3.41	3.26	4.07	3.61	3.82	3.90	4.08	3.37	3.79	3.55
0.157	0.181	0.472	0.300	0.210	0.184	0.337	0.114	0.167	0.104	0.042	0.121
1.613	1.859	4.858	3.092	2.167	1.892	3.475	1.178	1.717	1.073	0.433	1.243
3.53 4.15	3.27 3.98	2.48 4.33	2.67 3.85	3.66 4.48	3.25 3.97	3.16 4.48	3.68 4.13	3.75 4.40	3.17 3.57	3.71 3.87	3.31 3.78
4.15	3.23	3.85	3.85	3.54	3.38	3.92	3.92	3.85	3	3.62	3.46
4	3.56	3.44	4.19	3.75	3.63	3.81	3.81	4.06	3.56	3.69	3.38
3.59	3.57	3.62	3.97	4	3.78	4.19	4	4	3.46	3.97	3.78
3.80	3.50	3.62	4.00	3.85	3.66	4.04	3.94	3.99	3.39	3.83	3.62
0.290	0.193	0.206	0.172	0.230	0.202	0.196	0.095	0.108	0.299	0.185	0.212
2.355	1.572	1.670	1.401	1.871	1.642	1.589	0.775	0.879	2.426	1.505	1.720
3.23 4.37	3.12 3.88	3.22 4.02	3.66 4.34	3.40 4.30	3.27 4.06	3.66 4.43	3.75 4.13	3.77 4.20	2.81 3.98	3.47 4.20	3.21 4.03

Table 5. Total weighted mean rates, Standard Error (SE), Standard Deviation (SD), 95 % Confidence Interval (95 % CI) of the second survey questions (Q) (n=172) (prepared by the authors, 2021)

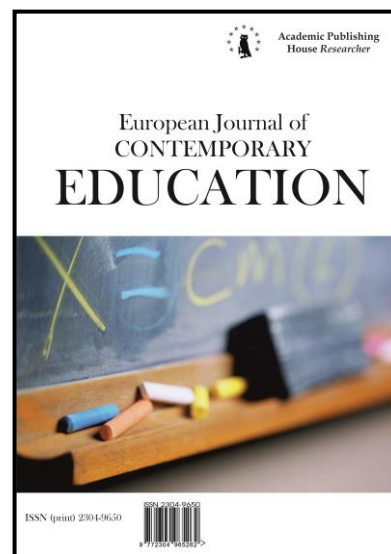
O.	Total weighted mean of the second survey (n=172)	SE	SD	95% CI
1.1.	3.79	0.016	0.205	3.76 3.82
1.2.	3.56	0.009	0.124	3.54 3.58
1.3.	3.81	0.007	0.091	3.80 3.83
1.4.	3.48	0.018	0.239	3.44 3.52
1.5.	3.53	0.037	0.490	3.46 3.60
1.6.	4.09	0.025	0.329	4.04 4.14
1.7.	3.52	0.014	0.181	3.49 3.54
1.8.	3.60	0.012	0.157	3.58 3.62
2.1.	3.60	0.017	0.227	3.56 3.63
2.2.	3.83	0.014	0.179	3.81 3.86
2.3.	3.93	0.013	0.165	3.91 3.55
2.4.	3.95	0.010	0.136	3.93 3.97
2.5.	3.63	0.015	0.200	3.60 3.66
2.6.	3.78	0.011	0.144	3.76 3.80
2.7.	3.03	0.016	0.214	3.00 3.06
2.8.	3.20	0.016	0.210	3.17 3.23
3.1.	4.02	0.007	0.088	4.00 4.03
3.2.	3.66	0.008	0.104	3.65 3.68
3.3.	3.58	0.008	0.110	3.56 3.59
3.4.	3.81	0.006	0.076	3.79 3.82
3.5.	3.38	0.010	0.131	3.36 3.40
3.6.	4.04	0.008	0.111	4.02 4.06
3.7.	3.92	0.006	0.079	3.91 3.93

4.1.	3.91	0.017	0.221	3.87 3.94
4.2.	3.63	0.010	0.137	3.61 3.65
4.3.	3.98	0.012	0.157	3.96 4.01
4.4.	3.54	0.015	0.199	3.51 3.57
4.5.	3.49	0.023	0.302	3.44 3.53
4.6.	3.58	0.010	0.134	3.56 3.60
4.7.	3.82	0.011	0.147	3.80 3.85



Copyright © 2021 by Academic Publishing
House Researcher s.r.o.
All rights reserved.
Published in the Slovak Republic
European Journal of Contemporary Education
E-ISSN 2305-6746
2021. 10(2): 395-408
DOI: 10.13187/ejced.2021.2.395
www.ejournal1.com

IMPORTANT NOTICE! Any copying, reproduction, distribution, republication (in whole or in part), or otherwise commercial use of this work in violation of the author(s) rights will be prosecuted in accordance with international law. The use of hyperlinks to the work will not be considered copyright infringement.



Preparing Junior School Aged Pupils for a Circle Definition: Teaching Mathematics within Physical Education Class

Jakub Liptak ^{a,*}, Iveta Scholtzova ^a

^a University of Presov, Slovakia

Abstract

The paper presents a specific case of how interdisciplinary approach to teaching elementary mathematics can be conceived. In this context, the mathematical concept of circle is delivered through physical education environment, during a lesson aimed at speed training. The rationale for this approach is that a teacher at the primary stage in Slovakia usually teaches all subjects in a grade and can thus integrate their curricula. The basic pedagogical premises in this study are constructivism (Bruner, 1996; Dienes, 1971; Piaget, 1973) and the theory of didactical situations (Brousseau, 2002). The adopted interdisciplinary approach to elementary mathematics education is based on the model of educational reconstruction (Jelemenská et al., 2003) with a specific focus on designing a learning environment. For this purpose, the design-based research methodology was chosen as it provides for both developing relevant educational materials and conducting subsequent research. A three-phase activity was designed to guide the pupils to reflect on the concept of circle. Subsequent intervention was carried out in a physical education lesson with two classes of fourth-graders. As the design-based research methodology focuses on the causality of designed interventions (Nathan, Kim, 2009), the data were collected by the methods of participant observation and individual interview. The analysis of the obtained data indicates that proposed physical activity is potentially effective for learning the concept of circle by primary school pupils.

Keywords: elementary mathematics, interdisciplinary approach, constructivism, physical education, curriculum integration.

1. Introduction

From the theory of constructivism, it is generally known that any learner is not static in their learning. This means that since pupils endeavor to grasp new knowledge, the active factor must be present. By the active factor, we mean not only the pupils' perception but also consciousness and awareness of the pupils while they are exposed to learning material. According to the theory of

* Corresponding author

E-mail addresses: jakub.liptak@smail.unipo.sk (J. Liptak), iveta.scholtzova@unipo.sk (I. Scholtzova)

constructivism, the pupils' active mental processes are conclusively responsible for either rebuilding existing knowledge or constructing a piece of new knowledge. To help pupils, teachers should present learning material in a way that enables the pupils attaining the knowledge easily. Kozarova and Duchovicova (2020) stated that educational material that is arranged in a non-linear way (mainly by use of graphical representations) shows improvement in pupils' results in the meaningfulness of their assertions, which is considered a substantial parameter for mathematics education.

Thought is assumed to form the basis of any knowledge. As humans use five perception modalities (vision, hearing, touch, smell, taste), the thought's nature can differ. There were multiple attempts to prove that each individual has their own modal preference, so pupils should be taught with respect to their preferred modality. This paradigm is also known as the VAK theory or the VAK model; an acronym which references to visual, auditory and kinesthetic learning style (Dunn et al., 1984). With regard to scientific facts brought forth by neuroscience, the VAK theory was recognized to be a neuromyth (Coffield et al., 2004; Pashler et al., 2008; Geake 2008; Dekker et al., 2012). Although visual, auditory and kinesthetic expressions are detected by different parts of the human brain (Dekker et al., 2012), the individual parts of the brain are mutually connected, and so the data are reciprocally transferred (Goswami, 2004; Gilmore et al., 2007). Therefore, rather than separating pupils according to their potentially preferred learning style (Sharp et al., 2008), teachers should engage all pupils with as many appropriate representations of the learning material and its various forms as possible. The visualization of math concepts is an essential element of their mental construction by pupils (Guncaga, Žilková, 2019).

In support of this statement, Dienes (1971) argued for the perceptual variability principle, which states that learning of any concept can be maximized if the concept is displayed to pupils through many contexts and if these concepts are embodied by many forms (Gningue, 2006). The purpose of this principle is to provide pupils with multiple types of stimuli so that the acquired knowledge is not isolated and incomplete but rather deep, wide and complex.

The discipline of mathematics is supposed to be an abstract science, and so its concepts are abstract too. On the other hand, some of mathematical concepts are grounded in real-life environment. Due to this fact, mathematics can be learned by pupils who have not yet reached an appropriate cognitive level to understand abstract concepts, provided the teacher presents an abstract concept in a comprehensible way. Since the mathematics ultimate goal is to grasp abstract knowledge, Piaget (1973) proposes to follow three stages of conceptual learning: the concrete, representational and the abstract stage. To utilize this sequence requires to demonstrate the concrete model of the concept to pupils as first. After they acquired understanding at the concrete stage, the teacher can continue and explain the concept using its graphical representation such as pictures, graphs, tables etc. Once pupils understand the concept at the representational stage, the teacher may proceed to explaining its abstract characteristics.

Inspiration for the design of the proposed activity was drawn from the model of educational reconstruction for improving instructional practice (Duit et al., 2012). Primary concern of this study is to design a learning environment conducive to enhancing mathematics education. More specifically, it concerns the environment of physical education (PE) with the activities typical for PE classes.

The study provides discussion on how the concept of circle can be delivered in PE classes on the background of speed training activity. Since it is the PE content that determines the design of the intended intervention, it is necessary to specify the nature of speed training. The essential principle of speed training is to perform a physical activity with maximal intensity within a very short time and almost no resistance (Perič, 2012). Even though speed as a human ability is strongly determined by genetics, its performance level can be improved by appropriate activities. Perič (2012) proposes to include speed training into individual educational units on regular basis; the physical load should take less than 10 seconds with recess lasting at least 6 times more than the time of the physical load, 3 to 5 repetitions within 1 to 3 sets. However, these, or similar, conditions can be seldom met during PE classes as different activities should be performed to achieve given curriculum standards. Nevertheless, speed training should be included as often as possible, especially in junior school age, because this age is considered to be a sensitive period for speed development. Peráčková (2001) suggests practicing speed training right after warm-up is done, because speed development requires energy, which might be insufficiently low in later stages of the lesson. Commonly used methods for pupils' speed development are sprints and starts from various

positions. Because the target group in this study is the junior school aged pupils, these exercises should be designed as competitions or games that enhance pupils' motivation to embrace speed training (Peráčková, 2001). The revised version of the National Educational Standards for Elementary Physical Education in Slovakia (2015) includes the following standards related to speed training:

- to improve the individual performance of running, tested by running 10 times between 2 stands which are 5 meters far each other;
- to apply specific means for fitness level improvement;
- to acquire the correct technique of sprinting; acceleration running and starts from various positions;
- movement games focused on speed and agility development.

For the purpose of facilitating acquisition of mathematical knowledge by pupils in an implicit way a short distance running (sprint) was utilized. Particularly, a three-phase activity was designed to lead pupils to gradually discover the concept of circle by reflecting on the distance between its center and its points. It is assumed that the activity would be conducive to discovery learning; a method with a potential to bring better educational results than the expository method (Kistian et al., 2017).

The concept of circle is a part of elementary mathematics content of fourth grade listed under the Geometry and Measurement section. However, pupils in this age often possess a prior knowledge of circle as they can encounter its models in real-life situations. The Slovak National Standards of Elementary Mathematics Education (2015) specifies pupils' performance standards regarding circle as follows:

- to discern/name a circle and area of a circle;
- to identify, mark and name the center, radius and diameter of a circle;
- to draw a circle by using a compass.

According to the TIMSS International Results in Mathematics, Slovak fourth-graders attained the lowest score in the domain of Geometric Shapes and Measures within the three distinct content domains assessed (Mullis et al., 2016). Hence, it was inferred that developing an activity which utilizes some elements of discovery learning of circle should be a reasonable step toward better mathematics education.

Before introducing the designed activity, it is necessary to clarify the concept of circle in its purely abstract nature. A circle is the set of all points in a plane that are equidistant from a given point C which is called the center of the circle. The distance r from the center to each point is called the radius.

The circle can then be graphically represented like a specific type of closed curve, as displayed in Figure 1.

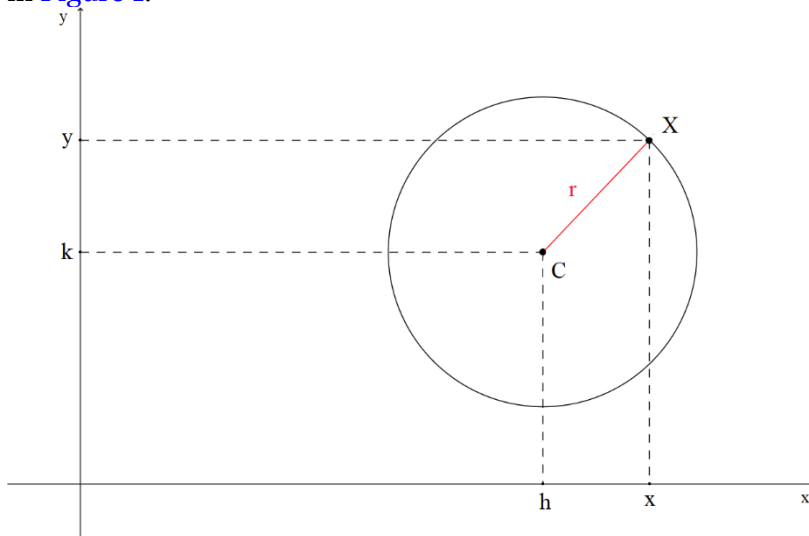


Fig. 1. A circle representation in a plane

As the coordinates of the center are $[h; k]$ and the general coordinates of all points of the circle are $[x; y]$, we can describe the set of all points of the circle with the following equation:

$$r^2 = |\overrightarrow{CX}|^2 = |X - C|^2 = |[x - h; y - k]|^2 = (\sqrt{(x - h)^2 + (y - k)^2})^2 = (x - h)^2 + (y - k)^2$$

This equation is also called General Standard Equation for a circle centered at $C = [h; k]$ with radius r .

The presented equation is the abstract definition of a circle, which can prove difficult to grasp by a junior school aged pupil and it is presented in such form much later, in the higher secondary stage of education. On the other hand, pupils commonly encounter concrete objects that remind them of a circle, such as a wheel, compact disks, Hoola hoop, traffic signs, a roundabout, a pie, a Frisbee, and many others. Based on that, even junior school aged pupils are ready to learn about this concept and possess partial understanding of it as they have some real experience with it. In a math class, they are typically exposed to a graphical representation of a circle so that they can recognize it and know how to construct it by using a drawing compass. Since they are familiar only with the graphical representation of a circle, they might tend to grasp the concept only as a type of closed curve, not engaging the actual definition. These pupils might only have procedural knowledge of a circle, which means that their knowledge is solely linked to a circle's graphical construction. To draw a circle means to draw a curved line by:

- 1) Taking the desired length of its radius into a compass;
- 2) Pressing down a needle of the compass at the point where its center will be;
- 3) Turning the knob on the top of the compass, so the pencil draws a circle.

The sequence of the abovementioned steps includes sensory-motor learning as well as remembering the procedure. Since its conceptual knowledge is tightly anchored to the knowledge of the definition as well, it might remain hidden out of pupils' sight. It is hence necessary to focus on how the very concept could be better demonstrated to pupils.

The pivotal part of the concept of circle is equal distance of the points from the center. Respecting Bruner's (1966) modes of thinking, the easiest way to demonstrate the distance aspect is by starting with an action-based representation of the concept succeeded by image-based observation and its reflection.

As already mentioned, the proposed intervention utilizes physical education classes, with their typical activities, for the purpose of attaining goals of mathematics education. Because the model of circle can be observed in many forms in real life, it was assumed that it could also be manifested in PE classes. The following activity was designed to guide pupils' awareness of some critical aspects of the concept of circle, particularly the aspect of distance. The intended PE class content utilizes an activity commonly used for speed training. As this activity relies on visualization of a mathematical concept, the proposed activity could have a positive impact on pupils' spatial visualization skills (Totikova et al., 2020).

2. Materials and methods

The aim of the following phases of the designed activity is to make pupils reflect on the essential property of a circle; equal distance of its points from the circle's center. The following phases introduce a didactical situation that stimulates pupils thinking leading to the new knowledge construction. According to Brousseau (2002), any didactical situation should consist of specific parts such as devolution, action, formulation, validation and institutionalization. To include all parts of a didactical situation into the activity design, it is necessary to reconcile: content of the activity, teacher's management of the class, what is communicated to the class and the way how it is communicated.

The following three-phase design combines an activity commonly used for speed training – a sprint run with the visualization of circle. The pupils are divided into several groups and stand on a start line (see groups A, B, C in Figure 2). Let us assume that each group's size is equal and individual groups do not significantly differ in performance, which can be secured by the teacher who distributes pupils into the groups. Each group is motivated to compete by the fact that they have a chance to win points for their position at the finish line.

Phase 1:

One pupil from each group starts running toward the finish line after the teacher gives a signal. Every group runs in their own path perpendicular to the finish line (shown in Figure 2).

Individual pupils compete against each other while collecting points for their groups. The teacher stands close to the finish line to judge pupils' positions at the finish line. Successively, all pupils take part in the activity. This phase is not focused primarily on teaching a circle. It is used only to bridge between regular PE activity and that which is specific for teaching a circle.

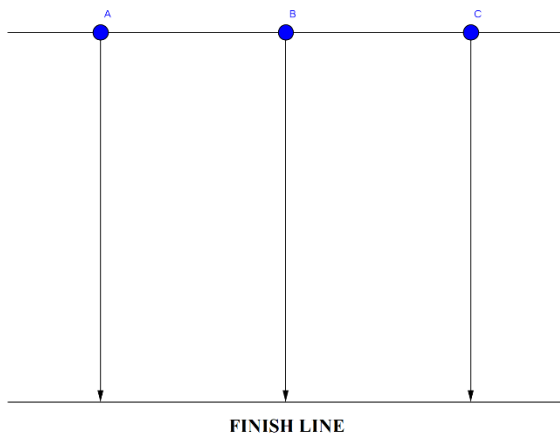


Fig. 2. Sprint run on a short distance

Phase 2:

Individual pupils run out from their starting positions. The goal is to run toward a finish line, which is the same distance as in the previous phase; however, it is narrower now (see a [Figure 3](#)). Even more, the finish line is narrower than a distance between the outer groups of pupils. This means that in their endeavor to cross the finish line, the pupils of outer groups cannot run straight, but their paths converge to the path of the group in the middle. In the real situation, the narrower finish line can be indicated by two random objects, e.g. cones, placed on the hypothetical endpoints of the line segment. Making the finish line more narrow results in:

- a) probable increase of physical contact between running pupils, which can be prevented by setting an optimal length of finish line relative to the number of groups;
- b) the occurrence of inequality in length of paths between individual groups.

The second result points out an important issue. The inequality is evident for the teacher who observes the situation, but it can happen that it is not apparent to pupils who participate in the activity. To conform with the principles of constructivism the pupils were left to discover this inequality by themselves. If they are unable to see it, the distance between the start line and the finish line can be shortened so as the ratio between the lengths of the path in the middle and the path on the side would become more visible to pupils. After the difference between the paths is made apparent, pupils are expected to argue that the conditions are unfair for some of the competing groups. At this point, a didactical situation is created by devolving the problem to pupils. Although pupils should be aware of the existing problem, they might not identify it accurately. Therefore, the teacher should make sure that the problem is correctly identified. After that, the phase of finding a solution takes place, and, finally, the proposed solution should be bridged with the considered mathematical concept – circle.

A solution of the arisen problem should consist of adjusting the start positions for each group, so as the distance between each start position and the finish line is equal. Modification of the length and the position of the finish line and the spans between groups A, B, C on the starting line (which can also be expressed as a length of line segments \overline{AB} and \overline{BC}) is not allowed. To scaffold the pupils, the teacher should ask questions as: “How can we make the distance equal for each team?”, “Could we make the paths of equal distance if we suppose that the finish line will not change its length and position?”, “What is the distance between start positions and the finish line for each group?”, etc.

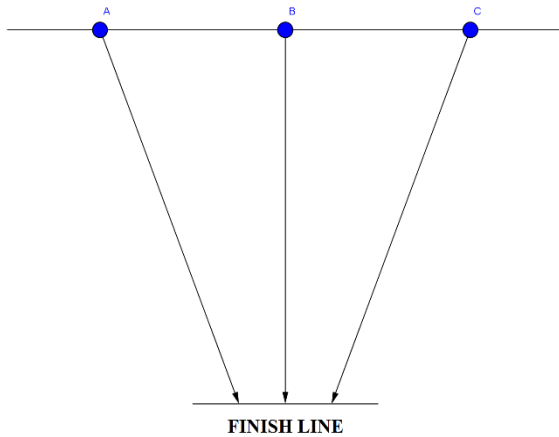


Fig. 3. Shortening of the finish line

A correct answer to the formulated problem expected from pupils is a discovery of such solution in which the start positions would be arranged, as shown in Figure 4. To guide the pupils to this answer, the teacher should steer pupils' thinking to the length factor and instruct them to compare the lengths of each group's path.

Phase 3:

Once pupils discover the expected solution to the given problem, they should prove its accuracy by executing the running activity. It is assumed that the given problem could be solved by the sequence of such actions as:

- 1) finding out the length of each group path;
- 2) moving starting positions closer to the finish line, so all groups are equidistant from the finish line.

The length of each group path can be determined according to the system of measurement adopted by the pupils. Let suppose that the pupil would decide to use the finish line's midpoint as the endpoint of their path. Subsequently, the actual lengths of paths the groups will run in are not equal since pupils from different groups do not run toward the same point (the center of the circle). The fact that they do not run toward the same point links to a safety factor, which must always be thoroughly implemented. For instance, the length of the path of the group A is shorter than the length of the path of the group B, because the line segment between point A and point where their path intersects the finish line is shorter than the line segment between point A and the center of the circle (radius of the given circle) which was used to determine new starting positions for the groups.

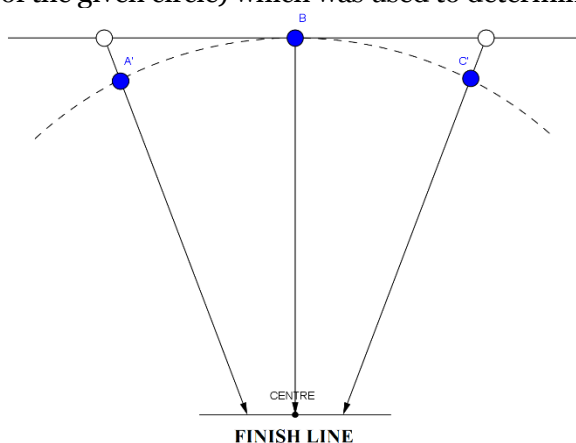


Fig. 4. New starting positions based on equal distances

The pupils carried out two activities – running from different starting positions to the finish line and measuring the path's distances, which are to be equal. The aim of the activity was to stimulate pupils' perception of a circle form in terms of its definition, i.e. as a set of all points in a plane with equal distance from the given point (center). For better understanding of this circle's

characteristic, it is advised to create more starting positions and repeat the two activities: running and subsequent distance measurement (see the [Figure 5](#)).

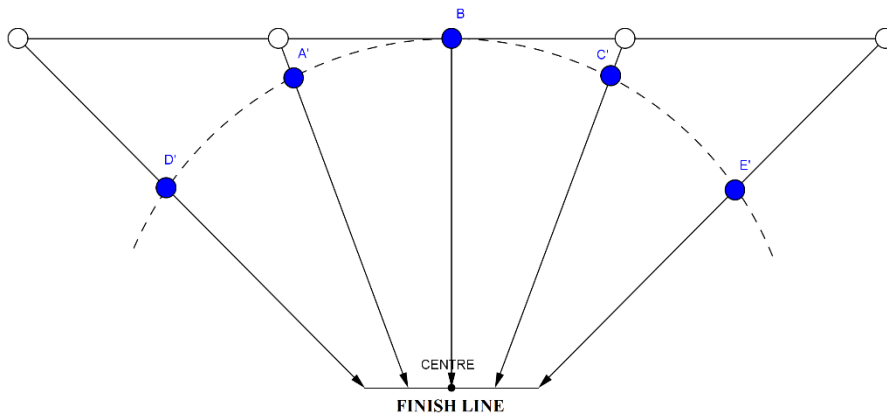


Fig. 5. Using more groups to make the arc more visible

Special attention must be paid toward safety. Therefore, the number of groups must correspond with the finish line's length to avoid physical collision of running pupils. On the other hand, creating many groups simultaneously with adjusting the finish line (to maintain the safe environment), may interfere with the aim of the activity. If every starting position is equivalent to a circle's points, centered at the midpoint of the finish line, the paths of the groups on the sides are shorter than the paths of the groups placed closer to the middle.

For instance, in [Figure 5](#) we see that groups D' and E' are closer to the intersection of their paths with the finish line than groups A' and C', which are also closer to their endpoints on the finish line than group B. Despite the fact that the paths are not of the same length, if the finish line is not too long, the differences would not be significant enough to be observed by pupils.

Before presenting our findings, we highlight characteristics of the intervention.

The presented activity within PE classes was conducted with the fourth-graders at a local primary school. The particular local school was chosen because of the accessibility for us and because the school does not provide classes for pupils with special needs. This choice refers to the selection of a typical case, helping us to inquire within the group of pupils while they are engaged in the activity ([Seawright, Gerring, 2014](#)).

Fourth-graders were selected because they represent the oldest and potentially the most cognitively developed group within primary school population of pupils in Slovakia. Therefore, if the activity were proven educationally effective for fourth-graders, we could surmise about its effectiveness for even younger primary school pupils.

As indicated earlier, to allow pupils to see elements of circle in the form of enactive representation within the submitted activity, the number of pupils involved must be at least 4 or 5. Since the purpose of the study was to determine the impact and evaluate the effectiveness of the designed activity ([Nathan, Kim, 2009](#)), which was considered a specific case of the interdisciplinary approach, the sample size should correspond with the standard size PE class. Therefore the empirical inquiry was undertaken with a class of 20 pupils. To prove the activity reliable, we iterate the activity with another class of 20 pupils. Both classes were mixed boys and girls with the even distribution of girls and boys.

Since the current governmental regulations did not allow the activity to be carried out inside the gym due to the Covid-19 pandemic, we conducted both classes at the outside playground. The activity was scheduled at the end of each PE class. The data were collected during the classes and immediately after the class ended. To collect the data, we used non-structured participant observation, voice recording and semi-structured interviews. Voice recording was obtained during the class to record pupils' reactions and class discussion. Semi-structured interviews were conducted in order to discover how the pupils perceived the activity and the spacing of their segments, and particularly if the activity reminded them of a circle or any similar math concept.

During the activity, we avoided using words like “circle”, “center” or any other math term so that the pupils’ outcomes would be authentic.

2. Results

In this section, we present situations which occurred during the intervention and the results obtained from interviewing the pupils. The three-phase activity was undertaken gradually, as described in the previous section. Since our plan consisted of changing the finish line’s length (phase 2), we decided to use two tennis balls that we placed on the endpoints of the line segment. Subsequently, we moved them toward the midpoint of the line segment to shorten its length. Initially, we observed one practical problem that some pupils did not run across the line segment but next to it (especially pupils from the groups on the sides). This problem relates to the safety factor. In this case, the groups’ paths were converging to each other, which might have been risky for running pupils. Therefore, we had to make sure that the finish line would be long enough to fit runners from all groups running shoulder to shoulder. Because of the limited time, we decided to create 5 groups of pupils. Optimally, we would recommend 3 to 4 groups of pupils to take all safety measures to avoid physical collisions at the finish line.

After that, we shortened the finish line and let the pupils compete. Even though individual path lengths were different, none of the groups from either of the two classes argued against the new condition, except one pupil who said: “our group has the best position”. It can be assumed that the initial distance of 9 meters between the start line and the finish line (in the phase 1 and 2) was not distinct enough for the pupils to notice the differences in the length of individual paths, and as a matter of fact, none of them argued about inequity. Therefore, we proceeded to the step two, which was to move the finish line closer to the start line, so the distance was changed to 6 meters. The pupils’ subsequent performance can be summarized in these two points:

- a) the gaps between the groups on the start line were shortening as the pupils wanted to face the finish line and did not run in a slant path;
- b) as all groups were told to stay on their initial start positions, pupils from the groups on the sides started to have objections against their paths’ length and slope.

Since these objections against the activity were raised, the pupils were prompted to present their opinion on what they consider unfair and what should be done to make the conditions equal for each group.

However, some unexpected reactions also occurred; the pupils were concerned with the slope of the paths. Because the paths of the groups, especially the paths on the sides, were changed due to shortening the finish line, the pupils also had to change the direction of their run immediately after they sprinted out from their new starting positions. Based on that, pupils from the groups on the sides argued that it is more difficult for them to run. Even though their argument might seem reasonable, their paths were of the same distance as the other paths and their paths were not curved. However, there is one simple thing that could be done to put their minds at ease: a slight rotation of the group, with pupils staying in the line so that they would face the spot at which their path crosses the finish line.

Except for the objection related to the paths’ slope, the pupils were neither satisfied with the paths’ lengths, which were not equidistant for each group. We proposed pupils to discuss the issue and present their ideas of how the activity could become fairer for each group. In the discussion, they brought some ideas such as:

- relocate a group consisting of fast runners to a starting position on a side and move slow runners to a starting point in the middle;
- all groups should move closer to each other at the start line so they would be facing the finish line;
- the finish line should be longer so each group could run straight towards it.

After they submitted their ideas, we explained that we want to keep the finish line as it was and that spans between the groups are given and cannot be changed. Also, each group’s speed performance relates to pupils’ distribution, which was done by using the “rock-paper-scissors” game, so the participation of any pupil in the group was random.

Right after we objectively argued against these potential solutions, we tried to scaffold them toward the issue of different lengths. The key questions which incited the process of finding new starting positions for individual groups, were: “Do the distances differ?”, “How could we show it?”

After introducing these questions, the pupils concluded that they could prove the inequality by making steps and counting them or by using a tape measure. Since no one possessed a tape measure, human steps seemed to be an ideal tool. As we opted for measuring by making steps, the pupils immediately realized that each child has a different length of step. Then, we suggested that to measure precisely, only one pupil should be taking steps and counting the length of each path, which seemed like an acceptable idea for all pupils. A chosen pupil measured individual distances, which were counted as lengths of a line segment between the midpoint of the finish line and the individual starting positions. The midpoint was considered to become a center of a circle (see [Figure 5](#)), whose points are determined by fair starting positions for each group. The measurement revealed the inequality between different paths; the longest path was 12 steps long, and the shortest path (the one in the middle) was 9 steps long. Then, the pupils decided to adjust the length of each path so that each path would be equal to the length of the path in the middle. Practically, they found each group’s new starting position by subtracting its initial length by a number 9, which resulted in the number of steps they should take towards the midpoint to reach an optimal starting position. The described process of finding (locating) new starting positions can be considered peer-learning since the smarter pupils were helping other pupils to understand the process. As they succeeded in searching for the fair starting positions, we let the pupils rerun the activity to allow them to see that the new conditions were equal for each group.

Since the nature of design-based research is open and interventionist, semi-structured individual interview was preferred over questionnaire ([Bakker, Erde, 2015](#)). Generally, interview promises to bring more subtle research data, which corresponds with in-depth qualitative research’s nature. During interviews, randomly chosen pupils were given the following task to solve:

Construct points K, L, M, N, O, P, Q, R, 4 centimeters far from a given point C.

Each interviewee was given the task sheet with preprinted point C. All interviews were conducted in a quiet room in the school with the presence of only individual interviewee and us. No time limit was imposed on the pupils solving the task.

Although no tool was given to the pupils beforehand, they immediately realized that they might need a ruler to find the missing points’ location. The ruler was given to the pupils after they asked for it, by which they manifested the necessity of using one to solve the given task. None of the pupils asked for a compass, as they have not learned yet how to use one. In most cases, they did not struggle with the task; however, some of them did not measure the length precisely due to their poor measuring skills. The idea behind this task was to determine if pupils realize a similarity between the constructed points and the starting positions in the phase 3. If they conceptually connected the constructed points with a circle – which they had not been informed of – and with starting positions in the phase 3, it would indicate that the placement of starting positions reminded them of either an arc, a semicircle, or a circle. Thus, the observed relation between the constructed points, a circle and the starting positions in the phase 3 should prove useful for teaching the concept of circle and its properties. To determine whether they associated the constructed picture with the activity, we directly asked them to look for similarities. Even more, we wanted to know whether the pupils could recognize any similarities between the activity and a circle and its properties during the intervention.

We individually interviewed 10 out of 40 pupils who participated in the designed activity.*

A summary of the data obtained from the interview is displayed in [Table 1](#). The [Table 1](#) presents different outcomes of how pupils mapped particular segments in the phase 3 and whether they indicated the connection with the concept of circle. The interviewed pupils labelled as P11-P15 and P21-P25 were from different classes.

* As we wanted our interview to be conducted immediately after the intervention, the number of interviewees was determined by the time constraint between the end the intervention and the end of the school day.

Table 1. Interview results and the analysis of the answers

Pupil	What does the picture evoke?	Is there any observed similarity with the last phase?	Explanation
P11	a semicircle	yes	nonspecific
P12	a circle	yes	point C reminds of the finish line; constructed points remind of groups of pupils
P13	a circle	yes	point C reminds of the finish line; constructed points remind of groups of pupils
P14	nothing	yes	point C reminds of the finish line; constructed points remind of groups of pupils
P15	a circle	not certain	none
P21	a circle	yes	the constructed points are equidistant from the point C as well as groups were equidistant from the finish line
P22	a circle	yes	the pupil related it to a different activity we were doing in the class as well
P23	a circle	yes	the starting positions remind of an arc
P24	something from the Slovak language, a snowflake, the sun	yes	the pupil related it to different activity we were doing in the class as well
P25	a circle	yes	the starting positions remind of a semicircle

When we taught the class which the pupils P21-25 belonged to, we included some more activities not mentioned in this paper. These activities were also aimed at enhancing the teaching of the concept of circle. Therefore, we assume one of these activities affected pupils P22 and P24 as their responses were related to the activity other than the one discussed here. Dismissing their responses, we see that most of the pupils (6 out of 8), especially those from the group P11-P15, quite precisely connected the activity' segments with some elements of circle. Furthermore, the pupils claimed that they had noticed the similarities with a circle even during the activity.

The research design aimed to show whether the pupils become aware of the specific associations between the activity and the concept of circle or do not associate the activity with any element of circle. Therefore, the obtained data can be sorted into two distinct categories: pupils who “associated” and who “did not associate”. We had initially expected that another two subcategories would occur: a subcategory in which pupils associated only the center of the circle with the finish line and a subcategory in which pupils associated only points of the circle with the starting positions. Neither of that happened, though. This finding implies the conjecture that since the activity employs enactive representations of both the center and the points of the circle, while these two are reciprocally dependent, the pupils will always mentally associate them both at once. With this arises the question whether the starting positions of individual pupils D', A', B, C', E' (referring to [Figure 5](#)) could have influenced how these individual pupils comprehend the enactive representation of the circle. Thus, the submitted research offers ideas for the following more detailed inquiry.

According to Fusch and Ness (2015), research reaches data saturation when it can be followed up by new research. Therefore we argue for sufficient data saturation in our research. Moreover, sufficient data saturation implies that the sample size used in our research was adequate for proving the educational potential of the proposed activity ([Glaser, Strauss, 1967](#)).

Altogether, despite the abovementioned limitation of the research, the answers obtained from pupils indicate that the submitted three-phase activity can be conducive and instrumental in teaching the concept of circle.

3. Discussion

As shown above, the presented activity is potentially instrumental to a teacher when teaching the concept of circle. Naturally, this activity is based on locomotion, which usually takes place in physical education classes. In Slovakia, the teachers in the primary stage usually teach all subjects in a grade. Since the teacher is familiar with different subjects and their contents, it is assumed that such teacher is capable of integrating different subjects and their curricula. The proposed activity can be included in PE class before presenting a circle to pupils in mathematics class in the fourth grade. Contemplating the practical utilization of the designed three-phase activity, three potential issues were detected:

1) How does the design fit into the PE curriculum?

This question has already been partially addressed in the introduction section. Speed and agility development is determined by accurately structured activities which are performed frequently. This means that to accomplish corresponding curriculum standards, suggested or similar activities should be included in PE classes. On the other hand, performing the proposed activity might absorb significant time from the PE class. The class would then be purely focused on agility, and speed development and almost no other educational goals could be considered within this class. Therefore, we see some limitation in our design in the matter of accomplishing various educational goals. However, if the intended educational goal is to develop speed or agility, utilization of the proposed activity does not prevent from attaining such goals.

2) Is the suggested activity safe enough to be part of PE education?

One of the most important PE class principles is to maintain that the environment and activities are safe for pupils. Therefore, a teacher is obliged to ensure that such activity does not increase the hazard of any injury. There might be a risk of pupils' collision when they run since their paths converge to each other as they approach to the finish line (phase 2 and 3). It is therefore necessary to adjust the finish line to be wide enough for all runners to run through while each of the runners has sufficient lateral space. The National Center for Health Statistics (1973) published that at 11 years of age, the girls' chest girth ranges from 60,4 to 83,4 cm, and for boys it is from 63,3 to 83,1 cm. According to these data, we suppose that each pupil should be assigned to at least 80 cm of the finish line's width, which should theoretically guarantee that pupils should not bump into each other while running. We have employed a volleyball court in our design as it is a commonly available and well-marked area of school gyms. Since the activity is designed for a volleyball court, the maximum width of the starting line can be 9 meters, as the court is 9 meters wide and 18 meters long. To keep pupils safe, we propose the width of the finish line is relative to the number of teams. As the increasing number of the teams would make the differences between the paths' lengths less visible to the pupils, we suggest creating not more than 5 competing teams.

3) Does the activity and its phases genuinely model and represent a circle?

According to the obtained data, we suppose that the activity is designed to bridge the concept of circle when discussing the segments with pupils. This connection is based on the actual actions carried out by the pupils while they are looking for ideal starting positions.

In our research, each path's length was calculated so that each group counted steps between its initial starting position (points D, A, B, C, E in [Figure 6](#)) and the finish line's midpoint (see intermittent straight lines in [Figure 6](#)).

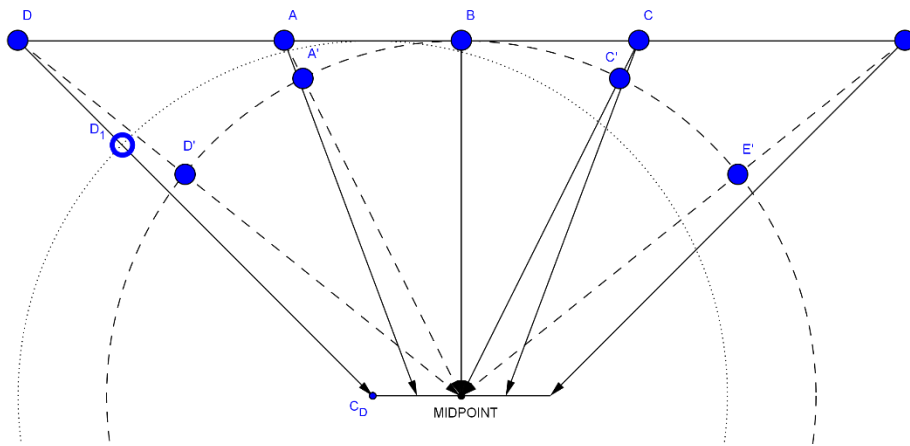


Fig. 6. A problem of different lengths

However, the groups' actual running paths are not equivalent to the paths used for calculating their lengths. As can be seen in Figure 6, according to the real measurement, group D should move their starting place from D to D'. However, pupils from the group D will not run toward the finish line's midpoint but toward a spot of the finish line, which is closest to them (point C_D in Figure 6). Since their initial running path is directed toward point C_D, a new starting position should be placed on the intersection of their initial path and the circle centered at C_D. The radius of this circle is equivalent to the line segment between the midpoint and group B's initial starting position (see point D₁ in Figure 6). We have used group D as an example, but the new starting positions of all groups except group B should be corrected if all real paths are to be equal.

Nevertheless, the pupils carried out measurements, so they believed that each path is of the same length, which is crucial for connecting the activity with a circle. Even though the paths were not of the same length and did not therefor precisely model a circle, the starting points seemed to be arranged in an arc. This activity is thus potentially inspiring teaching material for the early teaching of circle. Subsequently, the teacher might scaffold pupils to recall this activity when the concept of circle is introduced in a math class. Even more, recalling and reflecting on the activity might be beneficial for grasping the abstract definition of circle.

One more aspect that is worth to be mentioned is the gauge used for determining different paths' lengths. In fact, the finer gauge is used, the more precise the answer is. We, therefore, suggest measuring the distance by using feet instead of steps, as measuring with feet is more precise. Moreover, using feet could be even more beneficial when moving the finish line closer to the start line because the difference between numbers of counted feet would be greater than between numbers of counted steps.

4. Conclusion

Mathematics is primarily an abstract science, but it is generally believed, that the teaching of its concepts should involve as many concrete representations as possible to convey the knowledge to learners. The junior school aged pupils are usually capable of processing the knowledge presented to them on a concrete level of representation. The educators should bear in mind that using concrete objects and real-life examples is beneficial for pupils' knowledge construction. Fortunately, the educational content of school mathematics can be related to a great extent to things and processes in a real-life environment.

In this paper, we proposed a three-phase physical activity as a possible contribution to a constructivist teaching of elementary mathematics. The purpose of this activity was to improve pupils' speed as well as to create a basis for teaching circle. Our overall intention was to assess whether the proposed activity can be applied and whether it is effective in teaching the concept of circle. All three phases of the activity formed an intervention which was carried out at a local primary school with two classes of fourth-graders. The data were collected both during the interventions and immediately after them. The data collection method included participant observation and individual semi-structured interviews. We strived to provide the answer to this research question: "Do pupils

connect the segments of the proposed activity with a circle?" The analysis of the obtained data indicates that the pupils were capable of connecting conceptually the designed activity with the concept of circle. Such finding provides arguments for considering the design as a potentially effective tool for teaching the concept of circle, particularly its abstract definition.

5. Acknowledgements

This study was supported by the Scientific Grant Agency of the Slovak Republic (VEGA) project No. 1/0631/20.

References

- Jelemenská et al., 2003** – Jelemenská, P., Sander, E., Kattmann, U. (2003). Model didaktickej rekonštrukcie: Impulz pre výskum v odborových didaktikách [Model of didactic reconstruction: Impulse for research in trade union didactics]. *Pedagogika*. 53(2): 190-201. [Electronic resource]. URL: https://pages.pedf.cuni.cz/pedagogika/?attachment_id=1914&edmc=1914 [in Slovak]
- McKenney, Reeves, 2012** – McKenney, S., Reeves, T. (2012). Conducting educational design research. London: Routledge.
- Bruner, 1966** – Bruner, J.S. (1966). Toward a Theory of Instruction. Cambridge: Harvard University Press.
- Dienes, 1971** – Dienes, Z.P. (1971). Building up Mathematics. 4th Ed. London: Hutchinson Educational LTD.
- Piaget, 1973** – Piaget, J. (1973). To Understand Is To Invent: The Future of Education. New York: Grossman Publishers.
- Brousseau, 2002** – Brousseau, G. (2002). Theory of Didactical Situations in Mathematics. New York: Springer.
- National Standards..., 2015** – National Standards for Elementary Mathematics Education in Slovakia, 2015. Inovovaný Štátny vzdelávací program pre primárne vzdelávanie: matematika. (2015). Bratislava: Štátny pedagogický ústav. [Electronic resource]. URL: https://www.statpedu.sk/files/articles/dokumenty/inovovany-statny-vzdelavaci-program/matematika_pv_2014.pdf
- Nathan, Kim, 2009** – Nathan, M.J., Kim, S. (2009). Regulation of teacher elicitation in the mathematics classroom. *Cognition and Instruction*. 27(2): 91-120. DOI: 10.1080/07370000902797304
- Kozarova, Duchovicova, 2020** – Kozarova, N., Duchovicova, J. (2020). Non-Linear Structured Teaching Material as an Attribute Developing Meaningfulness in Students' Mental Representation. *European Journal of Contemporary Education*. 9(4): 807-818. DOI: 10.13187/ejced.2020.4.807
- Dunn, Dunn, Price, 1984** – Dunn, R., Dunn, K., Price, G. E. (1984). Learning style inventory. Lawrence: Price Systems.
- Coffield et al., 2004** – Coffield, F., Moseley, D., Hall, E., Ecclestone, K. (2004). Learning Styles and Pedagogy in Post-16 Learning: A Systematic and Critical Review. London: Learning and Skills Research Centre. [Electronic resource]. URL: <https://www.leerbeleving.nl/wp-content/uploads/2011/09/learning-styles.pdf>
- Pashler et al., 2008** – Pashler, H., McDaniel, M., Rohrer, D., Bjork, R. (2008). Learning Styles: Concepts and Evidence. *Psychological Science in the Public Interest*. 9(3): 105-119. DOI: 10.1111/j.1539-6053.2009.01038.x
- Geake, 2008** – Geake, J. (2008). Neuromyths in Education. *Educational Research*, 50(2): 123-133. DOI: 10.1080/00131880802082518
- Dekker et al., 2012** – Dekker, S., Lee, N. C., Howard-Jones, P., Jolles, J. (2012). Neuromyths in Education: Prevalence and Predictors of Misconceptions among Teachers. *Frontiers in Psychology*. 3. DOI: 10.3389/fpsyg.2012.00429
- Goswami, 2004** – Goswami, U. (2004). Neuroscience and Education. *British Journal of Educational Psychology*. 74(1): 1-14. DOI: 10.1348/000709904322848798
- Gilmore et al., 2007** – Gilmore, C.K., McCarthy, Spelke, E.S. (2007). Symbolic arithmetic knowledge without instruction. *Nature*. 447(7144): 589-597. DOI: 10.1038/nature05850
- Sharp et al., 2008** – Sharp, J.G., Byrne, J., Bowker, R. (2008). The trouble with VAK. *Educational futures*. 1(1): 89-97. [Electronic resource]. URL: <https://educationstudies.org.uk/?p=385>

Gunčaga, Žilková, 2019 – Gunčaga, J., Žilková, K. (2019). Visualisation as a Method for the Development of the Term Rectangle for Pupils in Primary School. *European Journal of Contemporary Education*. 8(1): 52-68. DOI: 10.13187/ejced.2019.1.52

Dienes, 1971 – Dienes, Z.P. (1971). Some Basic Processes Involved in Mathematics Learning. In C.W. Schminke & W.R. Arnold (Eds.): *Mathematics Is a Verb: Readings for Elementary Mathematical Methods*. Hinsdale: The Dryden Press.

Gningue, 2006 – Gningue, S. (2006). Students working within and between representations: An application of Dienes's variability principles. *For the Learning of Mathematics*. 26(2): 41-47. [Electronic resource]. URL: <https://www.jstor.org/stable/40248536>

Duit et al., 2012 – Duit, R., Gropengießer, H., Kattmann, U., Komorek, M., Parchmann, I. (2012). The Model of Educational Reconstruction – a framework for improving Teaching and Learning Science. In D. Jorde, J. Dillon (Eds.), *Science Education Research and Practice in Europe. Cultural Perspectives in Science Education, Vol 5*. Rotterdam: SensePublisher. DOI: 10.1007/978-94-6091-900-8_2

Perič et al., 2012 – Perič, T., Petr, M., Levitová, A. (2012). Sportovní příprava dětí [Sports training of children]. Praha: Grada. [in Czech]

Peráčková, 2001 – Peráčková, J. (2001). Rozvíjanie pohybových schopností v školskej telesnej výchove [Development of motor skills in school physical education]. In: Kolektív, *Didaktika školskej telesnej výchovy*. Bratislava: FTVŠ UK, pp. 81-92. [in Slovak]

National Educational Standards..., 2015 – National Educational Standards for Elementary Physical Education in Slovakia, 2015. Inovovaný štátny vzdelávací program pre primárne vzdelávanie: telesná a športová výchova. (2015). Bratislava: Štátny pedagogický ústav. [Electronic resource]. URL: https://www.statpedu.sk/files/sk/svp/inovovany-statny-vzdelavaci-program/inovovana-ny-svp-1.stupen-zs/zdravie-pohyb/telesna-sportova-vychova_pv_2014.pdf

Kistian et al., 2017 – Kistian, A., Armanto, D., Sudrajat, A. (2017). The Effect of Discovery Learning method on the Math Learning of the SDN 18 Students of Banda Aceh, Indonesia. *British Journal of Education*. 5(11): 1-11. [Electronic resource]. URL: <http://www.eajournals.org/wp-content/uploads/The-Effect-of-Discovery-Learning-Method-on-the-Math-Learning-of-the-V-Sdn-18-Students-of-Banda-Aceh-Indonesia.pdf>

Mullis et al., 2016 – Mullis, I.V.S., Martin, M.O., Foy, P., Hooper, M. (2016). International Results in Mathematics. [Online resource]. URL: <http://timssandpirls.bc.edu/timss2015/international-results/>

Totikova et al., 2020 – Totikova, G.A., Yessaliyev, A.A., Madiyarov, N.K., Medetbekova, N. (2020). Effectiveness of Development of Spatial Thinking in Schoolchildren of Junior Classes by Application of Plane and Spatial Modeling of Geometric Figures in Didactic Games. *European Journal of Contemporary Education*. 9(4): 902-914. DOI: 10.13187/ejced.2020.4.902

Seawright, Gerring, 2014 – Seawright, J., Gerring, J. (2014). Case selection techniques in case study research: a menu of qualitative and quantitative options. In M. Tight (Ed.). *Case studies*. 4: II213-II213. SAGE Publications Ltd. DOI: <https://www.doi.org/10.4135/9781473915480.n31>

Bakker, Eerde, 2015 – Bakker, A., van Eerde, D. (2015). An Introduction to Design-Based Research with an Example From Statistics Education. In A. Bikner-Ahsbabs, C. Knipping, N. Presmeg (Eds), *Approaches to Qualitative Research in Mathematics Education. Advances in Mathematics Education*. Dordrecht: Springer, 429-466. DOI: https://doi.org/10.1007/978-94-017-9181-6_16

Fusch, Ness, 2015 – Fusch, P.I., Ness, L.R. (2015). Are We There Yet? Data Saturation in Qualitative Research. *The Qualitative Report*. 20(9): 1408-1416. DOI: 10.46743/2160-3715/2015.2281

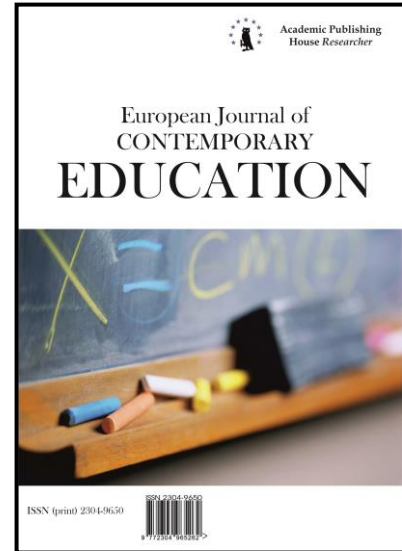
Glaser, Strauss, 1967 – Glaser, B.G., Strauss, A.L. (1967). The discovery of grounded theory: Strategies for qualitative research. Chicago: Aldine Publishing.

National Center for Health Statistics, 1973 – National Center for Health Statistics. (1973). Selected Body Measurements of Children 6-11 Years. *Vital and Health Statistics*. 11(123). [Electronic resource]. URL: https://www.cdc.gov/nchs/data/series/sr_11/sr11_123acc.pdf



Copyright © 2021 by Academic Publishing
House Researcher s.r.o.
All rights reserved.
Published in the Slovak Republic
European Journal of Contemporary Education
E-ISSN 2305-6746
2021. 10(2): 409-427
DOI: 10.13187/ejced.2021.2.409
www.ejournal1.com

IMPORTANT NOTICE! Any copying, reproduction, distribution, republication (in whole or in part), or otherwise commercial use of this work in violation of the author(s) rights will be prosecuted in accordance with international law. The use of hyperlinks to the work will not be considered copyright infringement.



The Potential of Motion Pictures as a Non-Traditional Form of Pedagogical Information Relating to Working with Gifted Children

Marina A. Maznichenko ^a, Nataliya I. Neskromnykh ^b, Anastasiya N. Platonova ^{c, *},
Anvar M. Mamadaliev ^{d, e}

^a Sochi State University, Sochi, Russian Federation

^b Center for Creative Development and Humanitarian Education, Sochi, Russian Federation

^c School of Business Gymnasium, Sochi, Russian Federation; Education Development Strategy Institute of the Russian Academy of Education, Moscow, Russian Federation

^d Cherkas Global University (International Network Center for Fundamental and Applied Research), Washington, USA

^e Volgograd State University, Volgograd, Russian Federation

Abstract

This paper aims to substantiate that working with gifted children may require pedagogues to adapt scholarly-theoretical knowledge to the individual characteristics and special educational needs of such children, which may require employing both traditional, i.e. scholarly (e.g., scholarly and instructional literature and information obtained in advanced training courses), and non-traditional, i.e. extra-scholarly (e.g., personal experience and intuition, colleagues' experience and best practices from innovative pedagogues, folklore and folk pedagogy, works of literature and films about school and gifted children, spiritual-moral norms and values, and pedagogical mythology), forms of pedagogical information. The findings from a survey by questionnaire conducted by the authors revealed that in organizing their work with gifted children most pedagogues tend to rely on the exchange of experience with their colleagues (64.1 %) and reflection about their own pedagogical experience (38.5 %). It was found that 48.2 % tend to gain relevant knowledge through reading scholarly and instructional literature, and 33.3 % tend to do so through taking advanced training courses. Only 15.4 % of respondents were found to invoke pedagogical conceptualization of literary works and films about gifted children. At the same time, 70 % of respondents were found to believe that watching and conducting pedagogical analysis of films about gifted children can be of help to the pedagogue in building interaction with the gifted child.

* Corresponding author

E-mail addresses: maznichenkoma@mail.ru (M.A. Maznichenko), nesknatali@mail.ru (N.I. Neskromnykh), cat_sochi@inbox.ru (A.N. Platonova), anvarm@mail.ru (A.M. Mamadaliev)

The paper explores the potential of motion pictures as a non-traditional form of pedagogical information relating to working with gifted children, which implies the possibility of invoking scholarly conceptualization of films with the aim of resolving the kind of objectives for working with gifted children for which there have yet to be produced scientifically rational pedagogical solutions and which require invoking pedagogical knowledge that content-wise is not scientifically conceptual and form-wise is not present in scholarly texts but is capable of functioning as a possible solution to achieve them. The work highlights the following key objectives: adjusting one's professional position in working with gifted children; adapting scholarly-theoretical knowledge on pedagogy and psychology to the individual characteristics of and the specific conditions of teaching and educating gifted children; making moral assessments of one's pedagogical actions in respect of gifted children; seeking to overcome difficulties in understanding and conceptualizing scholarly-theoretical knowledge; seeking to resolve various psychological issues (e.g., fears and anxiety, emotional exhaustion and frustration, psychological trauma, and animus toward a particular gifted child); seeking to resolve difficulties in engaging in reflection about one's pedagogical actions. The authors employed problem analysis and expert assessment to select 12 domestic and foreign motion pictures that address relevant issues in working with gifted children and look at problems and difficulties that gifted children may experience. Only less than a third of the respondents were found to be familiar with these movies (2.6 to 35.9 %). The exception is the film 'Scarecrow'. This may be associated with the fact that the launch of this movie was a significant event for the majority of Russians. The rest of the films, both Russian and foreign, which focus on equally important issues in working with gifted children, were found to have been overlooked by the participating pedagogues (e.g., 'The Jester', 'Schedule for the Day After Tomorrow', 'When I Will Become a Giant' (Russia), 'Gifted', 'Little Man Tate' (USA), 'Billy Elliot' (UK), 'Vitus' (Switzerland), 'The Little Prince' (France and Italy), and 'Little Stars on Earth' (India)). The findings suggest the need to engage future and practicing teachers in purposeful work involving the scholarly-pedagogical conceptualization of motion pictures and works of literature about gifted children and their problems in school and the mastering of relevant techniques for employing the results of such conceptualization in working with gifted children. The paper highlights the following key aspects of organizing this kind of work: criteria for selecting movies, methods for individual analysis of movies, organization of group discussions, and creation of collections of films focusing on various issues in working with gifted children. The insights from the research reported in this paper can be used by higher education institutions focused on the training of future pedagogues, curriculum developers in institutions of general learning and supplementary learning for children, and pedagogues working with gifted children.

Keywords: gifted children, working with gifted children, non-traditional forms of pedagogical information, motion pictures about school and gifted children, potential of motion pictures as a source of pedagogical information relating to working with gifted children.

1. Introduction

Issues related to organizing work with gifted children and preparing pedagogues for this kind of activity have been investigated in numerous research studies, both domestic and foreign. Prior related research has explored a number of topics, including: gaining insight into the essence of giftedness (Shadrikov, 2019) and attempting to define it (Smedsrud, 2020); differentiating between gifted children (a focus on the sciences) and talented children (a focus on sports, the arts, crafts, and entrepreneurship) (Sharp, Clemmer, 2015); describing the various types of giftedness (e.g., mathematical, information technology, linguistic, technical, artistic (e.g., being gifted in fine arts, music, or acting), entrepreneurial, sporting, social, leadership, emotional, and moral) and discussing various methodologies for assessing them (Heyd-Metzuyanim, Hess-Green, 2020; Kuular et al, 2003); developing special models for teaching gifted children with a focus on the development of their advanced capabilities (e.g., enriching the content of education factoring in a child's advanced capabilities and interests (Renzulli, Reis, 2012); employing accelerated learning (VanTassel-Baska, Little, 2011); employing differentiated learning (e.g., having a child attend special classes or groups; developing special standards, designing individual learning routes, and putting together special educational programs for gifted and talented children (Bulut et al., 2020)); developing integrated curricula based on continuous formative assessment (Kahveci, Atalay, 2015); employing autonomous learning (Betts, Knapp, 1981)).

From the standpoint of humanistic psychology, while giftedness is a gift, it may come with a number of challenges, issues, and difficulties for gifted children. As aptly put by scholar O.A. Bystritskiy, “the higher the level of a gifted child’s achievement, the wider and deeper is the range of their emotions, the heavier is the burden of issues that they are liable to carry, and the harder it is for them to live a happy childhood without incurring psychological damage” (Bystritskii, 2007: 18). In this regard, what has become lately a topic of relevance for research is problems and challenges faced by gifted children in areas such as building relationships with their classmates, teachers, and parents and dealing with their academic and personal failures, increased anxiety, an inadequate self-concept, emotional and behavioral disorders, etc. (Casino-García et al., 2021; Dullaghan, 2012).

In psychology, they have explored pedagogues’ perception of gifted children and teachers’ notions about interaction with such children and about their education, identified metaphors and stereotypes (including gender ones) that can facilitate or hinder the building of productive interaction (Akgül, 2021; Matheis et al., 2020; Weyns et al., 2021), and discussed the lack of pedagogues capable of working with gifted children (Barrera-Algarín et al., 2021). Pedagogical research has provided insight into the training of future and practicing pedagogues for working with gifted children (e.g., advanced training courses and instructional seminars on working with gifted children).

However, in practice, teachers working with such children tend to be faced with issues resolving which may require something more than traditional (scholarly) knowledge acquired in advanced training courses or via reading scholarly and instructional literature. Such issues may deal with teachers’ axiological self-determination, understanding of the individual characteristics and special needs of gifted children, forecasting of their behavior, building of pedagogical interaction, resolving of nonstandard situations, and searching for novel pedagogical means, i.e. ones that have yet to be described in pedagogical science.

A possible way to resolve such issues is scholarly conceptualization of motion pictures whose protagonists are children with manifestations of giftedness, their pedagogues, and their parents. In pedagogy, a sizable amount of research has been carried out into teachers’ artistic-figurative cognition of pedagogical reality (Robotova, 1996; Ovchenkova, 2006) and the use of fictionalized publicistic writing in the training of pedagogues (Kamysheva, 2003).

However, motion pictures have yet to be explored as a means of resolving the issues and difficulties faced by pedagogues in working with gifted children and expanding their notions about gifted children and working with them. It remains unclear whether or not teachers use motion pictures with the aim of engaging in reflection about and enhancing their work with gifted children, what films can be used for that purpose, based on which criteria such films are to be selected, and how they can be used in teaching. To determine this, the authors conducted a study aimed at analyzing teachers’ practice of working with gifted children, determining the potential of scholarly conceptualization of movies about school in resolving issues that may arise in teaching gifted children, and gaining an insight into the conditions required for realizing this potential.

The study’s hypothesis is as follows: pedagogues working with gifted children invoke both traditional (scholarly) and non-traditional (extra-scholarly) forms of pedagogical information (e.g., personal life and work experience, colleagues’ experience, and works of literature and films). When selected the right way and subjected to scholarly conceptualization, motion pictures can help pedagogues resolve productively the kind of objectives for working with gifted children for which no scientifically rational pedagogical solutions are available at the time.

2. Discussion

Contemporary psychological and pedagogical research conducted within the framework of the humanistic paradigm has documented a number of attempts to invoke scholarly conceptualization of extra-scholarly forms of cognition of pedagogical reality and investigation of their heuristic potential and their potential for helping resolve relevant pedagogical objectives, including those for working with gifted children.

An insight into the cognitive-heuristic potential of artistic-figurative cognition of pedagogical reality by means of works of literature has been provided by A.S. Robotova, who introduced the term ‘non-traditional pedagogical knowledge’, with literary-pedagogical knowledge regarded as one of its types. The scholar sees the pedagogical value of such knowledge, above all, in their

humanitarian nature, which urges the pedagogue to embrace the humanistic values of education. A.S. Robotova provides an insight into the cognitive-pedagogical functions of works of literature and the mechanics of artistic description of pedagogical activity, substantiates the ontopedagogical significance of the artistic portrayal of childhood in works of literature, and discusses the potential behind and some of the techniques for integrating artistic-figurative pedagogical knowledge into the teaching of pedagogy in higher education institutions (Robotova, 1996).

O.Yu. Ovchenkova views artistic-figurative cognition of pedagogical phenomena as a means of shaping a future teacher's pedagogical stance (Ovchenkova, 2006).

It is to be noted that some of the major pedagogical ideas from the golden pool of pedagogical concepts have been communicated in literary-artistic form specifically (e.g., 'Emile, or on Education' by J.-J. Rousseau, 'How Gertrude Teaches Her Children' by J.H. Pestalozzi, and 'The Pedagogical Poem' and 'Flags on the Battlements' by A.S. Makarenko).

The mechanics of pedagogical publicistic writing as a form of artistic-figurative reflection of pedagogical reality and its role in educational practice, pedagogical science, and the training of future pedagogues have been investigated by L.P. Kachalova, who explores the potential of pedagogical publicistic writing as an additional source of pedagogical information on the use of the holographic method with the aim of developing in future pedagogues multidimensional images of pedagogical reality (Kachalova, 1999), T.A. Sutyryna, who examines the origins, essence, mission, and functions of pedagogical publicistic writing in education (Sutyryna, 2006), and E.Yu. Kamysheva, who makes a case for the use of pedagogical publicistic writing as a means of fostering in future pedagogues an interest in the teaching profession (Kamysheva, 2003).

E.A. Klimov has suggested the idea that a number of contemporary psychological theories have their origins in folklore and popular thought from the distant past and have found reflection in proverbs and sayings, in people's everyday language, in public consciousness, and in religious texts (Klimov, 2006). Indeed, in proverbs, sayings, and other forms of folklore (e.g., jokes) a teacher can discover psychological and pedagogical ideas that can be important for understanding gifted children better and providing them with appropriate psychological-pedagogical support, and in folklore such ideas tend to be expressed in a more comprehensible, emotional, and figurative form than in scholarly sources.

O.K. Pozdnyakova, in substantiating the importance of enhancing the moral consciousness of teachers in the current climate of education having a market orientation, stresses the significant role of spiritual-moral cognition of pedagogical reality and the importance of the use by pedagogues, in this regard, of sources such as focusing on morality and spiritual-moral values, treating their pedagogical duty as the requirement to "teach everybody everything – without any exceptions", building an experience of spiritual-moral relations with students, and employing spiritual practices (Pozdnyakova, 2006).

T.N. Shurukhina has made a case for using myth as a special form of spiritual exploration of pedagogical reality. The scholar is of the view that myths contain hidden socio-cultural meanings that are crucial to understanding and explaining a number of humanitarian, including pedagogical, phenomena (Shurukhina, 2012). M.M. Elfimova has discussed the potential of teacher training by way of myth-based communication (Elfimova, 2011).

D.A. Belukhin has put forth the idea of fostering in teachers a humanistic attitude toward their students based on integrating the Christian principle 'Love your neighbor as yourself' and the tenets of humanistic psychology and person-oriented pedagogy (Belukhin, 2006).

There is high potential for resolving pedagogues' problems and difficulties in working with gifted children, expanding pedagogues' notions about gifted children and their problems, and helping pedagogues conduct psychological-pedagogical work with them in motion pictures and documentaries about school and about gifted children. At present, psychology and pedagogy are witnessing the development of the following areas for the use of cinema in education, including the education of gifted children:

– as a means of teaching and educating children and youth (Zhmyrova, Monastyrskii, 2012). In this respect, there has lately been an increased focus on the development of the theory and practice of media-education (Plotnikova, 2019). It has been suggested to employ in the teaching and education of gifted children both films created by professional directors and movies created by gifted children (Dzhafarova, Mikhailova, 2017);

– as a means of psychocorrective work with students: providing them with psychological assistance in self-cognition and self-development, tapping their inner reserves and potential, actualizing and living their passions, and developing the ability to reflect about what they do. To help achieve these objectives, there have been developed methods of cinema therapy (as a means of psychological rehabilitation and correction) (Berezin, 2003), cinema-based training (as a way to develop relevant personal qualities) (Trus', 2011), and ontopsihological cinology (as a tool for psychological and sociological analysis) (Menegetti, 2001); there has been conducted some research examining adolescents' perception of particular motion pictures (e.g., 'Scarecrow') (Sobkin, Markina, 2010) and have been proposed methodologies for cinema therapy and cinema-based training for students with disability, drug addiction, stuttering, and other issues;

– as a way to illustrate to students who are future pedagogues theoretical knowledge on pedagogy and psychology and identifying and exploring interdisciplinary links (Kon'kina, Shavrygina, 2017);

– as a means of psychological assistance for practicing pedagogues. Specifically, O.A. Bystritsky views cinema therapy as an effective means of enhancing the psychological competence of pedagogues working with gifted children. An insight has been provided into the potential of cinema therapy as a way to develop in one the ability to analyze the logic behind students' actions, see their hidden motivations, and explain their behavior based on their characteristics as opposed to one's own projections, train one's intellectual and observation skills, expand the repertoire of behavioral stereotypes known to one, develop the personal qualities that are crucial for working with gifted children, and develop one's command of relevant social and cultural standards and moral norms (Bystritskii, 2007);

– as a means of instructional assistance for pedagogues working in a climate of inclusive education. Specifically, scholars O.N. Ertanova and N.N. Mikhaylova have discussed film libraries as an additional instructional resource for teachers involved in inclusive education (Ertanova, Mikhailova, 2011).

The use of motion pictures as a non-traditional form of pedagogical information relating to working with gifted children has been limited in the literature to cinema-based training aimed at enhancing the psychological competence of teachers (Bystritskii, 2007). However, there is a growing realization that the potential of motion pictures as a source of pedagogical information relating to working with gifted children is much wider.

There have been a number of films that are entirely focused on school and teaching, including: 'Road to Life' (directed by N. Ekk, 1931), 'Spring on Zarechnaya Street' (F. Mironer and M. Khutsiev, 1956), 'The Republic of ShKID' (G. Poloka, 1966), 'We'll Live Till Monday' (S. Rostotsky, 1968), 'Big School-Break' (A. Korenev, 1973), 'Scarecrow' (R. Bykov, 1983), 'Dear Yelena Sergeyevna' (E. Ryazanov, 1988), 'Dead Poets Society' (P. Weir, 1989), 'Renaissance Man' (P. Marshall, 1994), 'The Chorus' (C. Barratier, 2004), 'Freedom Writers' (R. LaGravenese, 2007), 'Little Stars on Earth' (A. Khan, 2007), 'Front of the Class' (P. Werner, 2008). 'The Class' (L. Cantet, 2008), 'The Wave' (D. Gansel, 2008), 'School' (V. Gai Germanika, 2010), 'The Geographer Drank His Globe Away' (A. Veleinsky, 2013), 'Corrections Class' (I. Tverdovskiy, 2014), 'The Teacher' (A. Petrukhin, 2015). 'Gifted' (M. Webb, 2017), 'Night School' (M.D. Lee, 2018), and 'Detachment' (T. Kaye, 2011).

Cinema has portrayed both positive (e.g., Nestor Petrovich in 'Big School-Break', who manages to make good use of humanistic methods in dealing with a problematic class, and Brad in 'Front of the Class', who manages to become an award-winning teacher despite having Tourette syndrome) and negative (e.g., Dr Bykov in 'Interns', who is a sarcastic and cynical mentor of medical interns, former mafia soldier Foma in 'P. E. Teacher', who becomes a physical education teacher accidentally, and school superintendent Frank in 'Bad Education', who embezzles large sums of money) images of a teacher. There have also been some controversial characters, which are worthy of separate discussion (e.g., Yelena Sergeyevna in 'Dear Yelena Sergeyevna' and Alla Nikolayevna in 'The Teacher').

Movies can bring up and even anticipate various topical pedagogical issues (e.g., the issue of bullying a student being raised in 'Scarecrow').

Films can help a teacher understand the characteristics of a gifted child better and develop an individual style of interaction with them. For instance, an insight into the life of gifted students with dyslexia and the special nature of interacting with them is provided in 'Night School' and

'Little Stars on Earth'. The special nature of the behavior and education of gifted children with autistic disorders is illustrated in 'Rain Man', 'My Name Is Khan', 'Adam', 'Temple Grandin', 'Nell', 'House of Cards', 'Life, Animated', and 'Infinitely Polar Bear'. An insight into issues related to the socialization of gifted children is offered in 'Gifted' and 'The Professor and the Madman'.

The scholarly-pedagogical conceptualization of motion pictures helps resolve the kind of relevant pedagogical objectives for working with gifted children that it is not always possible to do using traditional forms of pedagogical information, which include the following:

- adjusting one's professional position and embracing the humanistic norms and values of working with gifted children;
- overcoming difficulties in understanding and conceptualizing psychological theories of giftedness and scholarly-pedagogical knowledge about working with gifted children;
- conceptualizing and applying practically in working with gifted children various scholarly-pedagogical ideas that are difficult to understand;
- adapting scholarly-theoretical knowledge on pedagogy and psychology to the individual characteristics of and the specific conditions of teaching and educating gifted children;
- making moral assessments of one's pedagogical actions in respect of gifted children;
- resolving various psychological issues (e.g., fears and anxiety, emotional exhaustion and frustration, psychological trauma, animus toward a particular gifted child, etc.);
- engaging in reflection about one's pedagogical actions by way of comparison with the experience of the movies' protagonists;
- engaging in reflection about the subjective reasons behind difficulties experienced in working with gifted children;
- resolving contradictions in working with gifted children (e.g., contradictions between the need to stimulate them to strive for high achievement and develop moral qualities in them and the assessment of gifted children from the standpoint of the realization by them of their advanced capabilities and from that of their relationships with their peers, teachers, and parents);
- trying to come up with novel ways to pedagogically influence and interact with gifted children and provide them with psychological-pedagogical support;
- developing a full picture of the pedagogical reality of working with gifted children, which will integrate the theoretical, sensuous (empirical), and moral aspects of one's understanding thereof.

The purpose of this study was to determine how much pedagogues use the potential of motion pictures in working with gifted children and to provide recommendations as to how it could be used more extensively and productively.

3. Materials and methods

In conducting the research reported in this paper, the authors employed the following methods:

- comparative analysis and summarization of domestic and foreign research;
- anonymous survey of pedagogues by way of a special Google Forms questionnaire (a survey of 46 pedagogues from various regions of the Russian Federation);
- statistical analysis of the empirical data using a one-proportion Z-test to compare (1) the share of pedagogues regarding as important the resolving of particular objectives in working with gifted children and the share of pedagogues who have resolved such objectives as part of their own activity; (2) the share of respondents familiar with motion pictures about gifted children and the share of respondents deeming that the pedagogical conceptualization of such films can help them in resolving difficulties in working with gifted children;
- problem-pedagogical analysis of films about school and gifted children;
- analysis of essays written by beginner primary school teachers after watching motion pictures about school. The teachers were asked to pick and watch a movie about school of their choice and then provide a pedagogical analysis thereof. They were asked to list in the analysis the pedagogical issues brought up in the movie and discuss the linkage between those issues and their own pedagogical activity.

The respondent sample was comprised of all categories of pedagogues working with gifted children (Table 1).

Table 1. Share of pedagogues working with gifted children in the sample

Respondent age, years old	Share, %	Length of pedagogical service, years	Share, %	Post	Share, %
20 to 30	5	1 to 3	7.3	subject teacher	26.8
30 to 40	12.5	4 to 10	7.3	primary school teacher	7.3
40 to 50	45	10 to 20	24.4	supplementary education pedagogue	19.5
older than 50	37.5	over 20 years	61	educational psychologist	2.4

At the time the survey was conducted, 39 % of the respondents also performed the duties of a homeroom teacher, and 2.4 % performed administrative duties (e.g., a deputy head teacher).

The respondents represented several types of educational institution: secondary schools (57.5 %), gymnasia and lyceums (15 %), and institutions of supplementary learning for children (25 %).

The sample was composed of pedagogues with varying levels of education: higher education (82.9 %), vocational education (12.2 %), and doctorate degree (4.9 %).

Almost all of the respondents had worked with gifted children, with 82.9 % responding to the question in the affirmative and 12.2 % having difficulty responding to it, which may be due to being unable to actually identify gifted children.

4. Results

The majority of pedagogues (70.7 %) view a gifted child as someone who is considerably ahead of their peers in the development of particular abilities (e.g., for creativity, sports, intellectual pursuits, crafts, and social activity), 14.6 % – as an out-of-the-box thinker, 7.3 % – as someone whose level of creative ability is much higher than that of their peers, and 4.9 % – as someone whose intellectual level is much higher than that of their peers. One of the pedagogues (2.4 %) provided a definition of their own – “a child who is into a particular hobby or activity, with that being something that thrills them”. Thus, the majority of pedagogues associate children’s giftedness with a particular type of activity, which it is manifested in, as opposed to general preconditions (e.g., intellect and creativity).

The overwhelming majority of pedagogues (95.1 %) were found to be convinced that it will help to identify and support gifted children in school.

Note that 63.4 % of respondents said that the process of identifying and supporting gifted children should involve various specialists, including subject teachers, supplementary education pedagogues, homeroom teachers, educational psychologists, and social pedagogues; 24.4 % said this is the job of a psychologist (which may be due to manifestations of giftedness in children tending to be assessed using standardized psychodiagnostic methodologies); 12.2 % said this is the job of a social pedagogue.

More than half of respondents (61 %) were found to view as a key objective for working with gifted children the development of their advanced capabilities; 56.1 % noted the importance of assisting gifted children with building and enacting scenarios for actualizing their abilities in various areas of life; 41.5 % stressed the need to provide them with assistance in professional and life self-development; 29.3 % spoke of the need to assist them with resolving issues in communication and socialization; 24.4 % voiced the need to assist them with resolving issues in school and social adaptation; 14.6 % said it is relevant to focus on their intellectual development.

A similar distribution was obtained with the respondents’ answers with regard to which objectives they have resolved as part of their own work with gifted children (Table 2). The assessment of the significance of differences using the one-proportion Z-test statistical method revealed that on all objectives except ‘Assistance with resolving issues related to school and social

adaptation' the differences were not significant. This is testimony that assisting gifted children with resolving issues related to school and social adaptation remains a tall order for many pedagogues, despite the fact that most of them are aware of the significance of resolving this objective.

Table 2. Pedagogues' understanding of key objectives for working with gifted children and practice of resolving them

Objectives for working with gifted children	Understanding of the importance of resolving the objective, %	Resolving the objective in teaching, %	z-value	p-value	Significance of differences at desired significance level = 0.05
Development of one's advanced capabilities and encouragement of manifestations of one's giftedness	61	68.4	1	0.3035	not significant
Assistance with building and enacting scenarios for actualizing one's abilities in various areas of life	56.1	42.1	1.9	0.0557	not significant
Assistance with establishing communication and interacting with one's peers, parents, and teachers	29.3	21.1	1.2	0.2217	not significant
Assistance with resolving issues related to school and social adaptation	24.4	10.5	2.2	0.0282	significant
Engaging one in the social life of the class and various educational activities and matters	Variant not included in the list of answers	26.3	–	–	–
Intellectual development	14.6	Variant not included in the list of answers	–	–	–
Undecided	Variant not included in the list of answers	10.5	–	–	–

As evidenced in [Table 2](#), while most are aware of the importance of particular objectives for working with gifted children, not all pedagogues tackle them in their work, which suggests the need to provide pedagogues with appropriate instructional support for the purpose.

Having difficulties in working with gifted children was admitted to by 71.1 % of respondents, with 5.3 % of these admitting to having them on a regular basis, and 65.8 % – on a once-in-a-while basis.

The authors compared the pedagogues' answers on difficulties they face in their work as a whole with those on difficulties they face in working with gifted children in particular: 69.6 % admitted to being aware of certain difficulties in their work; 21.7 % said they were not aware of any difficulties in their work; 8.7 % had difficulty answering the question. It appears that the shares of pedagogues experiencing difficulties in their work and in working with gifted children are about the same, i.e. working with gifted children is not perceived by them as more difficult.

For the most part, pedagogue difficulties in working with gifted children are associated with the understanding of individual characteristics and special educational needs of such children (42.4 %) and searching for novel ways to pedagogically influence and interact with them (36.4 %).

The authors compared the identified difficulties with those experienced by pedagogues in working with neurotypical children (Table 3).

Table 3. Difficulties experienced by pedagogues in working with gifted and neurotypical children

Working with gifted children		Working with neurotypical children	
Area of difficulty	Share of pedagogues	Area of difficulty	Share of pedagogues
Having an understanding of one's individual characteristics and special educational needs	42.4	Selecting and employing methodologies for assessing one's personal characteristics and learning achievements; processing and interpreting the assessment results	39.1
Looking for novel ways to pedagogically influence and interact with one	36.4	Designing and implementing pedagogical innovations	21.7
Building pedagogical interaction with one's parents	24.2	Building a relationship with one's parents	26.1
Designing and organizing group interaction between one and one's peers	21.2	Planning out pedagogical communication; presenting it in the form of a system of objectives	26.1
Selecting learning materials that may be of interest to one	18.2	Developing educational programs and instructional materials	43.5
Adapting teaching methodologies and methods, the content of education, and educational standards to one's special educational needs	18.2	Selecting relevant methods of teaching and educating one factoring in one's individual characteristics	30.4
Building interaction with one	15.2	Planning out pedagogical communication; presenting it in the form of a system of objectives	26.1
Forecasting one's behavior	15.2	Identifying the motives behind one's actions	30.4
Resolving conflicts with one and one's parents	12.1	Resolving conflicts with one's parents	26.1

As evidenced in Table 3, in working with gifted children pedagogues tend to experience more often than they do in working with neurotypical children difficulties associated with understanding

the learner's individual characteristics and adapting to them the content and methods of teaching and education and less often difficulties associated with pedagogical communication with children and their parents.

Colleagues' experience was listed by 64.1 % of respondents as the main source of pedagogical information relating to working with gifted children, followed by reflection about one's own pedagogical work (38.5 %), ahead of reading scholarly and instructional literature and taking advanced training courses (46.2 % and 33.3 %, respectively).

The use of non-traditional approaches and methods in working with gifted children was reported by 35.9 % of pedagogues.

Invoking in working with gifted children analysis of one's own experience as a child was reported by 20.5 % of respondents, proprietary pedagogical ideas and systems and best practices from innovative pedagogues – 17.9 %, pedagogical conceptualization of works of literature and film about gifted children – 15.4 %, and folklore and folk pedagogy – 10.3 % (with 2.6 % using jokes).

With that said, just 15.4 % of respondents admitted to invoking in working with gifted children pedagogical conceptualization of films about gifted children; 70 % said that watching and conducting pedagogical analysis of such films can help the pedagogue in building interaction with gifted children; 22.5 % were undecided; just 7.5 % said they did not consider the option.

The above difference in answers suggests the need to develop in educational organizations the right conditions for pedagogues to use motion pictures as a source of pedagogical information relating to working with gifted children (e.g., establishment of criteria for selecting such films, creation of a film library, development of a methodology for scholarly-pedagogical analysis and discussion of such films, application of the acquired knowledge in practical activity, organization of a pedagogical cinema club, and organization of cinema-based training).

What, also, speaks in favor of creating such conditions is the pedagogues' answers to the question about whether scholarly knowledge acquired from formalized sources (e.g., supplementary education, advanced training, and scholarly-pedagogical texts) suffices in working with gifted children: 82.9 % said this kind of knowledge is not enough; 17.1 % said scholarly knowledge does suffice for resolving difficulties and issues in working with gifted children.

A special focus in the questionnaire was on investigating pedagogues' use of motion pictures to resolve difficulties in working with gifted children, for, while their potential for that is quite high, it has yet to be explored in depth.

The authors identified the films about gifted children watched by the respondents. The most popular of them is 'Scarecrow' (Russia, 1983), watched by 76.9 % of respondents, followed by a large margin by 'Schedule for the Day After Tomorrow' (Russia, 1978) and the animated film 'The Little Prince' (France and Italy, 2015), watched by 35.9% of respondents each. Placed third was 'Certificate of Maturity' (Russia, 1954) – 28.2 %, and fourth – 'When I Will Become a Giant' (Russia, 1978) – 25.6%. In fifth place was 'Indigo' (Russia, 2008), watched by 17.9 % of respondents, and placed sixth was 'Corrections Class' (Russia, 2014) – 12.8 %. As can be seen, the most popular movies watched by pedagogues are domestic films made in the 1950-80s.

Below are some of the noteworthy foreign films focused on topical issues in working with gifted children that could be used to resolve typical difficulties but are not known to the majority of pedagogues:

- 'Searching for Bobby Fischer' (USA, 1998) – 10.3 %
- 'The Jester' (Russia, 1988), 'Gifted' (USA, 2017), 'Little Stars on Earth' (India, 2007), and 'The Young and Prodigious T.S. Spivet' (France and Canada, 2013) – 7.7 %;
- 'Billy Elliot' (UK, 2000) and 'Little Man Tate' (USA, 1991) – 5.1 %;
- 'Vitus' (Switzerland, 2006) and 'The Act' (France, 2006) – 2.6 %.

Table 4 provides the comparative data on the share of pedagogues familiar with films about gifted children and the share of pedagogues aware of the potential of such films for helping resolve difficulties in working with gifted children. The significance of differences was assessed using the one-proportion Z-test statistical method. For the most part, the differences were not significant. Significant differences were found on three films: 'Scarecrow' (Russia, 1983), 'The Little Prince' (France and Italy, 2015), and 'When I Will Become a Giant' (Russia, 1978). It may be that it is in these specific films that one has had particular difficulty discovering the meanings, images, and information that could be of use in working with gifted children and resolving issues in the process.

Table 4. Pedagogues' assessments of the potential of motion pictures for helping overcome difficulties in working with gifted children

Film's title	Share of pedagogues familiar with the film, %	Share of pedagogues who believe that the pedagogical conceptualization of the film can help resolve difficulties in working with gifted children, %	z-value	p-value	Significance of differences at desired significance level=0.05
'Scarecrow' (Russia, 1983)	76.9	52.9	3.9	0.0001	significant
'Schedule for the Day After Tomorrow' (Russia, 1978)	35.9	23.5	1.8	0.0796	not significant
'The Little Prince' (France and Italy, 2015)	35.9	20.6	2.2	0.0305	significant
'Certificate of Maturity' (Russia, 1954)	28.2	23.5	0.7	0.4787	not significant
'When I Will Become a Giant' (Russia, 1978)	25.6	8.8	2.6	0.009	significant
'Indigo' (Russia, 2008)	17.9	11.8	1.1	0.2805	not significant
'Corrections Class' (Russia, 2014)	12.8	11.8	0.2	0.8391	not significant
'Searching for Bobby Fischer' (USA, 1998)	10.3	5.9	1	0.3262	insubstantial
'The Jester' (Russia, 1988)	7.7	5.9	0.5	0.647	not significant
'Gifted' (USA, 2017)	7.7	7.7	0	1	insubstantial
'Little Stars on Earth' (India, 2007)	7.7	7.7	0	1	insubstantial
'The Young and Prodigious T.S. Spivet' (France and Canada, 2013)	7.7	7.7	0	1	insubstantial
'Billy Elliot' (UK, 2000)	5.1	0	1.6	0.1159	not significant
'Little Man Tate' (USA, 1991)	5.1	2.9	0.7	0.4976	not significant
'The Act' (USA, 2019)	2.6	0	1.1	0.2678	insubstantial

Additionally, the respondents listed the following as films that could help in resolving difficulties in working with gifted children: 'Ballad of a Soldier', 'Hot Snow', and 'Son of the Regiment' (2.9 % each). None of the respondents mentioned any other movie watched about gifted children or capable of helping in resolving difficulties in working with them. Note that 2.9 % of respondents said they would prefer works of literature over motion pictures as a resource to draw inspiration from for the purpose.

The objectives for working with gifted children which, in the view of the pedagogues, could be resolved via pedagogical conceptualization of motion pictures and works of literature received the following distribution:

- understanding the individual characteristics and special educational needs of gifted children – 61.5 %;
- forecasting the behavior of gifted children – 33.3 %;
- establishing the axiological and target foundations of pedagogical work with gifted children – 30.8 %;
- searching for novel ways to pedagogically influence and interact with gifted children – 30.8 %;
- designing and implementing pedagogical interaction with gifted children – 25.6 %;
- designing and organizing group interaction between gifted children and their peers – 23.1 %;
- designing and implementing interaction with gifted children's parents – 23.1 %;
- adapting teaching methodologies and methods, the content of education, and educational standards to gifted children's special educational needs – 17.9 %;
- selecting learning materials that may be of interest to gifted children – 15.4 %;
- resolving conflicts with gifted children and their parents – 15.4 %.

To gain a deeper insight into pedagogues' perception of motion pictures as a source of pedagogical information, the participating beginner primary school teachers were asked to write an essay containing a pedagogical analysis of a motion picture about school. The following movies were selected for analysis by the beginner teachers: 'Freedom Writers', 'Detachment', 'Practical Joke', 'Little Stars on Earth', 'Front of the Class', 'Pay It Forward', 'The Teacher', 'The Wave', and 'Night School'.

The overwhelming majority of respondents analyzed the movies out of conjunction with their own pedagogical activity and professional issues and difficulties. They gave characterizations to the characters and identified the various issues regarding schooling and education brought up in the movies, but they did not link them with their own activity and difficulties. Let us take, for instance, the film 'Freedom Writers': "For the sake of her students' freedom, the teacher, Ms. Gruwell, sacrifices her own freedom. She sublimates all of her energy, faith, and love into her class" (Narine D.). Here is a pedagogue statement on the film 'Detachment': "The film brings up a number of topical issues in present-day education: children being neglected pedagogically, teachers experiencing emotional burn-outs, child aggression, and insufficient parental participation" (Anastasiya A.). Here is one on 'Front of the Class': "In this film, we can see how considerate a teacher can be toward each and every little student of theirs. Brad mingles and jokes with the kids, but at the same time he also manages to maintain discipline among them, and, in return, the children show him respect and strive to learn" (Alena K.).

Only 18 % of the teachers (two of the 11 participants) perceived a linkage between a film's plot and their own activity. Let us take, for instance, the film 'Little Stars on Earth': "Nikumbh finds a way to work with Ishaan, teaches him to read and write, and helps him regain confidence in himself, which results in Ishaan changing. I feel that my pedagogical mission is to try to find in every child a special talent, which is like a seed that must be nourished, protected, and cultivated. I know that my students are talented, each in their own way. I must help each of them tap into their potential and harness all of it" (Anastasiya I.). Here is a pedagogue statement on the film 'The Teacher': "I first watched this movie as a sophomore. Back then, I found the depiction of what Alla Nikolayevna was emotionally going through too "movie-like". However, now I realize that was a magnification of present-day realities. These days, teachers get "run ragged" at work so much that there's little time to recharge. They have an emotional burnout before they know it, and there's no escaping that. I've drawn the following conclusions for myself: always keep your distance from your work; all children are different, so each child requires an individual approach; it is important for

me to know for the sake of what I became a teacher. I have mixed feelings about this movie. I would not employ those methods in my teaching. However, it made me pause and think about myself as a teacher. I'm learning to organize my work with students in a proper way, and learning from somebody else's mistakes could help. The film makes you understand that the life of a teacher is not always as ideal as you may want it to be" (Elena Ch.).

The findings suggest the need to provide pedagogues with assistance in selecting motion pictures to watch and establishing the link between a film's plot and the professional difficulties they have in working with gifted children.

5. Conclusion

With reliance upon the research by O.A. Bystritsky ([Bystritskii, 2007](#)), the authors established the following criteria for selecting motion pictures that could help resolve difficulties in working with gifted children:

- high cultural level (i.e., the film's quality in terms of directing and the story, music, and footage);
- positive story;
- the movie's plot matching the pedagogue's difficulties and the pedagogical and psychological substance of their work with gifted children
- topical pedagogical idea;
- problematcity (the film must contain a problem question (e.g., 'What is a teacher better off doing in working with a gifted child: listen to their heart or try to keep their reputation?');
- humanistic orientation, promotion of spiritual-moral, values, adherence to the principles of humanistic pedagogy and psychology.

The use of motion pictures to resolve difficulties in working with gifted children may include the following stages and forms of work:

- selecting movies based on a set of criteria, matching them to pedagogues' difficulties, and building a film library. A film collection of this kind may be composed by a vice-principal for curriculum, an educational psychologist, or a head of the instructional teacher unit for use by a school's entire pedagogical staff or by each individual pedagogue for their own use, based on their own difficulties;
- pedagogues independently watching and analyzing films with the aim of resolving their own work difficulties. In watching a movie, one may need to pay special attention to the stereotypes of pedagogical interaction and acceptable and unacceptable styles of behavior enacted in the movie and identify and try to formulate the key pedagogical ideas and meanings the movie's creators wanted to put across to the audience;
- cinema therapy and cinema-based training organized by an educational psychologist;
- pedagogues getting individual consultations with an educational psychologist based on the material of a movie they watched;
- group discussions on watched films at instructional teacher unit meetings, at meetings of the school's cinema club (in both online and offline format), or on the school's page on a social network;
- capturing one's newly acquired experience, beliefs, and values in drawings, poems, collages, and stories and in one's own pedagogical activity and interaction with gifted children.

It must be kept in mind that one's perception and conceptualization of motion pictures may vary depending on whether one watches a movie for entertainment purposes or to get help with resolving difficulties in working with gifted children, and these differences may be associated with scholarly-pedagogical reflection and the discovery of scholarly-pedagogical meanings, values, and ideas ([Table 5](#)).

Table 5. Differences between the pedagogue’s immediate perception and scholarly conceptualization of a motion picture about school

Immediate perception	Scholarly conceptualization
Identify oneself with and compare one’s own thoughts, feelings, and beliefs to those of the protagonist	Differentiate between the way the situation is understood by the movie’s protagonist and the way it is understood by oneself Differentiate between oneself and the protagonist and compare oneself with the protagonist, i.e. try to establish the differences and similarities between oneself and the protagonist
Explain the actions of the protagonist based on one’s own projections	Evaluate the protagonist’s actions from the standpoint of scholarly theories
Think of certain things in the movie as happening to oneself at the moment	Engage in pedagogical reflection about the movie’s events
Single out and commit to memory what is the most significant to one at the moment	Mentally prepare yourself beforehand to discover in the movie issues, situations, and narratives that are related to working with gifted children and overcoming difficulties in the process

Table 6 displays a film collection that could be used by pedagogues to resolve some of the typical difficulties in working with gifted children.

Table 6. Film collection that can help resolve typical difficulties experienced by pedagogues in working with gifted children

Difficulties experienced by pedagogues in working with gifted children (or their causes)	Movies recommended for scholarly-pedagogical analysis
Inadequate image of the gifted child	‘Schedule for the Day After Tomorrow’ (Russia, 1978, directed by Igor Dobrolyubov) ‘Certificate of Maturity’ (Russia, 1954, Tatyana Lukashevich) ‘The Jester’ (Russia, 1988, Andrei Eshpai) ‘When I Will Become a Giant’ (Russia, 1978, Inna Tumanyan) ‘Little Man Tate’ (USA, 1991, Jodie Foster) ‘The Young and Prodigious T.S. Spivet’ (France and Canada, 2013, Jean-Pierre Jeunet) ‘Indigo’ (Russia, 2008, Roman Prygunov)
Limited idea of the types of giftedness	‘Forrest Gump’ (USA, 1994, directed by Robert Zemeckis) ‘Corrections Class’ (Russia, 2014, Ivan Tverdovskiy) – the image of Lena Chekhova
Inadequate idea of the values and objectives associated with working with gifted children	‘Gifted’ (USA, 2017, Marc Webb) ‘Certificate of Maturity’ (Russia, 1954, Tatyana Lukashevich) ‘The Jester’ (Russia, 1988, Andrei Eshpai)
Manipulating a gifted child; viewing a gifted child only as someone who has advanced capabilities; ignoring a gifted child’s human needs	‘Vitus’ (Switzerland, 2006, Fredi M. Murer) ‘Searching for Bobby Fischer’ (USA, 1993, Steven Zaillian) ‘Little Man Tate’ (USA, 1991, Jodie Foster) ‘The Little Prince’ (France and Italy, 2015, Mark Osborne)
Being unable to understand major challenges facing gifted children (particular categories of such children): 1) a gifted child having	1) ‘When I Will Become a Giant’ (Russia, 1978, Inna Tumanyan) ‘Gifted’ (USA, 2017, Marc Webb) ‘The Young and Prodigious T.S. Spivet’ (France and Canada, 2013, Jean-Pierre Jeunet)

<p>problems with building relationships with their peers, teachers, and parents</p> <p>2) challenges facing “dual-exceptionality” children</p> <p>3) issues related to peers and pedagogues bullying, rejecting, and misunderstanding gifted children</p> <p>4) the pedagogue helping the gifted child resolve their problems</p>	<p>2) artistic giftedness and dyslexia – ‘Little Stars on Earth’ (India, 2007, Aamir Khan)</p> <p>social giftedness and disability – ‘Corrections Class’ (Russia, 2014, Ivan Tverdovskiy)</p> <p>sporting giftedness and mental disorders – ‘Pawn Sacrifice’ (USA, 2014, Edward Zwick)</p> <p>sporting giftedness and drug addiction – ‘The Queen’s Gambit’ (UK, 2020, Scott Frank)</p> <p>3) ‘Scarecrow’ (Russia, 1983, Rolan Bykov)</p> <p>‘Corrections Class’ (Russia, 2014, Ivan Tverdovskiy)</p> <p>4) ‘Little Stars on Earth’ (India, 2007, Aamir Khan)</p> <p>‘The Jester’ (Russia, 1988, Andrei Eshpai)</p> <p>‘Good Will Hunting’ (USA, 1997, Gus Van Sant)</p> <p>‘Akeelah and the Bee’ (USA, 2006, Doug Atchison)</p> <p>‘The Chorus’ (France, Germany, and Switzerland, 2004, Christophe Barratier)</p>
<p>The pedagogue unable to make a regular set of methods work for a particular gifted child</p>	<p>‘Little Stars on Earth’ (India, 2007, Aamir Khan)</p> <p>The use of the ‘Which character in the movie would look at my issues?’ technique. When the pedagogue comes across a certain issue, they check to see whether the solutions suggested in the movie fit their own situation</p>
<p>Insufficient empathy</p>	<p>‘Billy Elliot’ (UK, 2000, Stephen Daldry)</p>
<p>Insufficient positive thinking and pedagogical optimism in working with gifted children</p>	<p>‘Billy Elliot’ (UK, 2000, Stephen Daldry)</p> <p>‘Little Stars on Earth’ (India, 2007, Aamir Khan)</p> <p>‘Front of the Class’ (UK, 2008, by Peter Werner)</p> <p>‘The Ron Clark Story’ (USA, 2006, Randa Haines)</p> <p>‘The Republic of ShKID’ (Russia, 1966, Gennadi Poloka)</p>
<p>The pedagogue lacking certain competencies and qualities needed for working productively with gifted children</p>	<p>‘Schedule for the Day After Tomorrow’ (Russia, 1978, Igor Dobrolyubov)</p> <p>‘The Jester’ (Russia, 1988, Andrei Eshpai)</p>

6. Conclusion

1. Working with gifted children requires the pedagogue to adapt scholarly-theoretical knowledge to the individual characteristics and special educational needs of such children. This, along with a number of other factors (e.g., the humanitarian vector of the development of pedagogical science and educational practice, the multidimensionality of pedagogical reality as a unity of theoretical, sensuous (empirical), and axiological (moral) aspects, the special nature of pedagogical activity, which involves pedagogues both consciously and unconsciously adding to the initial theoretical knowledge base as they apply theoretical knowledge, and pedagogues having productive pedagogical experience, with engaging in scholarly reflection about their teaching and exchanging knowledge and best practices with each other being what can facilitate the resolution of difficulties that may arise in working with gifted children), substantiates the need for pedagogues working with gifted children to invoke both traditional, i.e. scholarly (e.g., scholarly and instructional literature and advanced training courses), and non-traditional, i.e. extra-scholarly (e.g., personal experience and intuition, colleagues’ experience and best practices from innovative pedagogues, folklore and folk pedagogy, works of literature and films about school and gifted children, spiritual-moral norms and values, and pedagogical mythology), forms of pedagogical information.

2. The main source of pedagogical information relating to working with gifted children for pedagogues is the experience of their colleagues (64.1 %), as well as engaging in reflection about their own pedagogical experience (38.5 %), ahead of reading scholarly and instructional literature and taking advanced training courses (46.2 % and 33.3 %, respectively).

3. A resource that has high potential for helping resolve difficulties faced by pedagogues in working with gifted children is motion pictures about school and gifted children. This potential lies in the possibility of resolving the following objectives:

- adjusting one’s professional position and embracing the humanistic norms and values of working with gifted children;
- overcoming difficulties in understanding and conceptualizing psychological theories of giftedness and scholarly-pedagogical knowledge about working with gifted children;
- conceptualizing and applying practically in working with gifted children various scholarly-pedagogical ideas that are difficult to understand;
- adapting scholarly-theoretical knowledge on pedagogy and psychology to the individual characteristics of and the specific conditions of teaching and educating gifted children;
- making moral assessments of one’s pedagogical actions in respect of gifted children;
- resolving various psychological issues;
- engaging in reflection about one’s pedagogical actions by way of comparison with the experience of the movies’ protagonists;
- engaging in reflection about the subjective reasons behind difficulties experienced in working with gifted children;
- resolving contradictions in working with gifted children;
- trying to come up with novel ways to pedagogically influence and interact with gifted children and provide them with psychological-pedagogical support;
- developing a full picture of the pedagogical reality of working with gifted children, which will integrate the theoretical, sensuous (empirical), and moral aspects of one’s understanding thereof.

4. While pedagogues are aware of the significant potential of motion pictures for helping resolve difficulties in working with gifted children, they have used it insufficiently – just 15.4 % of pedagogues invoke in working with gifted children pedagogical conceptualization of movies about gifted children. With that said, 70 % of pedagogues feel that watching and conducting pedagogical analysis of films about gifted children can be of help to the pedagogue in building interaction with the gifted child. This suggests the need to develop in educational organizations the right conditions for pedagogues to use motion pictures as a source of pedagogical information relating to working with gifted children (e.g., establishment of criteria for selecting such films, creation of a film library, development of a methodology for scholarly-pedagogical analysis and discussion of such films, application of the acquired knowledge in practical activity, organization of a pedagogical cinema club, and organization of cinema-based training).

5. Motion pictures for use in working with gifted children may be selected based on the following criteria: high cultural level; positive story; the movie’s plot matching the pedagogue’s difficulties and the pedagogical and psychological substance of their work with gifted children; topical pedagogical idea; problematcity; humanistic orientation. It will help to use both domestic and foreign films.

6. Pedagogues may use motion pictures for resolving difficulties in working with gifted children across the following areas: independent watching and analysis, individual work with a psychologist (psychotherapy and consultations), group discussions at instructional meetings and teachers' meetings, and cinema-based training as a form of enhancing one’s qualification.

7. One’s perception and conceptualization of motion pictures may vary depending on whether one watches a movie for entertainment purposes or to get help with resolving difficulties in working with gifted children, and these differences may be associated with scholarly-pedagogical reflection and the discovery of scholarly-pedagogical meanings, values, and ideas.

7. Acknowledgements

The research reported in this paper was conducted with financial support from the Kuban Science Foundation as part of a research project (No. MFI-20.1/112).

References

Akgül, 2021 – Akgül, G. (2021). Teachers’ metaphors and views about gifted students and their education. *Gifted Education International*. 1.

Barrera-Algarín et al., 2021 – Barrera-Algarín, E., Sarasola-Sánchez-Serrano, J.L., Fernández-Reyes, T., García-González, A. (2021). Deficit in teachers and educators' training on intellectual giftedness: A handicap for elementary education in Andalusia. *Revista de Investigación Educativa*. 39(1): 209-226.

Belukhin, 2006 – Belukhin, D.A. (2006). Uchitel', vozlyubi blizhnego tvoego, kak samogo sebya: pedagogicheskaya refleksiya sushchnosti i sodержaniya ponyatii lyubvi i blizhnego v religii i pedagogike [Teacher, love your neighbor as yourself: Engaging in pedagogical reflection about the substance and content of the concepts of love and of the neighbor in religion and pedagogy]. Moskva: Izdatel'stvo Moskovskogo psikhologo-sotsial'nogo instituta, Voronezh: MODEK. [in Russian]

Berezin, 2003 – Berezin, S.V. (2003). Kinoterapiya. Prakticheskoe posobie dlya psikhologov i sotsial'nykh rabotnikov [Cinema therapy. A practical guide for psychologists and social workers]. Samara. [in Russian]

Betts, Knapp, 1981 – Betts, G.T., Knapp, J. (1981). The autonomous learner model: A secondary model. In *Secondary programs for the gifted and talented*. Los Angeles: National State-Leadership Training Institute for the Gifted and Talented.

Bulut et al., 2020 – Bulut, A.S., Yildız, A., Baltacı, S. (2020). A comparison of mathematics learning approaches of gifted and non-gifted students. *Turkish Journal of Computer and Mathematics Education*. 11(2): 461-491.

Bystritskii, 2007 – Bystritskii, O.A. (2007). Terapiya kinoiskusstvom. Metody povysheniya psikhologicheskoi kompetentsii pedagogov [Cinematic art therapy. Methods for enhancing the psychological competence of pedagogues]. *Shkol'nyi psikholog*. 3: 18-21. [in Russian]

Casino-García et al., 2021 – Casino-García, A.M., Llopis-Bueno, M.J., Llinares-Insa, L.I. (2021). Emotional intelligence profiles and self-esteem/self-concept: An analysis of relationships in gifted students. *International Journal of Environmental Research and Public Health*. 18(3): 1-23.

Dullaghan, 2012 – Dullaghan, B. (2012). Why Doesn't Every Gifted Child Succeed? *Parenting for High Potential*. 1 (3). [Electronic resource]. URL: <http://www.nagc.org>

Dzhafarova, Mikhailova, 2017 – Dzhafarova, G.D., Mikhailova, D.S. (2017). Ekspres-kurs «Kinostudiya v karmane» v obrazovatel'nom tsentre «Sirius» (g. Sochi) [The 'Film Studio in Your Pocket' crash-course, offered at the Sirius education center (Sochi)]. *Konferentsiya studentov, aspirantov i molodykh uchenykh, posvyashchennaya godu rossiyskogo kino*. Sankt-Peterburg: Sankt-Peterburgskii gosudarstvennyi universitet kino i televideniya. [in Russian]

Elfimova, 2011 – Elfimova, M.M. (2011). Teoretiko-metodicheskie osnovy mifokommunikatsionnogo treninga v rabote s uchitelyami. Chelovek v mire. Mir v cheloveke: aktual'nye problemy filosofii, sotsiologii, politologii i psikhologii [Theoretical-methodological foundations of teacher training based on myth-based communication. Man in the world. The world in man: relevant issues in philosophy, sociology, political science, and psychology]. Perm'. [in Russian]

Ertanova, Mikhailova, 2011 – Ertanova, O.N., Mikhailova, N.N. (2011). Fil'moteka kak resurs inkluzivnogo obrazovaniya [The film library as a resource for inclusive education]. *Inkluzivnoe obrazovanie: metodologiya, praktika, tekhnologiya*. Moskva: Izdatel'stvo Moskovskogo gosudarstvennogo psikhologo-pedagogicheskogo universiteta: 89-91. [in Russian]

Heyd-Metzuyanım, Hess-Green, 2020 – Heyd-Metzuyanım, E., Hess-Green, R. (2020). Valued Actions and Identities of Giftedness in a Mathematical Camp. *International Journal of Science and Mathematics Education*. 18(7): 1311-1331.

Kachalova, 1999 – Kachalova, L.P. (1999). Metod golograficheskogo podkhoda i protsess integratsii psikhologo-pedagogicheskikh znaniı budushchego uchitelya [The holographic method and the process of integrating a future teacher's psychological-pedagogical knowledge]. *Integratsiya obrazovaniya*. 4: 27-30.

Kahveci, Atalay, 2015 – Kahveci, N.G., Atalay, Ö. (2015). Use of integrated curriculum model (ICM) in social studies: Gifted and talented students' conceptions. *Eurasian Journal of Educational Research*. 59: 91-112.

Kamysheva, 2003 – Kamysheva, E.Yu. (2003). Pedagogicheskaya publitsistika kak sredstvo vospitaniya interesa k uchitel'skomu trudu u studentov pedagogicheskogo vuza [Pedagogical publicistic writing as a means of fostering in teaching majors an interest in the teaching profession].

Extended abstract of candidate's thesis]. Avtoreferat dissertatsii kandidata pedagogicheskikh nauk. Ekaterinburg. [in Russian]

Klimov, 2006 – *Klimov, E.A.* (2006). Psikhologicheskaya mysl' v narodnom soznanii dalekogo proshlogo [Psychological thought in the public consciousness of the distant past]. Moskva: Moskovskii psikhologo-sotsial'nyi institut. [in Russian]

Kon'kina, Shavrygina, 2017 – *Kon'kina, E.V., Shavrygina, O.S.* (2017). Ispol'zovanie uchebnogo fil'ma v podgotovke budushchego pedagoga na primere distsipliny «Vvedenie v pedagogicheskuyu professiyu» [The use of instructional films in the training of future pedagogues through the example of the discipline “Introduction to the pedagogical profession”]. *Problemy sovremennogo pedagogicheskogo obrazovaniya*. 10(55): 100-108. [in Russian]

Kuular et al, 2003 – *Kuular, D.O., Ragulina, M.I., Lapchik, M.P.* (2019). Future teachers' training in identification and development of IT giftedness at schools of the Republic of Tyva. *Journal of Siberian Federal University. Humanities and Social Sciences*. 12(9): 1659-1669.

Matheis et al., 2020 – *Matheis, S., Keller, L.K., Kronborg, L., Schmitt, M., Preckel, F.* (2020). Do stereotypes strike twice? Giftedness and gender stereotypes in pre-service teachers' beliefs about student characteristics in Australia. *Asia-Pacific Journal of Teacher Education*. 48(2): 213-232.

Menegetti, 2001 – *Menegetti, A.* (2001). Kino, teatr, bessoznatel'noe [Cinema, theater, and the unconscious]. Moskva: NNBF «Ontopsikhologiya». [in Russian]

Ovchenkova, 2006 – *Ovchenkova, O.Yu.* (2006). Khudozhestvenno-obraznoe poznanie pedagogicheskikh yavlenii kak sredstvo formirovaniya pedagogicheskoi pozitsii budushchego uchitelya [Artistic-figurative cognition of pedagogical phenomena as a means of shaping the pedagogical stance of a future teacher]. Dissertatsiya kandidata pedagogicheskikh nauk. Kirov. [in Russian]

Plotnikova, 2019 – *Plotnikova, E.A.* (2019). Ispol'zovanie tekhnologii videokeisov v mediavospitanii shkol'nikov [The use of videocases in schoolchild media-education]. *ZNAK*. 3(33): 42-48. [in Russian]

Pozdnyakova, 2006 – *Pozdnyakova, O.K.* (2006). Nravstvennoe soznanie uchitelya: eticheskii aspekt [The moral consciousness of a teacher: the ethical aspect]. M.: Izdatel'stvo Moskovskogo psikhologo-sotsial'nogo instituta. 160 p. [in Russian]

Renzulli, Reis, 2012 – *Renzulli, J.S., Reis, S.M.* (2012). A virtual learning application of the schoolwide enrichment model and high-end learning theory. *Gifted Education International*. 28(1): 19.

Robotova, 1996 – *Robotova, A.S.* (1996). Khudozhestvenno-obraznoe poznanie pedagogicheskoi deistvitel'nosti sredstvami khudozhestvennoi literatury [Artistic-figurative cognition of pedagogical reality by means of works of literature]. Avtoreferat dissertatsii doktora pedagogicheskikh nauk. Sankt-Peterburg. [in Russian]

Shadrikov, 2019 – *Shadrikov, V.D.* (2019). Sposobnosti i odarennost' cheloveka: Monografiya [A person's abilities and giftedness: a monograph]. Moskva: Izdatel'stvo Instituta psikhologii RAN. [in Russian]

Sharp, Clemmer, 2015 – *Sharp, L.A., Clemmer, P.* (2015). The Neglected Readers: Differentiating Instruction for Academically Gifted and Talented Learners. *The Journal of Balanced Literacy Research and Instruction*. 3(1): 17-21.

Shurukhina, 2012 – *Shurukhina, T.N.* (2012). Mif kak osobaya forma dukhovnogo osvoeniya pedagogicheskoi real'nosti [Myth as a special form of spiritual apprehension of pedagogical reality]. *Vestnik nauki TGU*. 2(9): 336-338. [in Russian]

Smedsrud, 2020 – *Smedsrud, J.* (2020). Explaining the Variations of Definitions in Gifted Education. *Nordic Studies in Education*. 40(1): 79-97.

Sobkin, Markina, 2010 – *Sobkin, V.S., Markina, O.S.* (2010). Fil'm «Chuchelo» glazami sovremennykh shkol'nikov [The film ‘Scarecrow’ through the eyes of present-day schoolchildren]. Moskva: Institut sotsiologii obrazovaniya Rossiiskoi akademii obrazovaniya. [in Russian]

Sutyryna, 2006 – *Sutyryna, T.A.* (2006). Gumanisticheskie idei pedagogicheskoi publitsistiki: monografiya [Humanistic ideas in pedagogical publicistic writing: a monograph]. Ekaterinburg: Izdatel'stvo Ural'skogo gosudarstvennogo pedagogicheskogo universiteta. [in Russian]

Trus', 2011 – *Trus', A.A.* (2011). Kinotrening: tekhniki i metody videoobshcheniya [Cinema-based training: video-communication techniques and methods]. Sankt-Peterburg: Rech'. [in Russian]

VanTassel-Baska, Little, 2011 – VanTassel-Baska, J., Little, C.A. (Eds.) (2011). Content-based curriculum for high-ability learners. Waco, TX: Prufrock Press.

Weyns et al., 2021 – Weyns, T., Preckel, F., Verschueren, K. (2021). Teachers-in-training perceptions of gifted Children's characteristics and teacher-child interactions: An experimental study. *Teaching and Teacher Education*. 97.

Zhmyrova, Monastyrskii, 2012 – Zhmyrova, E.Yu., Monastyrskii, V.A. (2012). Kinoiskusstvo kak sredstvo vospitaniya tolerantnosti u uchashcheisya molodezhi: praktiko-orientirovannaya monografiya [Cinema art as a means of fostering tolerance in student youth: a practice-oriented monograph]. Tambov: Izdatel'stvo TROO «Biznes-Nauka-Obshchestvo». [in Russian]



Copyright © 2021 by Academic Publishing
House Researcher s.r.o.

All rights reserved.

Published in the Slovak Republic

European Journal of Contemporary Education

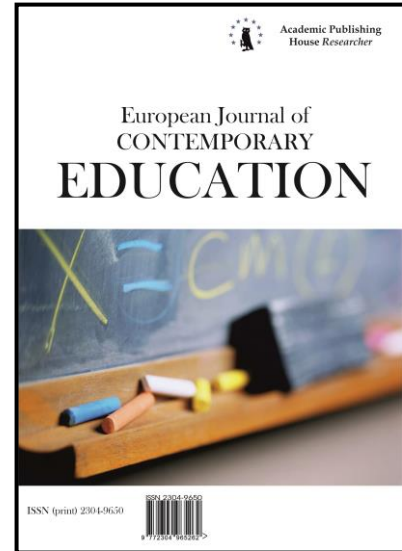
E-ISSN 2305-6746

2021. 10(2): 428-437

DOI: 10.13187/ejced.2021.2.428

www.ejournal1.com

IMPORTANT NOTICE! Any copying, reproduction, distribution, republication (in whole or in part), or otherwise commercial use of this work in violation of the author(s) rights will be prosecuted in accordance with international law. The use of hyperlinks to the work will not be considered copyright infringement.



Methodology of Working with a Textbook Versus Field Activities of Teaching Geography during the Corona Crisis

Lucia Petrikovičová ^{a,*}, Adriána Ďurinková ^a, Roman Králik ^b, Victoria Kurilenko ^b

^a Constantine The Philosopher University in Nitra, Slovakia

^b Peoples' Friendship University of Russia, Moscow, Russian Federation

Abstract

As part of the educational process, it is currently difficult for a teacher to engage students for the amount of information that is available all around us today. Therefore, it is necessary to choose appropriate methods and actively prepare various teaching aids that can motivate students, arouse interest in self-study and thus educate them. The paper focuses on teaching geography in primary and secondary schools by using innovative methods also during Corona crisis. The results of the paper are beneficial in the educational process of regional landscape geography with a focus on physical geography. The central theme of individual activities is biogeography, focused on specific species of fauna, respectively ichthyofauna and flora of the studied area. The studied area represents the area of the river Rajčianka and Kuneradský brook, which flow through the district of Žilina in Slovakia. The paper also includes a memory game and a folder Fish of our waters, which can also be used as a bilingual brochure for tourists.

Keywords: regional landscape geography, biogeography, Slovakia, Rajčianka, Kunerad.

1. Introduction

The teaching process is not just a one-sided effect of the teacher to students. Students in their approach to teaching, learning and the level of knowledge significantly affect the operation of the teacher. The teaching process is also influenced by other factors: teaching methods, teaching principles, organizational forms of teaching, teaching aids, didactic techniques and others. The term teaching process is meant as a planned, purposeful and deliberate action of the subject of teaching (teacher) on the subject of training and education (student) to be systematically educated and brought up. During the teaching process, it is possible to observe several phases: motivational (preparation of students for active learning), exposure (initial acquaintance of students with the new curriculum), fixation (initial repetition and confirmation of the curriculum) and diagnostic

* Corresponding author

E-mail addresses: lpetrikovicova@ukf.sk (L. Petrikovičová)

(testing of acquired knowledge, skills, skills and habits) (Petlák, 2004; Pushkarev, Pushkareva, 2020; Bírová, Eliášová, 2014). The aim of the paper is to create several innovative activities that can be used in different stages of the teaching process of geography and during the Corona crisis. The issue of the impact Covide-19 teaching also addressed by Haskova, Havettova, Vogelova (2020), Kobylarek, Alaverdov, Jabubowska (2020) and Cobo, Martin, Bianco (2020). The subject of geography develops students' knowledge of the Earth. Students learn to understand the importance of knowing the laws of the Earth, which are very important for life. In this course, they will realize that a thorough understanding of the principles of the existence of the Earth will help them to use and protect it. The knowledge that students learn when studying geography allows them to get to know the country, the laws of its organization, the possibility of appropriate use and protection of the landscape. Every place on Earth is different, it differs by its individual components (for example: climate, flora, fauna). Knowledge of these components leads to an understanding of the interrelationships in the country (Statny Pedagogický Ustav, 2010, Boltžiar, Chrastina, 2018; Grežo, Petrovič, 2019, Darulová et al., 2018; Murgaš, Petrovič, 2020; Khonamri, Pavlíková, 2020; Azizi et al., 2020; Azizi et al., 2020; Žalec, Pavlikova, 2019). According to Čižmárová (2000), Kalimullin et al. (2020), Gaufurov (2020), the role of the teacher is to teach and the role of the student to actively participate in the learning of everything new, to get to know and discover the unknown. The teacher can significantly support this role of the student by a suitable choice of methods and activities used in the lesson. In the teaching process, the use of new teaching methods is essential, leading to higher motivation of students, their active acceptance of knowledge and the development of creative and critical thinking.

The term teaching method means a way of deliberately organizing the activities of teachers and students to achieve the set educational goals of geography. The method is therefore a specific didactic intervention by which we can guide the development of personality in terms of the goals of geographical education. The aim of the teaching method is to achieve maximum efficiency in teaching and permanent required changes in the student's personality (Stracar, 1977; Cobo et al., 2020; Zhafyarov, 2020; Bírová et al., 2016; Baghana et al., 2020). Within the teaching of geography, the method of field research is more beneficial for the effectiveness of teaching and due to the corona crisis, which, however, requires appropriate natural conditions (weather). Students are better able to fix the facts about the country by staying in it, for example on an excursion, than by classical classroom instruction during a pandemic. For some types of students (according to learning), written or visual learning material may be more appropriate. Higher efficiency in teaching is achieved mainly by the right choice of methods used and arousing the interest of students in studying or self-study.

2. Methodology

One suitable method is to approach from near to far, that is, to move from the local (topical) level to the regional (choral) or national level. Students using activities created in the familiar field, e.g. around the school or their place of residence, it will be easier for them to understand the individual contexts. In this paper, we propose specific activities in teaching the geography of the local country, which are applicable to various localities in Slovakia, but also in the world and usable in interdisciplinary relationships, such as biology, history, or aesthetic and civic education.

The local landscape (microregion) is an area of validity of the daily routine rhythm of a person in the environment at the interface of the local and regional dimension. It represents that part of the human environment which is located at the junction of the zone of immediate and continuous sensory cognition, e.g. house, local neighborhood and village with a higher complex of amenities, with a zone perceived periodically. It is dealt with in the subject of microgeography.

Education of microgeography – in the didactic system, microgeography is referred to by several terms, e.g. local country geography, small area geography, small region or small area geography. In primary schools and grammar schools, microgeography is part of the subject Regional Geography of the Slovak Republic (Kandráčová, Michaeli, 1996; Dubcová et al., 2012; Souckova, 2020).

In the teaching of geography local landscape important role to play and walk respectively. excursion. We can organize the walk within the teaching process, but also within the use of free time. The aim is to know the results of work effort, the natural conditions of the country as a result of expanding knowledge. Walks are planned to the surrounding area and excursions to more

distant cities, walks are more natural, patriotic or physical education, on the contrary, we emphasize the creation of material values during excursions (Masarik et al., 2003; Petrikovičová et al., 2020; Petrikovičová, Wittlinger, 2020).

Biogeography is a scientific discipline that studies the areas of plants and animals, plant and animal communities as well as biogeographic regionalization (Hornik et al., 1986). Ichthyofauna is a fish fauna. It is the subject of the study of ichthyology (gr. *Ichtyos* = fish, *logos* = science). Ichthyology is an independent scientific discipline within zoology (Kosco et al., 2015). The essence of these scientific disciplines is the basis for the elaboration of our contribution.

At present, according to the State Education Program (ISCED 1), pupils get to know the local country practically from the first stage of primary school on the subject *Vlastiveda*. Homeland studies – motivational cognition begins in the 1st and 2nd year (first grade) with knowledge of the school and residence and attitudes to society, continues in the 3rd year (*My village*) and ends in the 4th year (*Discovery trips around Slovakia*) (Statny Pedagogický Ustav, 2010). In the second stage of primary schools (ISCED 2) in the subject *Geography*, the country Slovakia is taught theoretically in the 8th grade, when students according to the performance standard should be able to justify the layout of vegetation stages in Slovakia, five typical plant and animal species living in individual vegetation stages and to delimit large-scale protected areas in Slovakia in the thematic map. Frančovič's research (2014) confirmed that positive attitudes towards plants are supported by garden work, planting, similar to that reported by Lohr, Pearson-Mims (2005). Living near gardens has been a significant predictor of interest in adult plants. It has been confirmed that children from families with a garden improve their attitude towards plants, just as the presence of an animal has an effect on improving attitudes towards animals. Early contact with nature and its components is an effective factor influencing a positive attitude not only to animals but also to plants. Plant-specific educational programs are essential – they make a significant contribution to realizing the value of plants (Lindemann-Matthies, 2005). Every teacher can attract and motivate students. Many studies confirm that students are much more interested in the lesson taught by an avid teacher (Nováková et al., 2018; Horvathova, 2020). A teacher with a positive attitude towards the subject will affect the student much more than a teacher with a negative attitude. Students acquire much better knowledge in group work, practical activities, focusing on various topics related mainly to real life. The right choice of methods influences better memory (Čižmarová, 2000; Petrikovičová et al., 2020).

Part of the research was a questionnaire, by which we monitored attitudes to new teaching methods, whether they lead to motivation and active acceptance of knowledge in a sample of 97 primary and secondary school students.

Definition of territory

The studied area is located in the Slovak Republic, in the Žilina Region and the Žilina District. The Rajčianka River springs on the south-eastern slope of Strážov Hill (1,213 m above sea level) in Strážovské vrchy, southwest of the village of Čičmany at an altitude of 956 m above sea level. It flows mainly in a northerly and northeastern direction. The total length of the stream is 47.5 km and the catchment area is 359.059 km². Together with its tributaries, it drains the adjacent slopes of the Strážovské vrchy and Malá Fatra. From the right side, the watercourses Žilinská, Ráztoka, Suchý potok, Bročkov potok, Rybná, Lesnianka, Kamenný potok, Kľače, Porubský potok, Kuneradský potok, Stránsky potok, Medzihorský potok, Turiansky potok and Bytčický potok flow into Rajčianka. The left tributaries are the Čierňanka, Jasenovský potok, Medník, Svinianka, Lietavka, Bitarovský potok and Bradová watercourses. Rajčianka stretches from the Čičmianská valley to the city part of Žilina, to Strážov, where it flows into Váh under a railway bridge at an altitude of 325 meters. It is its left tributary. The Kuneradský brook watercourse springs in the Malá Fatra mountains on the southern slope of the Veľká lúka hill at an altitude of 1426 m above sea level. From the spring it stretches to the west and southwest, and in the section Nad majerom it turns to the northwest and continues west. Near the Kuneradský manor, its left tributary Bystrička flows into the Kuneradský stream. From this place Kuneradský stream continues to the northwest and passes through the village Kunerad. From the urban area of the village of Kunerad, it passes in a northwestern direction to the urban area of the village Rajecké Teplice, where it flows into Rajčianka by the lake in the Rajecké Teplice Park (Figure 1).

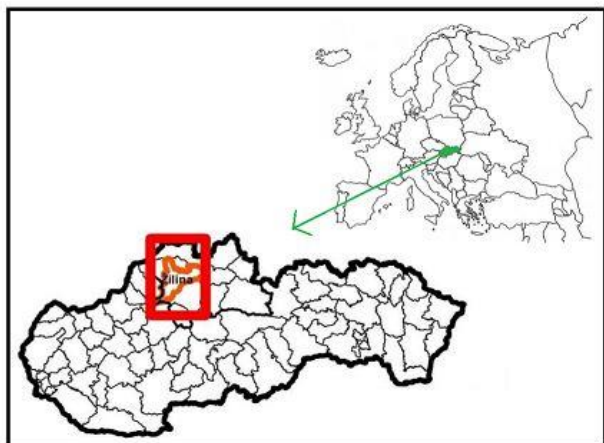


Fig. 1. Definition of territory

3. Results

To teach the physical geography of the local country, we have created several activities for primary and secondary schools. We created several activities in the field of morphography, pedogeography, biogeography, climate geography and hydrogeography. The aim of this research is to find out how students evaluate our method of teaching using an interactive teaching tool to support the teaching of the geography at primary and secondary school. In addition, we wanted to get their opinion, whether the procedure and method of use remains.

At the end of the experiment already carried out, we asked the primary and secondary school's students to complete a questionnaire, supplemented comment what they lacked and which according to them was too much. Students were divided into groups according to their field skills. Total participated in testing was 97 students (70 students of primary school and 27 students of secondary school). Types of groups were inhomogeneous, such as by age and gender.

3.1. Walk to the village Rajecké Teplice with a fisherman (primary school, second grade)

Tools for teacher: camera, book publication on freshwater fish (the text part of the proposed folder "Fish of our waters" can be used). Tools for students: boards for writing, pens, sturdy shoes.

The basis of the activity is to provide a professional fisherman who has a valid fishing permit and fishing license. It is important that the walk is planned during the fishing trout season t. j. from 16 April to 30 September. The months of May and September are recommended, when the weather temperature is reasonable without precipitation.

The essence is to catch different species of fish, which students have to identify and describe the body characteristics of the captured species. The teacher will then give the students a short expert explanation, from which the students will write down the most important information. Upon arrival at the school, the teacher divides the students into groups as needed (number of species caught = number of groups). Each group will be given the task of processing a text part about one caught species, which is given to them by the teacher, from their own notes together with the use of a professional publication. During one week, the teacher prepares photographs of individual species, prints them and sticks them on a drawing of the required size. Under each photo omits place for text section of each group to complement students. The poster created in this way can be hung in the classroom or at school and can thus be used for education as a teaching aid.

3.2. "Leporelo" (primary school, second grade)

Leporelo is a folding textbook that contains knowledge about the ichthyofauna of the local landscape. This book can be used as a tourist brochure, owing to the content page in two languages (English and Slovak) (Figure 2). It deals with ten species from the ichthyofauna of Rajčianka and Kuneradský brook.

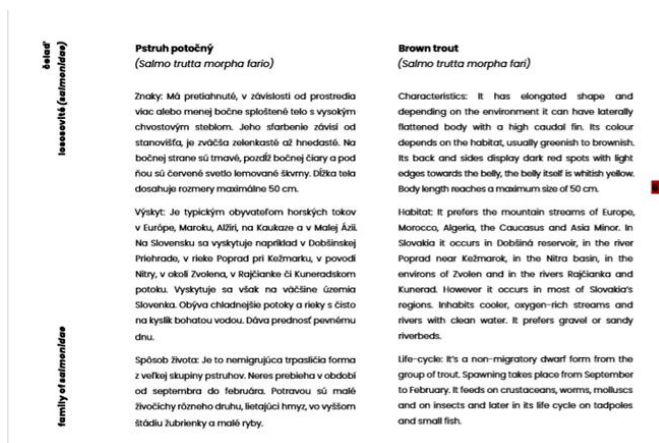


Fig. 2. Leporelo

3.3. “Pexeso” – memory game (primary school, second grade)

The images of the created memory game (Figure 3) contain photographs of selected species of fauna and flora of the local landscape. The teacher can use this method of teaching at the beginning of the lesson in the motivational phase. The memory game contains 32 pairs of pictures. The teacher can divide the memory game into several parts in advance and also divide the students into several groups so that the other phases of the lesson can be completed in time. The pictures contain both Slovak and Latin names of the species. As part of the use of memory game in primary school, the education of Latin names is not required. For high school students, respectively can require some Latin names after considering the teacher.



Fig. 3. Memory game

3.4. Water analysis/monitoring (high school)

Tools: 3 water samples from different places, pH indicator, indicator for measuring water hardness, school chemical case for measuring the content of various chemicals in the water (ammonia, nitrites, nitrates).

The main step in the preparation of this activity is the collection of 3 water samples, which will come from a mountain stream (mountain spring in the village Kunerad), from the river Rajčianka and from a water tap. Students are divided into 3 groups. Each group will receive one sample. In the next step, the measurement of the chemical content in the water, the water hardness and the pH value will take place. Each group analyzes the water sample with the help of the teacher, describes the causes and consequences of the color of the sample, the content of chemicals, or contamination of the sample.

3.5. Soil permeability (primary school, second grade)

Tools: tool for digging into the ground (eg spade), containers for soil types, 3 samples of soil types – clay-aluminum, aluminum, sandy-aluminum (samples of clay-aluminum soil type can be taken in the locality Žilina-Závodie, aluminum soil type in the village of Kunerad and the sandy-aluminum soil type in the village of Lietavská Lúčka, water, filter paper (3 x), filter funnel (3 x), time measuring device (watch, stopwatch).

The aim of the activity is to determine the permeability of individual soil types and to assign the characteristics of individual soil species to their names.

First, we dig samples of three different soil types. Put filter papers and the same amount of soil in the filter funnels. We irrigate soil samples with the same amount of water and observe the permeability of individual soil types, the rate of filtrate formation, the time for which the filtrate is formed and the quality of the filtrate. Based on the results of the observation, students try to assign individual soil types together with their characteristics in terms of Fulajtar (2006), Lukniš (1972) and the Research Institute of Soil Science and Soil Protection, 2015.

The preparation of the assignment will take place in the students' home environment. Students prepare a weather report (range: approx. A4). The essence of the task is to present the weather report in the same way as the weather announcer on television, using the staging method of teaching used in the assignment. The weather must apply to the area from the Žilina Region (however, this can be applied to any location in the world) and must include information on air temperature, clouds, total precipitation, air pressure, wind speed and direction. Students should have sufficient time (at least 1 week) to complete the assignment. Students will also prepare a presentation (by using the computer program Microsoft PowerPoint), which will contain maps, respectively images suitable for presentation and fellow students a better idea for the weather reports. Students can work in pairs or groups (depending on the number of students in the class), but during the presentation, all students in the group must take turns so that everyone can try out the role of weather announcer. It is also possible to divide task presentations into several lessons as needed. After the presentation of their work will vote for "best tree frog class" that can be rewarded. For this project in Slovakia can be used www.shmu.sk, www.pocasio.sk within the world, e.g. www.imeteo.com, www.meteoblue.com pod.

3.6. Keyword filter (high school)

Capek (2015) describes this type of teaching activity as a method of working with a text, which leads to the ability to better understand a professional text and take important facts from it, to select the important from the less important. The activity begins with the distribution of the professional text by the teacher in pairs. The task of the students is to choose from the text 3-5 keywords that they consider the most important (words that best describe the meaning and content of the text). The teacher draws a funnel on the board and a bank below it. When students have their keywords ready, they gradually come to the board and write the words to the bank (always write only the word that has not yet been used). Subsequently, the students will vote for the 5 best keywords (or there will be a discussion). Filtered keywords that help students better understand the subject matter are written in the notebooks. For example, we present curriculum activities suitable for morphogeography teaching of local landscape:

In the Rajčanka river basin, which also includes the Kuneradský stream, the highlands and mountains are the most pronounced in Malá Fatra and the mountainous type of relief also appears on the ridge. The relief of erosive furrows is also typical in the highest parts of the Rajčianka basin. In the Strážovské vrchy, the mountainous relief completely predominates. In Rajecká and Žilina Basin prevails surface of small scale surface river plains, which is especially visible at the bottom of the Rajčianka valley. The low and medium terraces along Rajčianka form mostly continuous strips. On the slopes of Lúčanská Malá Fatra rises several streams that form a ribbed system of deep valleys, which are usually the place where lie the individual municipalities. One such major streams is also Kuneradský stream which forms the eastern border of cadastral municipality Stránske. Erosion and erosion-accumulation processes contributed to a large extent to the geomorphological development of the Rajčianka and Kuneradský streams.

From this text are these 5 best keywords (for example): Rajčianka and Kuneradský streams, Strážovské vrchy (Mts.), Malá Fatra (Mts.), erosion, basin.

Through survey we focused on the influence and support of field teaching, because currently prevailing trend of Corona crisis and related restrictions and so their implementation in different parts of the learning process.

Individual items of the questionnaire, which characterized the field teaching method by students were measured on a scale (negative, neutral, positive). Overall, in the evaluation involved 97 students. The highest recorded age was 18 and the lowest 11. The testing was attended by 30 boys and 67 girls. From the questionnaire we wanted to see if there are significant differences in the assessments of field method of teaching as among all respondents (students), as well as among students of the primary and secondary groups separately. And to verify that the proposed methods of teaching geography in the field meet with a positive response. The first part of the questionnaire focused on motivation (Table 1). Three of the respondents (4.3 % of primary school) and only one from secondary school's student stated a negative relationship of this method, 12 of students of primary school (17.1 %) and 5 of students of secondary school (18.6) had neutral attitude. The most of them had positive attitude 55 students of primary school (78.6 %) and 21 students of secondary school (77.7 %). No significant differences between primary school's students and secondary school's students were found ($\chi^2(2) = 0.04, p > 0.05$).

Table 1. Student's attitudes (motivation)

	Attitudes to new teaching methods, leading to higher motivation of students, % (frequency)		
	Negative	Neutral	Positive
Primary school's students	4.3 (3)	17.1 (12)	78.6 (55)
Secondary school's students	3.7 (1)	18.6 (5)	77.7 (21)

The second part of the questionnaire research was focused on attitudes to new teaching methods, leading to active acceptance of knowledge (Table 2). Four of the respondents from primary school (5.7 %) and again only one from secondary school's student stated a negative acceptance of knowledge, 13 of students of primary school (18.6 %) and 8 of students of secondary school (29.7) had neutral attitude. The most of them had positive attitude, so 53 students of primary school (75.7 %) and 18 students of secondary school (66.6 %). No significant differences between primary school's students and secondary school's students were found ($\chi^2(2) = 1.47, p > 0.05$).

Table 2. Student's attitudes (active acceptance of knowledge)

	Attitudes to new teaching methods, leading to active acceptance of knowledge, % (frequency)		
	Negative	Neutral	Positive
Primary school's students	5.7 (4)	18.6 (13)	75.7 (53)
Secondary school's students	3.7 (1)	29.7 (8)	66.6 (18)

In the survey, we are most focused on whether it would be appropriate this field method for students only as a supplement or as a substitute for a full education. At the same time we focused on teachers, because they can determine the direction and progress of the education process. The proposed methods can be used by teachers as one of the possible tools.

4. Conclusion

Teaching students in a teacher's life should not only be his job, but above all his mission. In teaching, there is sometimes a stereotypical approach of teachers to the teaching process. The required change in the teaching system in primary and secondary schools can be implemented

by teachers who use different methods and different innovative activities within different phases of the lesson, which can motivate students to further their studies. In the education of geography, the content of the curriculum is to lead mainly to the development of students, and therefore we have created several innovative activities within the results that can be beneficial for primary and secondary school students in teaching geography of the local landscape with a focus on physical geography. The first, second and third activities are devoted to the biogeography of the local landscape. Walking in the countryside to fish students will learn the best information about the country in which they live and learn new knowledge about the local ichthyofauna, thus the fish species that live in the water flow. This textbook publication entitled "Fishes of Our Waters" about the ichthyofauna of the Rajčianka and Kuneradský streams also serves as information for students and can also serve as promotional material for the Žilina Region for tourists from abroad due to its bilingual content. "Pexeso" – memory game is suitable for use especially in the motivational or fixation phase of the lesson. The species it contains are typical for the surroundings of Rajčianka and Kuneradský stream and thus for the local area. The fourth and fifth activities teach students to distinguish individual phenomena in nature. Through the sixth activity, students learn to present their own projects and also appear in front of an audience. The seventh activity is suitable for a better understanding of a professional text and students learn to distinguish important elements from less important ones.

In the survey, we have chosen a questionnaire method, since this way is possible to get a lot of information in a relatively short time. At the same time the respondent has the opportunity to rethink and consider their responses. Based on a questionnaire survey, we can state that the proposed teaching methods in the field are interesting for students of both levels and lead to their motivation. The knowledge gained from these creative methods certainly leads to active acceptance of knowledge. Geography as a science has a great importance in solving many current problems of the world. Through these methods can students learn by fun way and acquire new skills.

5. Acknowledgements

This paper was supported by Scientific Grant Agency VEGA project No 1/0880/21 "Transformation of the Nitra Region in Changing Socio-economic Conditions with Special Focus to the Effects of the COVID-19 Pandemics" and by the Slovak Research and Development Agency under the Contract no. APVV-18-0185.

References

- Azizi et al., 2020 – Azizi, M., Pavlikova, M., Masalimova, A.R. (2020). Exploring literature reading classes in terms of types of feedback provided by efl teachers: Does teaching experience play a determining role? *Education and Self Development*. 15(3): 19-36.
- Azizi et al., 2020a – Azizi, M., Tkáčová, H., Pavlikova, M., Jenisova, Z. (2020). Extensive Reading and the Writing Ability of EFL Learners: the Effect of Group Work. *European Journal of Contemporary Education*. 9(4): 726-739.
- Baghana et al., 2020 – Baghana, J., Ogneva, E.A., Voloshina, T.G., Mironova, G.V., Novakova, K.S. (2020). Dialogic speech as a field of compound-complex sentence communicative types application. *XLinguae*. 13(2): 235-244.
- Bírová et al., 2016 – Bírová, J., Ocovay, J., Vashieva, D.G. (2016). Implementation of new teaching technologies during the action research by experienced language teachers. *Mathematics Education*. 11(8): 3089-3103.
- Bírová, Eliášová, 2014 – Bírová, J., Eliášová, S. (2014). Plurilingual and pluricultural competence and foreign language teaching at primary and secondary schools in Slovakia. *XLinguae*. 7(1): 75-82.
- Boltižiar, Chrastina, 2018 – Boltižiar, M., Chrastina, P. (2018). Application of Geographical Information System (GIS) in Geography (Digital data pre-processing for land-use changes analysis). Turciani, M., Balogh, Z., Munk, M., Kapusta, J., Benko, L (Eds.). *Divai 2018: 12th international scientific conference on distance learning in applied informatics, Nitra: UKF*. Pp. 29-36. [Electronic resource]. URL: <https://publons.com/journal/258699/divai-2018-12th-international-scientific-conference>

Čapek et al., 2015 – Čapek, R. (2015). Moderní didaktika: Lexikon výukových a hodnoticích metod. [Modern didactics, Lexicon of teaching and assessment methods]. Praha: Grada Publishing, 604 p. [in Czech]

Čižmarová, 2000 – Čižmarová, K. (2000). Didaktika geografie I. [Didactics of geography]. 1. vyd. Banská Bystrica: FPV UMB, Banská Bystrica, 166 p. [in Slovak]

Cobo et al., 2020 – Cobo, M.O., Králik, R., Bianco, R. (2020). Refugees' L2 learning: new perspectives on language motivation research. *XLinguae*. 13(4): 64-80. DOI: 10.18355/XL.2020.m13.04.05

Cobo et al., 2020 – Cobo, M.O., Martin, J.G., Bianco, R. (2020). Will the "normality" times come back? L2 learning motivation between immigrants and refugees before Covid-19. *Xlinguae*. 14(1): 182-196.

Darulová et al., 2018 – Darulová, J., Košťalová, K., Nováková, K.S. (2018). Cultural and confessional specifics of national minorities of Slovakia as a part of identity examples of urban and rural environment. *European Journal of Science and Theology*. 14(6): 107-114.

Dubcová et al., 2013 – Dubcová, A. et al. (2013). Didaktika geografie v teréne. [Methodology of Teaching Geography in field]. Nitra: Univerzita Konštantína Filozofa v Nitre. [in Slovak]

Francovicova et al., 2014 – Francovicova, J. (2014). Zvyšovanie záujmu žiakov o rastliny Od teórie k praxi [Increasing students' interest in plants From theory to practice]. Trnava: Typy Universitatis Tyrnaviensis, SAV. [in Slovak]

Fulajtar, 2006 – Fulajtar, E. (2006). Fyzikálne vlastnosti pôdy [The physical conditions of soil]. Bratislava: VÚPOP, 142 p. [in Slovak]

Gafurov, 2020 – Gafurov, R.I. (2020). Teacher Training at Kazan Federal University: Ten Years of Modern History. *Education and Self Development*. 15(3): 13-18. DOI: 10.26907/esd15.3.01

Grežo, Petrovič, 2019 – Grežo, H., Petrovič, F. (2019). How open source can expand teacher's horizons. *Conference: 12th Annual International Conference of Education, Research and Innovation*. Sevilla. DOI: 10.21125/iceri.2019.2029

Haskova et al., 2020 – Haskova, A., Havettova, R., Vogelova, Z. (2020). Learning to teach and learn (not only foreign languages) during the coronavirus pandemic. *Xlinguae*. 14(1): 3-16.

Hornik et al., 1986 – Hornik, S. a kol. (1986). Fyzická geografie II [Physical geography II]. Praha: Štátne pedagogické nakladateľstvo. 319 p. [in Czech]

Horvathova et al., 2020 – Horvathova, B. (2020). Developing critical thinking by enhancing compensation strategies in Tefl. *Slavonic Pedagogical Studies Journal, The Scientific Educational Journal*. 9(2): 181-191. DOI: 10.18355/PG.2020.9.2.8

Kalimullin et al., 2020 – Kalimullin, A.M., Zhigalova, M.P., Ibrasheva, A.K., Lodatko, Y.A., Nurlanov, Y.B. (2020). Post-soviet identity and teacher education: Past, present, future. *Education and Self Development*. 15(3): 145-163.

Kandráčová, Michaeli, 1996 – Kandráčová, V., Michaeli, E. (1996). Mikrogeografia v edukácii, výskume a pre prax [Microgeography in education, research and practice]. Krajina Východného Slovenska v odborných vedeckých prácach. Prešov: Prešovská univerzita. [in Slovak]

Khonamri, Pavlíková, 2020 – Khonamri, F., Pavlíková, M. (2020). Exploring Teachers' and Learners' Attitude towards Homework: The case of English versus Non-English-Major Teachers' Homework Practices. *Education and Self Development*. 15(4): 32-49.

Kobylarek et al., 2020 – Kobylarek, A., Alaverdov, E., Jakubowska, L. (2020). The Significance of a pandemic in teaching foreign languages with special regard to the teaching of seniors. *Xlinguae*. 14(1): 73-80.

Kosco et al., 2015 – Kosco, J. a kol. (2015). Ichtyológia II [Ichthyology II]. Prešov: Prešovská univerzita. [Electronic resource]. URL: <https://www.pulib.sk/web/kniznica/elpub/dokument/Kosco2> (date of access: 14.05.2020). [in Slovak]

Lindermann-Matthies, 2005 – Lindermann-Matthies, P. (2005). Loveable' mammals and 'lifeless' plants: how children's interest in common local organisms can be enhanced through observation of nature. *International Journal of Science Education*. 27(6): 655-677.

Lohr et al., 2004 – Lohr, V.I., Pearson-Mims, C.H., Tarnai, J., Dillman, D.A. (2004). How Urban Residents Rate And Rank The Benefits And Problems Associated With Trees. How urban residents rate and rank the benefits and problems associated with trees in cities. *Journal of Arboriculture*. 30(1): 28-35.

- Frančovičová, 2014** – *Frančovičová, J.* (2014). Zvyšovanie záujmu žiakov o rastliny: od teórie k praxi [Increasing students' interest in plants: from theory to practice]. Trnava: Typy Universitatis Tyrnaviensis, SAV. [in Slovak]
- Lukniš et al., 1972** – *Lukniš, M.* red. (1972). Slovensko. 2 – príroda [Slovakia, 2 – Nature]. 1. vyd. Bratislava: Obzor, 920 p. [in Slovak]
- Masarik et al., 2003** – *Masarik, P. a kol.* (2003). Teória školskej a mimoškolskej výchovy [Theory of school and extracurricular education]. Nitra: Vysoká škola pedagogická, 133 p. [in Slovak]
- Murgaš, Petrovič, 2020** – *Murgaš, F., Petrovič, F.* (2020). Quality of life and quality of environment in Czechia in the period of the COVID-19 pandemic. *Geografický časopis*. 72(3): 261-274. DOI: <https://doi.org/10.31577/geogrcas.2020.72.3.13>
- Nováková et al., 2018** – *Nováková, K.S., Košťalová, K., Kušnierová, D., Kurajda, L.* (2018). Minority languages in Europe in the context of revitalizing activities. *XLinguae*. 11(3): 16-27.
- Petlák, 2004** – *Petlák, E.* (2004). Všeobecná didaktika [General didactics]. 1. vyd. Bratislava: IRIS, 311 p. [in Slovak]
- Petrikovičová et al., 2020** – *Petrikovičová, L., Dysková, S., Vilinová, K.* (2020). Teaching of the regional landscape geography in Slovakia and Iceland within the school education system. *INTED2020 Proceedings, 14th International Technology, Education and Development Conference*. Valencia, Spain, pp. 6599-6608, 2020. [Electronic resource]. URL: <https://library.iated.org/view/PETRIKOVICOVA2020TEA>
- Petrikovičová, Wittlinger, 2020** – *Petrikovičová, L., Wittlinger, L.* (2020). Didactic Activities In Teaching Of Geography In Pre-School And School Facilities Focused On Nature Conservation. *EDULEARN 2020 Proceedings, 12th International Conference on Education and New Learning Technologies*. Valencia, Spain. Pp. 6473-6480. [Electronic resource]. URL: <https://library.iated.org/view/PETRIKOVICOVA2020DID>
- Pushkarev, Pushkareva, 2020** – *Pushkarev, Y.V., Pushkareva, E.A.* (2020). Virtualization of social communication in education: values-based approach to information development (a critical review). *Science for Education Today*. 10(2): 73-90. DOI: <http://dx.doi.org/10.15293/2658-6762.2002.05>
- Souckova, 2020** – *Souckova, T.* (2020). Developing critical thinking by enhancing compensation strategies in Tefl. *Slavonic Pedagogical Studies Journal, The Scientific Educational Journal*. 9(1): 61-69. DOI: [10.18355/PG.2020.9.1.7](https://doi.org/10.18355/PG.2020.9.1.7)
- Statny Pedagogický Ustav, 2010** – Štátny vzdelávací program [State educational program] [Electronic resource]. URL: https://www.statpedu.sk/files/articles/dokumenty/statny-vzdelavaci-program/geografia_isced2.pdf (date of access: 14.05.2020). [in Slovak]
- Stracar, 1997** – *Stracar, E.* (1997). Systém a metódy riadenia učebného procesu [Learning process management system and methods]. Bratislava: SPN. [in Slovak]
- Čižmárová, 2000** – *Čižmárová, K.* (2000). Didaktika geografie [Didactics of geography]. I. 1. vyd. Banská Bystrica: FPV UMB, Banská Bystrica, 166 p. [in Slovak]
- Vyskumny Ustav..., 2020** – Vyskumny Ustav Podoznalectva a Ochrany Pod. 2020. Parametre BPEJ [Parameters of BPEJ]. [Electronic resource]. URL: <https://portal.vupop.sk/portal/apps/webappviewer/index.html?id=d89cff7c70424117ae01ddba7499d3d> (date of access: 14.05.2020). [in Slovak]
- Žalec, Pavlíková, 2019** – *Žalec, B., Pavlíková, M.* (2019). Civic virtues and functions of religion in public life. *European Journal of Science and Theology*. 15(6): 75-84.
- Zhafyarov, 2020** – *Zhafyarov, A.Z.* (2020). Hierarchical Model Of Building Creatively Competent And Intellectually Developed Teams Of Personnel. *Science for Education Today*. 10(2): 138-149. DOI: <http://dx.doi.org/10.15293/2658-6762.2002.09>



Copyright © 2021 by Academic Publishing House Researcher s.r.o.

All rights reserved.

Published in the Slovak Republic

European Journal of Contemporary Education

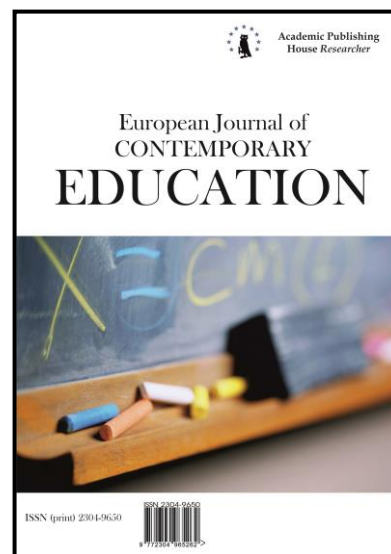
E-ISSN 2305-6746

2021. 10(2): 438-449

DOI: 10.13187/ejced.2021.2.438

www.ejournal1.com

IMPORTANT NOTICE! Any copying, reproduction, distribution, republication (in whole or in part), or otherwise commercial use of this work in violation of the author(s) rights will be prosecuted in accordance with international law. The use of hyperlinks to the work will not be considered copyright infringement.



Impact Study of Programme Assessment at Three Universities in Vietnam: Students' Perspectives

Huong Thi Pham ^{a, *}, Phuong Vu Nguyen ^{b, c}

^a Institute of Education Research, Ho Chi Minh University of Education, Ho Chi Minh City, Vietnam

^b University of Economics and Law, Ho Chi Minh City, Vietnam

^c Vietnam National University, Ho Chi Minh City, Vietnam

Abstract

The study examines the impact of the AUN-QA assessment at the programme level on quality improvement from the students' perspective. Data was collected through a survey questionnaire distributed to 439 participating students in the third and final years of the three programmes from three universities that were assessed and recognised by AUN-QA in 2018 and 2019. The findings indicate very positive changes observed by students during the AUN-QA assessment process at the programme level. Most students observed changes in curriculum design and development, teaching methods, student assessment methods, equipment and facilities, and research while few students observed changes in academic staff, support staff, and student support services. These changes appeared to be attributed to the adaptation of the OBE approach by the universities in this study as well as the requirements of the AUN-QA for programme assessment. However, the study also shows a difference in the students' self-reported evaluation or observation of changes at the three universities. It is suggested that further studies should be conducted using more direct methods of measuring changes such as direct assessment of student learning for evaluating the impacts of external QA. Another research applying a qualitative approach (such as interview) could provide more in-depth information on the impacts of AUN-QA assessment from the students' perspectives.

Keywords: assessment of study programme, AUN-QA Guideline to assessment, students' perspectives, impact study.

* Corresponding author

E-mail addresses: huongpt@hcmue.edu.vn (H. Thi Pham), phuongnv@uel.edu.vn (P. Vu Nguyen)

1. Introduction

Higher education accreditation in Vietnam only started five years ago in 2015 after nearly 20 years of development. The government's initial attempt to external quality assurance was on institutional accreditation in 2003. For the programme assessment and accreditation, the Ministry of Education and Training (MoET), through regional and world-funded projects, encourages universities to participate in the regional and international assessment such as AUN-QA, ABET, CTI, and AACSP. Of these standards, AUN-QA Guideline for assessment at the programme level was common for most universities in Vietnam. However, very few studies have been done in Vietnam to evaluate the impact of the AUN-QA assessment, a regional agency, on the programmes assessed.

Many studies have been conducted worldwide to examine the impacts of external quality assurance (EQA) (in all methods: assessment, audit, and accreditation) at both institutional and programmatic levels. These studies are also varied and different as regards participants of the studies (QA managers, academics, top university leaders, QA practitioners, and students) as well as research designs (quantitative, qualitative, or mixed methods). Research topics are also very diverse for different types of higher education institutions (public and private). In general, there are three groups of impacts have been reported from these studies: expected impacts, undesirable impacts, and mixed impacts.

Impacts of external quality assurance

T.H. Pham (2018) reviewing related literature on the impacts of external QA has identified certain positive impacts and negatives impacts. Three key contributions of EQA include a cultural change in management and evaluation, improvements as a result of external recommendations, and engagement of various stakeholders in quality conversation. For negative impacts, three themes were identified, including bureaucratic, expensive and time-consuming, resistance and distrust by academics and professionals, and limited improvements on teaching and learning (Pham, 2018). She concluded that EQA current practices have “multi-dimensional impacts” (p. 6) on both institutions and programmes being assessed.

Some studies have also reported mixed impacts of EQA. It is evident in an impact study of the national QA system on a university in Australia by Baldwin (1997). On one hand, significant gains were found in three aspects: more rigorous course approval procedures, increased awareness of students' perspectives on teaching and learning, and a perceptible shift in the climate as a result of combining EQA requirements and IQA of the university (pp. 59-60). On the other hand, external processes were found to negatively influence quality of the university:

Excessive bureaucratisation of procedures, with associated pedantry and legalism; a greatly increased administrative workload for academic staff taking them away from their 'core business; a formalism that was stifling creativity and individuality, the very qualities that universities should foster; a de-professionalization of academic staff, associated with a policing mentality and a lack of trust. (pp. 60-61)

Similarly, Wahlén (2002) reported both desirable and undesirable impacts of EQA practices in Sweden higher education. The audit approach applied in Sweden education were found to facilitate the development of policy and structure at the institutional level but also promote a tendency of standardisation and the potential of counteracting the further development of quality work in universities and colleges due to the exclusion of reviews carried out as a process of internal quality assurance and other measures. Mixed impacts of a quality monitoring system were also found in work by Stensaker, Langfeldt, Harvey, Huisman, and Westerheijden (2011). Positive impacts were found on new routines and procedures, on the scholarly discussion of learning and teaching, and on the quality of education and teaching, as well as on staff engagement in learning and teaching questions. However, their study also cautioned against a real danger that QA mechanisms could be inefficient and aimed at developing processes that stimulated bureaucracy, organisation, and regulation far more than they addressed core issues according to academics' and students' perspectives.

In summary, positive impacts from quality assurance processes in the extant literature mainly focused on strengthening quality structure and quality work, improving discussion, conversation, and cooperation with academics units that could lead to teaching improvements. However, external quality assurance approaches have not necessarily been found to improve the student experience or transform quality in the tertiary sector (Shah, 2012). Kristensen (2010)

argued that the success of the external process in quality improvement was reliant on well-developed internal quality systems or on the culture, regardless of the above-identified positive impacts of various external quality monitoring approaches. External audits and other forms of external evaluation could serve as a driver for change and improvement in processes, but well-developed internal quality assurance and individual institutions are key to transformation in quality.

The quality assurance framework in Vietnamese higher education

The Vietnamese QA system

According to the Higher Education Law in Vietnam (2019), higher education institutions (HEIs) and study programmes are required to be accredited every five years. In Vietnam, accreditation is the chosen national QA mechanism (Do et al., 2017). For both institutional and programmatic accreditation, the MoET decided to translate the AUN-QA standards to be used for Vietnamese higher education system. The Vietnamese version will be used by HEIs who choose to be accredited by Vietnamese accrediting agencies (MoET, 2016). Because of the similarities of the Vietnamese standards and AUN-QA standards, many HEIs have chosen to be assessed by AUN-QA, which is a regional external QA agency and is believed to be “better” than national recognition. Furthermore, the availability of AUN-QA programme standards soon in 2004 also contributed to the popularity of these quality standards in Vietnam, a member of the ASEAN University network. Twelve years later, the MoET has just recently translated the standards (version 3) into Vietnamese in 2016.

International programme accreditations

There have been attempts in Vietnam to align with international trends in QA at both national and institutional levels. Vietnam is a member of the International Network of Quality Assurance Agencies in Higher Education (INQAAHE), the Asian-Pacific Quality Network (APQN), and AUN-QA. Besides MoET quality standards, the government encourages HEIs to apply for international accreditation, including AUN-QA, ABET, FIBAA, and ACBSP.

One hundred and forty seven programmes from HEIs were assessed by AUN-QA as of 31 May, 2020. In early 2015, the University of Science of VNU-Hanoi registered for AUN-QA institutional accreditation, which is the first case of institutional accreditation in the region. The University of Technology of VNU-HCMC and FPT University was applied for ABET accreditation of their programmes. Some other universities such as the University of Technology of VNU-HCMC and Hoa Sen University pursued ACBSP accreditation (Accreditation Council for Business Schools and Programs).

As of 30 May 2020, 307 study programmes have been assessed in Vietnam (Table 1), of which 186 programmes were assessed by international QA agencies.

Table 1. Number of study programmes being assessed and recognised

No.	Accrediting agencies	Number of programmes
I.	Vietnamese accrediting agencies	121
II.	Foreign agencies	186
2.1	ASEAN University Network – Quality Assurance	147
2.2	Accreditation Board for Engineering and Technology	6
2.3	Accreditation Council for Business Schools and Programs	6
2.4	Foundation for International Business Administration Accreditation	9
2.5	Commission des Titres d'Ingénieur	16
2.6	Other agencies	2
Total		307

Source: Vietnam Education Quality Management Agency, 2020

Table 1 shows that the number of programmes that have been assessed and recognised by AUN-QA outnumbers those by other agencies including Vietnamese accrediting agencies.

Several factors may contribute to the popularity of international programme accreditations in Vietnamese higher education. It could be the absence of a national set of quality standards for

programmes until 2016. Another driver for this tendency is the international supports for local universities to pursue international accreditations. Yet, as concluded by Do et al. (2017), “underlying the pursuit of international accreditation in the Vietnamese higher education are matters beyond quality” (p. 204). International recognition of Vietnam education and student mobility in the ASEAN region are among the motives for the trend. International accreditation is an important “selling point” of a programme. The international accreditation status helps HEIs to attract both local and foreign students (Do et al., 2017).

Aim of the study

This project aims to assess the impact of external quality assessment, i.e. AUN-QA on the study programmes. It also offers suggestions to improve quality for universities and accrediting activities in Vietnam.

The specific objectives of the study include: (1) exploring the changes observed by students during the AUN-QA assessment process which includes both the self-assessment process by the universities and the site visit by AUN-QA assessment team; (2) identifying any association between student perspectives at the three universities and the changes they reported; and (3) informing policy makers on the possible development of quality assurance in Vietnam.

Participants and research methods

Data were collected through a survey questionnaire distributed to students who were studying in the third year and fourth year in their undergraduate programmes which have been assessed and certified by AUN-QA in 2018 and 2019. Out of 17 programmes that were assessed during the two years, three programmes were selected purposefully to join the study so that they could represent three different disciplines at three different universities: (a) Education, (b) Finance-Banking, and (c) Chemical Engineering.

1.1. Participants

Table 2. The number of participating students

HEIs	N
University A – Finance – Banking	96
University B – Education	157
University C – Chemical Engineering	186
Total	439

There were 439 students in the third and final years of the three programmes (Education, Finance-Banking, and Chemical Engineering) of the three universities (A, B, and C) participating in the survey.

1.2. Number of assessed programmes at the three universities

The total number of study programmes assessed and recognised by AUN-QA as of August 2019 at the three participating universities is as follows:

Table 3. Number of the programmes assessed by AUN-QA at the three universities

<i>No.</i>	<i>HEIs</i>	<i>Total number of programmes assessed by MoET</i>	<i>Total number of programmes assessed by AUN-QA</i>	<i>Total number of programmes assessed by other international standards</i>
1	University A	0	2	0
2	University B	0	6	0
3	University C	0	9	3

Source: Vietnam Education Quality Management Agency, 2019

1.3. The survey

The questionnaire covers the changes students can observe in major aspects related to AUN-QA criteria: Curriculum design and development; Teaching and learning approach; Student

assessment; Academic staff; Support staff; Student support services; Teaching and learning facilities and equipment/infrastructure; and Research. The rest of the survey questionnaire items used in this study were adapted from the European impact evaluation project (Bejan et al., 2018; Leiber et al., 2018; Leiber et al., 2018) which were asked for changes in course types used in assessed programmes; perceived initiatives of changes; QA instruments; constructive alignment between student assessment and learning outcomes; observability of QA effects and quality improvements; attitude towards internal QA and external QA; perceived attitude of leadership towards QA; assessment of expenditure/benefit for programme assessment; challenges during programme assessment; and suggestions for QA activities. This paper focuses on the changes students might observe in the eight major aspects of AUN-QA criteria, in the course types used in the programmes, and who or what initiated the changes they observed.

1.4. Data analysis

Descriptive statistics were used to calculate the percentages of students of each programmes responded to each item in the questionnaire. In this paper, students were asked to report on any changes they might observe and the levels of change in the study programmes and course types. They were also asked to report on what or who are drivers of changes.

To identify if there is any difference between students' perspectives at the three universities and the reported changes at each level, chi square tests were used and reported.

2. Results

Observed changes in study programmes

Table 4 shows the changes that students could observe in the AUN-QA assessment of study programmes.

Table 4. Observed changes in HEIs and study programmes across the three universities and presentation of results from chi-square analysis with three groups of students

No.	Observed changes and level of changes	HEI A	HEI B	HEI C	χ^2 (df)	p	Cramer's V	
1	Curriculum design and development**	Major	15,6 %	22,3 %	35,5 %	27.170 (6)	.000	.177
		Partial	55,2 %	44,6 %	45,7 %			
		Unchanged	6,3 %	17,8 %	7,0 %			
		No opinion/information	23,0 %	15,2 %	11,9 %			
2	Teaching and learning approach*	Major	25,0 %	29,9 %	33,9 %	16.430 (6)	.012	.138
		Partial	52,1 %	43,4 %	46,2 %			
		Unchanged	10,4 %	20,3 %	7,2 %			
		No opinion/information	12,5 %	6,3 %	12,4 %			
3	Student assessment *	Major	31,3 %	22,3 %	29,6 %	16.458 (6)	.011	.138
		Partial	43,8 %	43,3 %	46,2 %			
		Unchanged	13,5 %	25,5 %	10,8 %			
		No opinion/information	11,4 %	8,9 %	13,4 %			
4	Academic staff**	Major	20,8 %	18,5 %	21,5 %	20.519 (6)	.002	.155
		Partial	31,3 %	38,9 %	41,5 %			
		Unchanged	24,0 %	34,4 %	19,4 %			
		No opinion/information	24,0 %	8,2 %	27,8 %			
5	Support staff**	Major	12,5 %	10,2 %	24,2 %	35.159 (6)	.000	.202
		Partial	38,5 %	31,8 %	38,2 %			
		Unchanged	20,8 %	42,7 %	19,4 %			
		No opinion/information	28,1 %	15,3 %	18,3 %			

6	Student support services**	Major	14,6 %	10,2 %	30,1 %	30.049 (6)	.000	.188
		Partial	41,7 %	46,5 %	40,3 %			
		Unchanged	22,9 %	28,7 %	13,4 %			
		No opinion/ information	20,8 %	14,7 %	16,2 %			
7	Teaching and learning facilities and equipment/ infrastructure**	Major	21,9 %	17,8 %	36,6 %	49.747 (6)	.000	.240
		Partial	30,2 %	42,7 %	44,1 %			
		Unchanged	32,3 %	30,6 %	6,5 %			
		No opinion/ information	15,6 %	8,9 %	12,9 %			
8	Research**	Major	6,3 %	15,9 %	34,4 %	50.388 (6)	.000	.245
		Partial	41,7 %	42,7 %	44,6 %			
		Unchanged	18,8 %	21,0 %	5,3 %			
		No opinion/ information	33,3 %	20,4 %	15,6 %			

* Groups are significantly different ($p < .05$)

** Groups are significantly different ($p < .01$)

The changes (major and partial) observed in the three universities from the students' point of view are visually presented as follows:

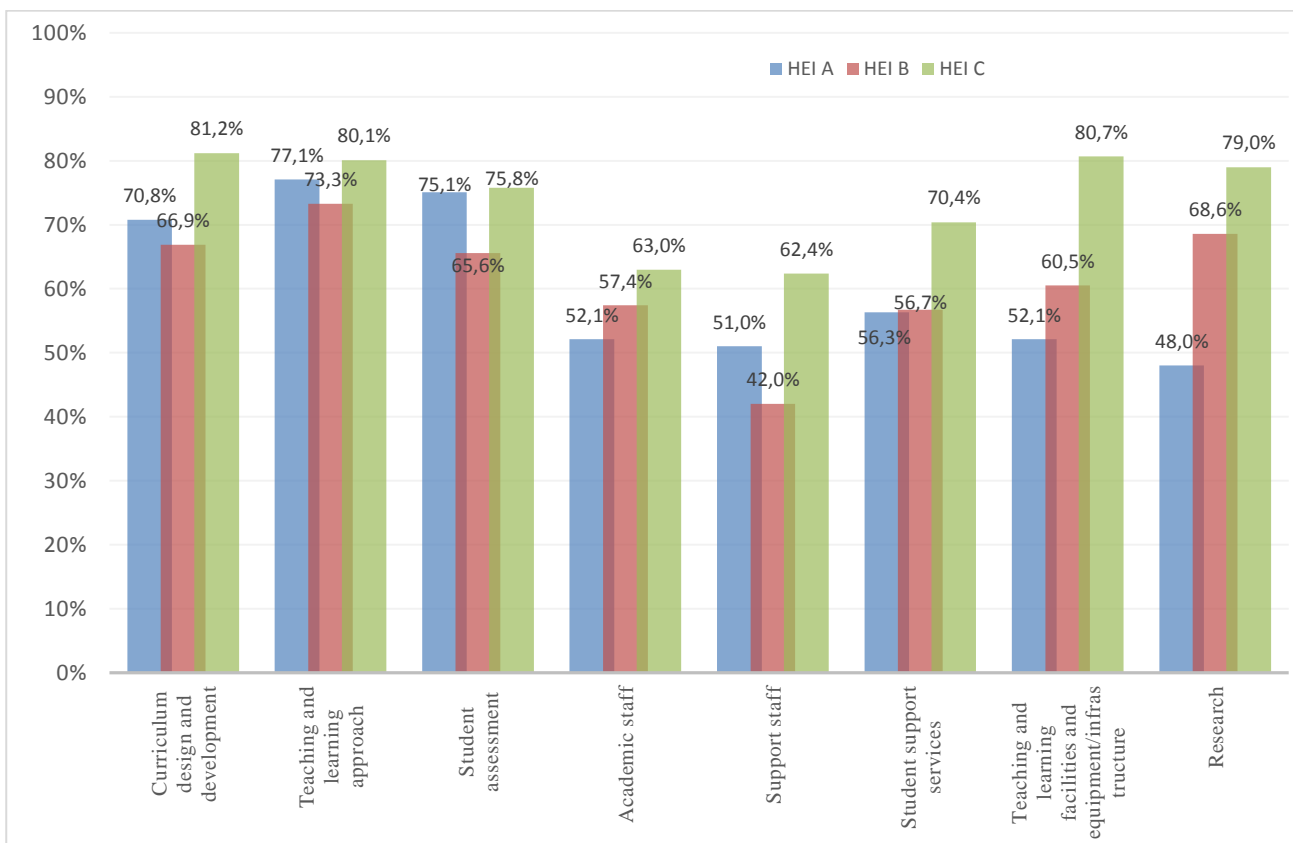


Fig. 1. Changes (at the major or partial levels) observed by students

Figure 1 shows that the students at University C observed the most (major and partial) changes in almost all surveyed aspects. Most of them can observe changes in curriculum design and development (81.2 %) and also changes for teaching and learning facilities and infrastructure (81.7 %). In other aspects, the students of University C also observed more changes than those from the other two universities. For University A, students observed the most change for teaching and learning approaches (77.1 %), and limited changes were reported for research (48 %), among those

of the other two universities. Not many students (less than 50-42 %) at University B self-reported that they could observe changes related to support staff (42.0 %) but in research (68.6 %) which is relatively higher than that of University A.

As also seen in Table 4, the comparison of the three groups of students at three universities in general shows significant differences between the three groups in reporting changes they observed at their universities. Figure 1 shows the details of differences.

The survey results show that to some extent students studying at the three programmes share some similarity in reporting their observation of changes most in curriculum design and development, teaching methods, student assessment, equipment and facilities, and research. Few students observed changes in academic staff, support staff, and student support services.

Observed changes in course types in the programmes by students

For the study, students were asked to report on any changes they observed in course types used in the programmes and the initiatives of the changes. Table 5 shows the survey results of changes students observed as regards course types.

Table 5. Recent changes related to course types and presentation of results from chi-square analysis with three groups of students

No	Course types.	Level of changes	HEI A	HEI B	HEI C	χ^2 (df)	p	Cramer's V
1	Lecturing **	Increasing	34,4 %	15,3 %	43,5 %	43.138 (6)	.000	.223
		Decreasing	22,9 %	46,5 %	28,5 %			
		Unchanged	31,3 %	31,8 %	18,8 %			
		No opinion/ /informatio	10,4 %	6,4 %	9,2 %			
2	Interactive courses *	Increasing	64,6 %	50,3 %	63,4 %	15.052 (6)	.020	.132
		Decreasing	6,3 %	19,7 %	11,8 %			
		Unchanged	16,7 %	21,0 %	19,4 %			
		No opinion/ information	12,5 %	8,9 %	5,2 %			
3	Courses with practice-related elements **	Increasing	27,1 %	40,1 %	59,7 %	62.770 (6)	.000	.269
		Decreasing	7,3 %	22,9 %	10,2 %			
		Unchanged	37,5 %	28,7 %	21,5 %			
		No opinion/ information	28,1 %	8,2 %	8,6 %			
4	Courses with project-based elements**	Increasing	22,9 %	25,5 %	5,7 %	51.003 (6)	.000	.243
		Decreasing	9,4 %	24,8 %	10,8 %			
		Unchanged	36,5 %	31,2 %	22,6 %			
		No opinion/ information	31,3 %	18,5 %	13,9 %			
5	Online courses**	Increasing	18,8 %	28,0 %	18,3 %	30.997 (6)	.000	.190
		Decreasing	11,5 %	17,8 %	24,7 %			
		Unchanged	37,5 %	39,5 %	25,8 %			
		No opinion/ information	32,3 %	14,7 %	31,2 %			
6	Courses with simulations**	Increasing	17,7 %	11,5 %	52,2 %	78.555 (6)	.000	.304
		Decreasing	9,4 %	24,8 %	10,8 %			
		Unchanged	36,5 %	29,9 %	19,9 %			
		No opinion/ information	26,5 %	33,8 %	17,2 %			

* Groups are significantly different ($p < .05$)

** Groups are significantly different ($p < .01$)

Students were asked to select among the four levels of change (increasing, decreasing, unchanged, and no information/no answer).

For University A, the highest percentages (or most students selected) were for:

- increasing: interactive courses (64,6 %), lecturing (34,4 %)
- unchanged: courses with practice-related elements (37,5 %), courses with project-based elements (36,5 %), online courses (37,5 %), and courses with simulations (36,5 %)

For University B, the results were as follows:

- Increasing: interactive instruction (50,3 %), courses with practice-related elements (40,3 %),
- Decreasing: lecturing (46,5 %),
- Unchanged: online courses (39,5 %), courses with project-based elements (31,2%), and courses with simulations (33,8 %)

For University C, the results were as follows:

- Increasing: lecturing (43,5%), interactive courses (63,4 %), courses with practice-related elements (59,7%), courses with simulations (52,2 %)
- Unchanged: courses with project-based elements (22,6 %)
- No idea/information: online courses (31,2 %)

At University A, 64,6 % of students agreed that interactive courses were used increasingly while a third of students observed an increase in lecturing as a method of teaching in the Bachelor programme of Finance and Banking. Approximately 30 % of students reported unchanged for most of the teaching methods and approaches. At University B, students observed different changes in course types used in the Bachelor programme of Education. Unlike what was reported at University A, for 46,5 % of students at University B, lectures were used less while 40,3 % of students observed more courses with practice-related elements. Similar to the results at University A, more interactive courses were used in the programme for 50,3 % of students – the highest percentage. For the rest of the teaching methods, students were also divided with an almost equal number of students reported unchanged (around 30 %). To some extent, students at Universities A and B share certain similarities in reporting changes in the course types used in the undergraduate programmes of Finance and Banking and Education. For University C, the patterns seem to be different and more positive. Modern ways of education delivery were used increasingly in the Bachelor programme of Chemical Engineering: interactive courses (for 63,4 % of students), course with practice-related elements (59,7 %), and courses with simulations (52,2 %). Only project-based teaching and learning was reported to be unchanged.

For comparing the differences of the three groups of students at three universities, chi-square analyses with three groups of students were used. Table 5 presents the results from chi-square analyses showing significant differences between the three groups in reporting changes they observed in course types. In general, changes taken place at University C tend to be the most positive.

Drivers of observed changes

Students were also asked about who and what initiated the changes in course types. Table 6 shows the results of students self-reported about who or what initiated a lecturer to change his/her teaching methods:

Table 6. Self-reported drivers of observed changes in course types and presentation of results from chi-square analysis with three groups of students

No.	Who or what initiated the changes	Levels of change	HEI A	HEI B	HEI C	χ^2 (df)	p	Cramer's V
1	Students**	Major	26,0 %	25,5 %	50,0 %	40.026 (6)	.000	.214
		Partial	53,1 %	54,1 %	36,0 %			
		Unchanged	9,4 %	15,3 %	5,4 %			
		No opinion/information	11,5 %	5,1 %	8,6 %			
2	Other academic staff**	Major	20,8 %	13,4 %	45,7 %	65.926 (6)	.000	.275
		Partial	53,1 %	56,7 %	33,3 %			
		Unchanged	2,1 %	14,6 %	4,8 %			

		No opinion/ information	24,0 %	15,2 %	16,1 %			
3	Board of Rectors**	Major	32,3 %	13,4 %	52,2 %	69.518	.000	.283
		Partial	43,8 %	48,4 %	2,6 %	(6)		
		Unchanged	3,1 %	17,2 %	8,1 %			
		No opinion/ information	20,8 %	21,0 %	17,2 %			
4	External quality assurance (accreditation)**	Major	26,0 %	23,6 %	51,1 %	39.320	.000	.214
		Partial	44,8 %	42,7 %	23,7 %	(6)		
		Unchanged	6,3 %	12,1 %	5,4 %			
		No opinion/ information	22,9 %	21,7 %	19,9 %			
5	Internal quality assurance (from the results of surveys)**	Major	16,7 %	15,9 %	44,1 %	45.651	.000	.230
		Partial	47,9 %	47,1 %	28,5 %	(6)		
		Unchanged	7,3 %	12,7 %	8,1 %			
		No opinion/ information	28,1 %	24,2 %	18,3 %			
6	Legal regulations**	Major	16,7 %	14,0 %	29,6 %	36.373	.000	.205
		Partial	34,4 %	31,8 %	31,2 %	(6)		
		Unchanged	11,5 %	27,4 %	8,1 %			
		No opinion/ information	37,5 %	26,8 %	31,1 %			
7	Employers**	Major	13,5 %	17,2 %	32,3 %	32.707	.000	.197
		Partial	43,8 %	40,1 %	44,6 %	(6)		
		Unchanged	8,3 %	18,5 %	4,3 %			
		No opinion/ information	34,3 %	24,2 %	18,8 %			

** Groups are significantly different ($p < .01$)

The results indicate that multiple sources are attributed to how academic staff changed their teaching methods. In other words, most of the students perceived that all the drivers surveyed had a certain level of influence on observed changes in teaching methods. The results show that the drivers of the changes (major and partial) as perceived by students at the three universities are somehow similar. For University A, the three major initiatives for changes came from students (79.1 %), from other academics (73.9 %), and from the Board of Rectors (76.1 %). For University B, the initiatives for changes also came from students (79.6 %), from other academics (70.1 %), and from external quality assurance (66.1 %). For University C, the initiatives for changes came from students (86 %), from other academics (78 %), and from employers (76.9 %). Despite the discrepancies in the percentages, the two major initiatives of changes in the teaching methods originated from students and other academic staff as perceived by most students at all three universities (for 70-86 %). They differed as regards the third source of changes: the board of rectors at University A, external QA at University B, and employers at University C. This possibly can tell a different story related to internal quality assurance systems at these universities and the role of these stakeholders in triggering changes for the university (such as course types in this study).

Findings presented in Table 6 show that University C are significantly different to the other two in terms of the degree of impact, the percentages of students reported “major change” are higher than “partial change” compared to the other two universities. A relatively small proportion of students that did not have information and did not respond to all surveyed content varied from 5.1 % (in University B as regards the changes initiated from students) to 37.5 % (in University A as regards “legislative changes”). The results of chi square analyses also show the differences between three groups of students at Universities A and B in reporting drivers of changes. This somehow reflects the current situation of how many and how much students participated in and knew about the activities of the University. The number of students who had limited information related to what and who initiated the changes could be explained as follows: (1) either these students were not interested in the activities at the university level or (2) they were not directly informed of the related activities.

3. Discussion

The article presents the results of surveying students' perspective on the changes during the AUN-QA assessment process at the programme level by recording observed changes. Regarding the changes observed by students in the assessment process, students of all three universities perceived that there were changes (major and partial) in most of the surveyed aspects: curriculum design and development, teaching and learning methods/approaches, student assessment methods, academic staff, support staff, student support services, teaching supporting equipment and facilities, and research. These are positive changes at the programme level. This is similar to the results in the study of Buwalda, Braspenning, Dijk, and Visser (2018). All three bachelor programmes were re-designed to reflect outcomes-based education pursued by AUN-QA (AUN, 2015). This education paradigm shift requires universities in Vietnam to declare programme learning outcomes and ensure the constructive alignment suggested by Biggs (2014) between the programme learning outcomes, teaching and learning, and student assessment. Another visible impact that the AUN-QA scheme directly on higher education governance is the participation of stakeholders inside and outside of the university (Pham, 2019).

These changes can be seen to be very positive. AUN-QA is considered to be the first organisation to assess study programmes in Vietnam when the government attempted to develop a national quality assurance system, and there was no domestic accrediting agency. The AUN-QA's approach to curriculum design and development according to outcomes-based education was then imported to Vietnam. Since then, any study programme that aims to be certified the AUN-QA needs to change accordingly to meet its requirements. HEIs have changed to design and declare their graduates' expected learning outcomes. This approach is completely new to higher education in Vietnam. Most HEIs that choose to participate in the AUN-QA assessment have just changed in this direction. In addition, because Vietnam's Qualification framework (VQF) has just recently been issued in 2017, not many HEIs have reviewed the curriculum to be in line with the VQF. Thus, it can be said that before 2020, most of the study programmes changing towards OBE is to meet the requirements of the AUN-QA.

Since then, there have been changes in teaching approaches and assessment methods to align with the declared expected learning outcomes. Changes in curriculum design and development also require the participation of stakeholders including students. Therefore, the survey results show these changes from students' observations and possibly from their participation in the process of reviewing and designing the curriculum according to the OBE approach. Another change many students observed is the change in equipment and facilities. All three universities had a certain investment in facilities for the study programmes applying for the AUN-QA assessment. This investment is understandable. In this respect, these bachelor programmes were benefited from participating in the AUN-QA assessment because the investments in facilities and equipment are relatively expensive that few HEIs could do periodically if there were no external funding resources (from non-governmental organisations, or the state budget).

There was a limited number of students who observed changes in academic staff and support staff, which could be explained from students' perceptions of what change is. Students reported changes in academic staff could be the same one who reported the changes in teaching approaches and assessment methods. Students who did not think there was a change in academic staff and support staff possibly because they saw the same academic staff, support staff, and no new staff. For the support staff, a change in the students' perspectives can be from two aspects: quantity and quality of service. A small number of students that selected "changed" in both aspects may be an area for improvement. However, although the results varied from the students' perspective, the overall assessment (the highest percentage) at Universities A and B is "unchanged" in most teaching approaches and methods. This result can be seen to be similar to some previous studies on the impact of external QA on the quality of teaching and learning as in studies by Buwalda et al. (2018), Cardoso, Rosa, and Videira (2018) or Vincenzi, Garau, and Guaglianone (2018). In particular, there is no change in some learner-centered teaching methods.

Regarding the results related to the factors triggering the observed changes, although the rates were different, the requests by students and academics were perceived by students of all three universities as contributing to the changes. This reflects the students' perceptions of two closely related parties in university: the students themselves and the academics, who can be considered as the two core partners of the teaching and learning process. In addition, it can be seen that the

students were aware that the university is now attempting to support them in learning and that their voices are heard. There are certain differences in students' perceptions of the third group of factors initiating the changes in teaching methods. Students at University A perceived that the changes were due to the requests from the Board of Rectors while in University B they were attributed to the requirements of the accreditation of education quality. At University C they were from the employers' needs. This difference may be due to the difference in the ways students were communicated about activities at the university. Students at University A may have found little information about the impact of the AUN-QA assessment on the changes. University B students may have been aware of the AUN-QA assessment of their study programme, which could have affected the survey results. At University C, the way the university informed and involved students in the process of assessment and changes may have shaped their belief of who and what initiated the changes. They believed that the changes were for their sake to improve their employability, i.e., from the needs of employers. University C, therefore, seems to be able to integrate the external requirements into practical actions towards internal quality assurance.

For the purposes of comparing the differences between the three groups of students in reporting changes they observed at their universities, changes in course types, and drivers of changes, chi square analyses were used. The results show that there is significant differences between the three groups of students. Students at University C reported more positive changes in almost all surveyed aspects and internal quality assurance tends to be more developed than the other two universities.

4. Conclusion

This study was conducted through the survey method to examine students' perspectives of the impact of the AUN-QA assessment at the programme level, the quality assurance mechanism of the ASEAN. Very few past studies have been done with students on examining the impact of external QA. As part of this project, T. H. Pham and Nguyen (2020) reported on the results exploring the perspectives of academic staff from the same universities. Comparing with the results in this study, it can be seen that academic staff observed more positive changes in many areas related to the assessed study programmes than students. This shows that the changes observed by students were not the improvements in the quality of teaching and learning (except for University C) because such changes could not lead to real changes in the quality of education but it takes time for the universities to transform or for more visible lasting impact (e.g., University C). Similar studies can be done in these three universities after two to three cycles of assessment of the study programmes to be able to assess the long-term impacts of external QA. Although the results are only of perception survey, the study shows initial (positive) impacts of the AUN-QA assessment, especially in curriculum design and development based on the OBE approach. Further studies can use in-depth interviews with students to further explore the impact level of external QA or AUN-QA, a QA organisation in the ASEAN region for recommendations suitable with the specific situation of each university. This may be related to the quality culture and quality assurance system within each university, especially the difference between University A, University B, and University C.

5. Acknowledgements

This research is funded by Vietnam National Foundation for Science and Technology Development (NAFOSTED) under grant number 503.01-2018.303.

References

- [AUN, 2015](#) – AUN. Guide to AUN-QA assessment at programme level. Bangkok, Thailand: The Author, 2015.
- [Baldwin, 1997](#) – Baldwin, G. (1997). Quality assurance in Australian higher education: The case of Monash University. *Quality in Higher Education*. 3(1): 51-61.
- [Bejan et al., 2018](#) – Bejan, A.-S., Damian, R.M., Leiber, T., Neuner, I., Niculita, L., Vacareanu, R. (2018). Impact evaluation of institutional evaluation and programme accreditation at Technical University of Civil Engineering Bucharest (Romania). *European Journal of Higher Education*. 8(3): 319-336. DOI: 10.1080/21568235.2018.1474780
- [Biggs, 2014](#) – Biggs, J. (2014). Constructive alignment in university teaching. *HERDSA Review of Higher Education*. 1: 5-22.

Buwalda et al., 2018 – Buwalda, N., Braspenning, J., Dijk, N., Visser, M. (2018). Local and national effects of a quality system in Dutch general practitioner specialty training: a qualitative study. *Quality in Higher Education*. 24(1): 43-54. DOI: 10.1080/13538322.2018.1445431

Cardoso et al., 2018 – Cardoso, S., Rosa, M. J., Videira, P. (2018). Academics' participation in quality assurance: does it reflect ownership? *Quality in Higher Education*. 24(1): 66-81. DOI: 10.1080/13538322.2018.1433113

Do et al., 2017 – Do, Q.T.N., Pham, H.T., Nguyen, K.D. (2017). Chapter 12 – Quality Assurance in the Vietnamese Higher Education: A Top-Down Approach and Compliance-Driven QA. In M. Shah & Q. T. N. Do (Eds.). *The Rise of Quality Assurance in Asian Higher Education* (pp. 191-207): Chandos Publishing.

Kristensen, 2010 – Kristensen, B. (2010). Has external quality assurance actually improved quality in higher education over the course of 20 years of the "quality revolution"? *Quality in Higher Education*. 16(2): 153-157. [Electronic resource]. URL: <http://search.proquest.com/docview/742872373?accountid=14782>

Leiber et al., 2018 – Leiber, T., Prades, A., Alvarez del Castillo, M. (2018). Impact evaluation of programme accreditation at Autonomous University of Barcelona (Spain). *European Journal of Higher Education*. 8(3): 288-303. DOI: 10.1080/21568235.2018.1474778

Leiber et al., 2018 – Leiber, T., Stensaker, B., Harvey, L.C. (2018). Bridging theory and practice of impact evaluation of quality management in higher education institutions: a SWOT analysis. *European Journal of Higher Education*. 8(3): 351-365. DOI: 10.1080/21568235.2018.1474782

MoET, 2016 – MoET. Circular No. 04/2016/TT-BGDDT Promulgating Regulations on Assessment Standards for Higher Education Programmes. Hanoi, VN: The Author, 2016.

Pham, 2019 – Pham, H.T. (2019). Stakeholders' Engagement in Quality Assurance in Vietnam. In C. H. Nguyen & M. Shah (Eds.), *Quality Assurance in Vietnamese Higher Education: Policy and Practice in the 21st Century* (pp. 137-161). Cham: Springer International Publishing.

Pham, 2018 – Pham, T.H. (2018). Impacts of higher education quality accreditation: a case study in Vietnam. *Quality in Higher Education*. 24(2): 168-185. DOI: <https://doi.org/10.1080/13538322.2018.1491787>

Pham, Nguyen, 2020 – Pham, T.H., Nguyen, V.P. (2020). Tác động của đánh giá chương trình đào tạo theo Bộ tiêu chuẩn AUN-QA: Quan điểm của giảng viên [Impact of AUN-QA assessment on the assessed programmes: Academic staff's perspectives]. *Ho Chi Minh Open University Journal*. 15(5): 3-17. [in Vietnamese]

Shah, 2012 – Shah, M. (2012). Ten years of external quality audit in Australia: evaluating its effectiveness and success. *Assessment & Evaluation in Higher Education*. 37(6): 761-772.

Stensaker et al., 2011 – Stensaker, B., Langfeldt, L., Harvey, L., Huisman, J., Westerheijden, D. (2011). An in-depth study on the impact of external quality assurance. *Assessment & Evaluation in Higher Education*. 36(4): 465-478.

Vietnam Education Quality..., 2019 – Vietnam Education Quality Management Agency, M. (2019). Danh sách các chương trình đào tạo được đánh giá/công nhận (cập nhật đến ngày 31/12/2019) [List of study programmes assessed and recognised as of 31/12/2019]. [Electronic resource]. URL: <https://moet.gov.vn/giaoducquocdan/khao-thi-va-kiem-dinh-chat-luong-giao-duc/Pages/Default.aspx?ItemID=6342>

Vietnam Education Quality..., 2020 – Vietnam Education Quality Management Agency, M. (2020). Danh sách các chương trình đào tạo được đánh giá/công nhận (cập nhật đến ngày 31/5/2020) [List of study programmes assessed and recognised as of 31 May, 2020]. [Electronic resource]. URL: <https://moet.gov.vn/giaoducquocdan/khao-thi-va-kiem-dinh-chat-luong-giao-duc/Pages/Default.aspx?ItemID=6702> [in Vietnamese]

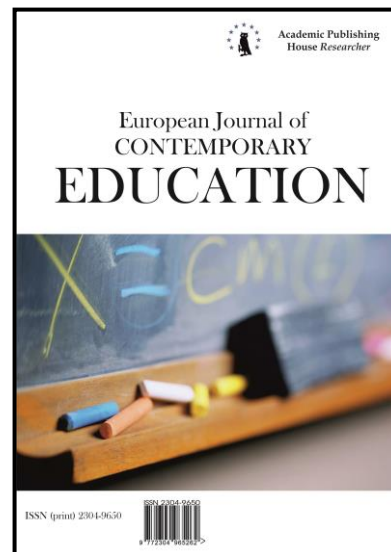
Vincenzi et al., 2018 – Vincenzi, A., Garau, A., Guaglianone, A. (2018). Has the quality of teaching and learning processes improved as a result of the implementation of quality assurance coordinated by the state? *Quality in Higher Education*. DOI: <https://doi.org/10.1080/13538322.2018.1426382>

Wahlén, 2002 – Wahlén, S. (2002). Teaching skills and academic rewards. *Quality in Higher Education*. 8(1): 81-87.



Copyright © 2021 by Academic Publishing
House Researcher s.r.o.
All rights reserved.
Published in the Slovak Republic
European Journal of Contemporary Education
E-ISSN 2305-6746
2021. 10(2): 450-461
DOI: 10.13187/ejced.2021.2.450
www.ejournal1.com

IMPORTANT NOTICE! Any copying, reproduction, distribution, republication (in whole or in part), or otherwise commercial use of this work in violation of the author(s) rights will be prosecuted in accordance with international law. The use of hyperlinks to the work will not be considered copyright infringement.



The Effects of Using Digital Game Based Learning in Primary Classes with Inclusive Education

Gulnaz I. Salgarayeva ^{a,*}, Gulaim G. Iliysova ^b, Aigul S. Makhanova ^a,
Rakhymzhan T. Abdrayimov ^c

^a Kazakh National Women's Teacher Training University, Almaty, Kazakhstan

^b Abay Kazakh National Pedagogical University, Almaty, Kazakhstan

^c South Kazakhstan State Pedagogical University, Kazakhstan

Abstract

This study investigates the effectiveness of digital games designed specifically for the formation of correct reading skills in the learning of the Latin alphabet by learners with special educational needs in primary school. Learners participating in the study (N = 36) were randomly selected from primary school with inclusive education. During an 8-week intervention for the training group in addition to school provided support were used digital game-based learning to teach correct reading the Latin alphabet, and the control group continued receiving only school-provided support. These activities were conducted under the supervision of their parents and teachers, both at school and at home. The results showed that the level of reading skills of learners in the training group, which used digital game, based learning to teach reading in Latin, developed significantly faster compared with the level of learners in the control group. In addition, in comparison with the results of training learners in the school curriculum before the study, during the digital game based learning intervention, it was found that their reading development was significantly faster. During the study, there was an increase in interest of learning learners in the training group, and there was observed no change in the motivation of learners in the control group. However, the increased interest of learners is mainly because parents allow them to extend the time of using digital devices for education. The results of the 8-week study showed that the exercise of letters, sounds, syllables, words with digital game based learning contributes to improving the learning skills of learners, especially those in need of special education. The results of research on the use of digital game based learning in order to respond the needs of learners with special educational needs can be used for further development of learners.

* Corresponding author

E-mail addresses: gulnaz_salgara@gmail.com (G.I. Salgarayeva), gg_researcher@yahoo.com (G.G. Iliysova)

Keywords: digital game-based learning, inclusive education, primary school, reading disability, Latin graphics.

1. Introduction

In Kazakhstan, there are 39 special kindergartens and 315 special groups, involving more than 15,000 preschool children, as well as 106 special schools and 1,219 special classes in general education schools, involving 25,000 learners with special educational needs. Currently, 17 rehabilitation centers, 133 psychological and pedagogical correction offices and 558 speech therapy school centers provide correction-pedagogical support to children with special educational needs (Kenesbayev et al., 2017).

Among the technologies being developed for use in education, a special place is occupied by digital technologies to support learners with special educational needs (Tombak, Ateşkan, 2019). Digital technologies, in particular, special training programs and mobile applications can become an auxiliary tool in all conditions of life (Salgarayeva et al., 2020). One of the important tools of the technology product that is used to increase learners' interest in learning when teaching the alphabet to primary school learners is digital game-based learning (Prensky, 2001; Gee, 2007). Digital game-based learning is used as a convenient, interactive advanced learning method for learners (Chu, Chang, 2014; Prensky 2003). In addition, digital games can be considered as an independent form of educational technology, these games aim to increase the interest of learners in learning by including in the content of training game elements such as idea, special rules, achievement of goals, privacy, control to achieve educational goals (Garris et al., 2002; Hwang et al., 2012; Hwang et al., 2013).

According to researchers and practitioners in the educational sector, this approach of learning involves solving individual problems (Hwang et al., 2014), forming and developing reading skills (Hwang et al., 2017, Yang et al., 2013) of learners with special educational needs.

Digital games have a special interest in teaching children through tasks that are presented and designed at a high level, in accordance with the age characteristics of learners. A meta-analysis of the impact of digital game-based learning (Wouters et al., 2013) showed that their effect is higher than simple instructions that are provided in terms of teaching. However, the analysis of Girard et al. (2012) indicated that more research, comparable to other forms of learning, is needed to better generalize about the effects of digital games. Additional research is also needed to determine the impact and effectiveness of digital games should be conducted specifically for a group of learners with special educational needs (Ke, Abras, 2013). Digital games can provide the formation of certain skills of learners with special educational needs through individual adaptive learning, which is not fully implemented during simultaneous training with all learners in an inclusive educational environment. It is worth taking into account the fact that children with special educational needs have a problem of inhibition of motivation (Chapman et al., 2000; Morgan, Fuchs, 2007; Mol, Bus, 2011), which is another reason for using digital games to effectively increase their interest in receiving new knowledge (Ke, Abras, 2013; Rosas et al., 2003). The game has a special place in building reading skills for students with special educational needs (Van de Ven et al., 2017; Van Gorp et al., 2016).

Since digital games in mobile devices are very popular among children aged 6-8 years, researchers believe that the process of developing and planning the further distribution of educational digital games is an important objective.

Although digital games on mobile devices are very popular among children aged 6-8 years (Fromme, 2013), researchers believe that developing digital games for educational purposes and developing their distribution requires careful planning. Learning strategies need to be effectively integrated into game content, otherwise the impact of digital game-based learning can have a negative impact on learning and motivating learners.

In our study, we consider the issue of training with the digital game-based learning for the teaching of children with special needs, which is still insufficiently studied. This study was aimed at raising the level of knowledge about the effectiveness of digital games designed to prevent and eliminate speech impairment in students with general underdevelopment of speech, especially to support children with special educational impairments.

To develop the design and content of educational digital games, a consultation was held with narrow specialists, such as a Speech therapist, Psychologist, and Children's doctors. These

specialists shared their many years of experience working with children with impaired language, reading and speech from an early age. Digital games designed to teach the Latin alphabet not only teach children the printed and written forms of the alphabet, but also help to restore the overall development of colloquial speech of students. Performing tasks set in digital games, students learn to pronounce individual sounds correctly, master the phonetic structure of words. In this study, we determined the effectiveness of games in education and assessed the degree of involvement of students with special needs in the educational process.

2. Discussion

Today, the presence of developmental delay in learners with special educational needs in reading and speaking is one of the most common problems in learning (Chapman et al., 2000; Morgan, Fuchs, 2007; Mol, Bus, 2011). Reading instruction depends on the language we are learning. Therefore, there is a definite connection between teaching, learning, and overcoming difficulties encountered in the learning process.

Children with general speech underdevelopment are students aged 4-8 years with speech defects, but with normal hearing and intelligence. Speech disorders are diverse, they can be manifested in a violation of pronunciation, grammatical structure of speech, poverty of the vocabulary, as well as in violation of the pace and smoothness of speech (Vakulenko, 2018).

It is noted that many primary school learners who had problems with spoken language at the stage of preschool childhood, despite overcoming them in the process of correctional work, experienced certain difficulties in mastering writing and reading (Grushevskaya, 1989; Kornev, 1997).

In this regard, increasing a number of studies in the sector of digital technologies in the educational process of preschool and elementary grades. The analyze of literature on the research topic, the impact of digital learning games on the learner's reading skills was examined in detail. For instance, Li and Tsai (2013) found that these games are designed to develop a learner's reading skills. Cheng et al. (2015) indicated that researchers focused on the role of digital game-based applications for learning in improving the formation of student's learning skills.

The level of reading skills in primary school students is observed in the first month of the educational process (Eklund et al., 2015). One of the most common problems is the difficulties in reading comprehension (Juel et al., 1986), which in the future leads to low academic achievements of the child, when choosing a career that does not require an extended education (Savolainen et al., 2008).

Children with poor reading and speaking skills also face a number of difficulties in memorizing, pronouncing, dividing words into syllables and reading them again (Ramus et al., 2003; Lyytinen et al., 2008). Children with special educational needs also have problems with attention (Willcutt, Pennington, 2000) and language impairment (Pennington, Bishop, 2009), which in turn suppress the child's emotional reaction and motivation to learn (Chapman et al., 2000). Children with general speech underdevelopment are characterized by «motivational» intellectual passivity, due to insufficient personal readiness for schooling (Troshin et al., 2005, Spirova et al., 1985).

Researchers emphasize that prevention of these complications should be carried out from an early age (Torgesen, 2004). In solving this problem, it is becoming increasingly important to use educational technologies designed specifically for children with special needs.

In addition, conducted an analysis of scientific research articles that provide empirical information (Young et al., 2012). Analysis shows that digital games are often used to support learners' knowledge and improve their cognitive abilities. Hwang and Chen (2017) put into practice the use of game elements in the learning process and considered them as the main factor in increasing the learning skills of students to determine their effectiveness. Developed a method of game approach to study the effectiveness of this learning mechanism. The results of the study showed that the use of additional digital games for the formation of educational skills taught is useful to compare with the implementation of traditional training.

Cheng et al. (2015) examined the effect of design and ease of use of digital games for educational purposes on the formation of students' reading skills. The results of the study showed that researchers focused on the role of educational applications based on digital games in improving the formation of children's learning skills. Qian and Clark (2016) showed that the use of

digital games in learning has led to increased student interest in learning. Young (Young et al., 2012) believe that a lot of research is needed to determine whether digital game-based learning is a viable method of learning. Thus, there is no doubt that the work to increase the attractiveness and popularity of digital games created for educational purposes still needs to be continued.

3. Materials and methods

In the course of the study were used, methods of analysis and synthesis, deduction and induction. As well as compare the level of the experimental groups was used the method of comparative analysis. Conducted a number of studies and meta-analyses about the impact of educational technologies on learning (Cheung, Slavin, 2013). However, less is known of the specific effects of digital games adapted for children with special educational needs. The main advantage of digital game-based learning is that the content of the training will be adapted to the individual characteristics of the child. Adaptation plays an important role in creating a game, with taking into account the individual characteristics of the player and focusing on the level of complexity (Ke, Abras, 2013). In addition, to automate the acquisition of initial training skills, you need to repeat the same task several times. Digital game-based learning can provide multiple repetitions of exercises, keeping each child's interest in accordance with their needs.

For instance, M. Ronimus et al. (2019) reviewed the impact of the game GraphoLearn on second grade students with difficulty learning the correct reading skills. In this study, which lasted 6 weeks, participated 37 students. This game is aimed at improving the child's reading skills by repeatedly completing tasks, such as determining whether letters match, composing words, and combining sounds. According to the results of the study, observed in students development of learning skills.

Although some studies have shown that game elements increase the interest of players and positively influence the learning process, experimental results in some studies deny this (Abdul Jabbar et al., 2015; Kim et al., 2017; Ronimus et al., 2014). This is due to shortcomings in the game design, due to the distraction of students' attention to the features of game entertainment (Zheng, Spires, 2014) or the complexity of the training content (Kim et al., 2017). To focus students only on learning, in our case, on the study of letters, sounds, syllables and words, it is necessary to carefully consider the design of the game. Games, being attractive, should not bother the player in mastering the content (Wrzesien, Raya, 2010). Another important condition for the productive existence of a digital game-based learning is that in order to encourage the child to correctly perform educational tasks, it is necessary to add a reward element to the structure of the game (Abdul Jabbar, 2015).

4. Results

4.1. Game description

The digital game "Qazaqsha logoped" used in the study is aimed at developing students' reading skills, such as word reading, spelling, reading fluency and reading comprehension. In development stages of the game, we were guided by the concept of "learning reading" by Svetlovskaya (2001), where 5 methods are used in the formation of educational skills: 1) letter-by-letter; 2) abrupt syllable; 3) smooth syllable; 4) smooth syllable with a holistic reading of individual words; 5) reading in whole words and groups of words.

According to this concept, the tasks given in the game consist of several stages. At the first stage, the student is given articulation exercises for individual groups of sounds. At the second stage were proposed tasks for abrupt syllable reading, at the third stage – tasks for training smooth syllable reading, at the fourth stage – tasks for reading sounds with difficult pronunciations aloud, at the fifth stage – songs and tongue twisters for practicing these sounds (Figure 1).

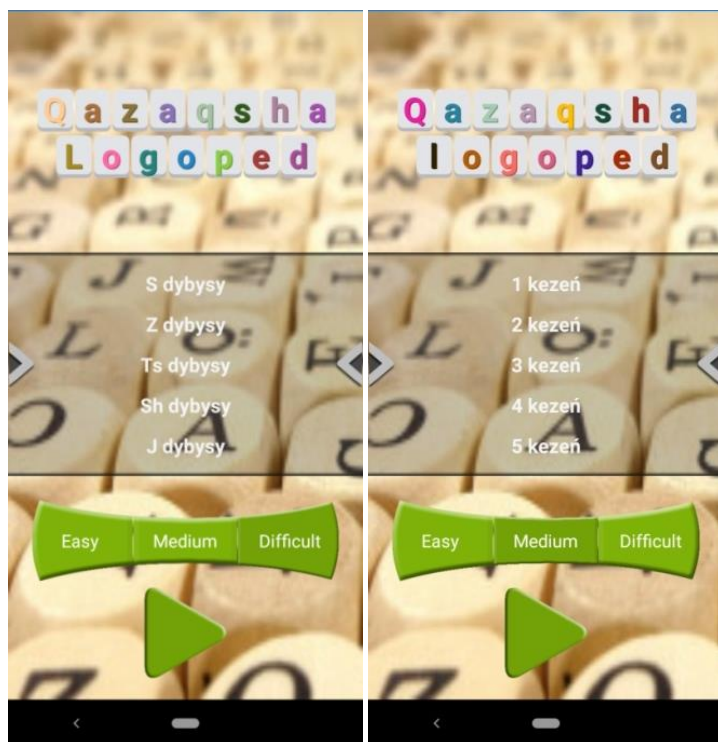


Fig. 1. Digital Game Qazaqsha Logoped

1) *Spell reading.* At the first stage of the "Qazaqsha logoped" digital game, a student performs letter recognition exercises. During the game, the letter sounds, and the letter corresponding to its pronunciation is selected from four possible answers.

2) *Syllable reading.* In the second phase of the "Qazaqsha logoped" digital game, a student learns to read open and closed syllables.

3) *Smooth syllabic reading.* At the third stage of the "Qazaqsha logoped" digital game, the student learns to smoothly combine syllables of these words. During the task, learner practices reading syllables together, starting with stretching the first consonant, adding the next consonant and continuing, gradually reducing the pronunciation of the consonant. The syllable table was used to represent the words in the tasks for joint reading of syllables. These exercises help students with general speech underdevelopment overcome the difficulties of joint integration. In particular, from the number of familiar syllables are formed the skills of reading joint syllables.

4) *Reading aloud by connecting syllables.* In the fourth stage of the digital game, "Qazaqsha logoped" combines syllables with difficult sounds and reads it aloud. Correct syllabic reading of words is pre-voiced. The learner listens to the correct reading for self-control and repeats.

5) *Reading full words and groups of words.* At the fifth stage of the digital game "Qazaqsha logoped", were distributed tongue twisters and poems dedicated to the formation of the student's reading skills.

The tasks were organized according to the method proposed by Krasilnikova (2003). In the task, syllables or letters of some words of the poem are missing; the student finds this syllable or letter and fills the words. Full tongue twisters and poems are pre-voiced. The student listens to the correct reading, then repeats and rehearses for a self-test.

The user interface of the game is very simple and all instructions sounded, so student does not need to have any reading skills when using the game. The difficulty level of the game is adjusted according to the level of the student's game. The game begins with the acquisition of letters and sounds, and since then the game is complicated in accordance with the educational achievement of the learner. This game is effective for children with difficulty in learning skills, such as exercises presented in the game, offer exercises, such as correctional tasks.

The knowledge of students in the training group was tested before and after using digital games in the educational process. In the course of the study, the influence of the game "Qazaqsha

logoped" on improving the learning speed of students was taken under control. As a result, it was noticed that the students developed skills in recognizing letters, correct pronunciation, reading syllables, and reading words independently. The use of digital game-based learning showed that students have acquired some skills (writing, drawing) that are not included in the game. Digital game-based learning have shown that they as forming learning skills, including letter-sound communication, lead to positive changes in the learning process.

4.2. Experimental design

To study the pedagogical advantages of using digital game-based learning for educational purposes and determine the effectiveness of motivation to learning the field of education, an experiment was conducted in elementary school students with inclusive education.

A. Participants

The experiment involved three large districts such as Almaly (9 schools), Zhetysu (12 schools), Medeu (7 schools) of Almaty city that provide inclusive education. The participants were selected from the primary school group according to the study plan. They are difficult to recognize and read the letter, need special support, and need to overcome their difficulties. After the written consent of parents, the first screening test was received from children of primary school.

The test was used to determine the level of literacy of students and their level of development. At the average level, it was found that children only know 10-15 letters (there are $N = 32$ letters in the alphabet based on Latin graphics). Thus, $N = 36$ children from 28 schools (21 boys, 15 girls) took part in the experiment. The number of children in the training group was 18 (7 girls, 38.89 %) and in the control group 18 (8 girls, 44.44 %). All children were native speakers of Kazakh. The mean age of the participants at the beginning of the second grade was 8.17 years ($SD = 0.38$).

The results of a survey of parents showed that before for children with special educational needs were held corrective training classes by necessity. It was also confirmed that all students have difficulties in learning and speaking.

B. Research tools

The main goal of our short 8-week study was to determine the impact of using digital games on the development of reading skills for students with special educational needs.

We divided students into 2 groups as a control and training group to evaluate the effectiveness of the proposed games. We were interested in the results of the training group.

In particular, according to the results of the experiment, we had to answer the following question: How much does the use of digital game-based learning affect the development of reading and spelling skills of students with special educational needs?

C. Experimental procedure

The procedure of the study is represented in [Figure 2](#). Each school was randomly assigned either to the GL intervention or control group. We asked teachers to help divide the children into groups. The number of children participating in the study was 18 in the training group (11 boys, 7 girls, 14 schools) and 18 (10 boys, 8 girls, 14 schools) in the control group. The groups did not differ from each other in gender distribution $\chi^2(1, N = 36) = 0.11, p = .74 > .05$.

The 8-week intervention took place at school (6 children), at home (5 children), or at both places (7 children), depending on the preferences of the teachers and parents. Among the students, there were also children who did not have the skills to use a digital game-based learning (3 children). However, this did not cause significant difficulties for students, since the user interface of the digital game is designed so that students can easily use the game.

The selection process of the participants and procedure are:

1. Permission from educational organizations to conduct research;
2. Information letters sent to the schools in the area;
3. Volunteering teachers contact the researchers;
4. Parental consent forms and background questionnaires;
5. The consent forms and questionnaires filled in and sent by parents.

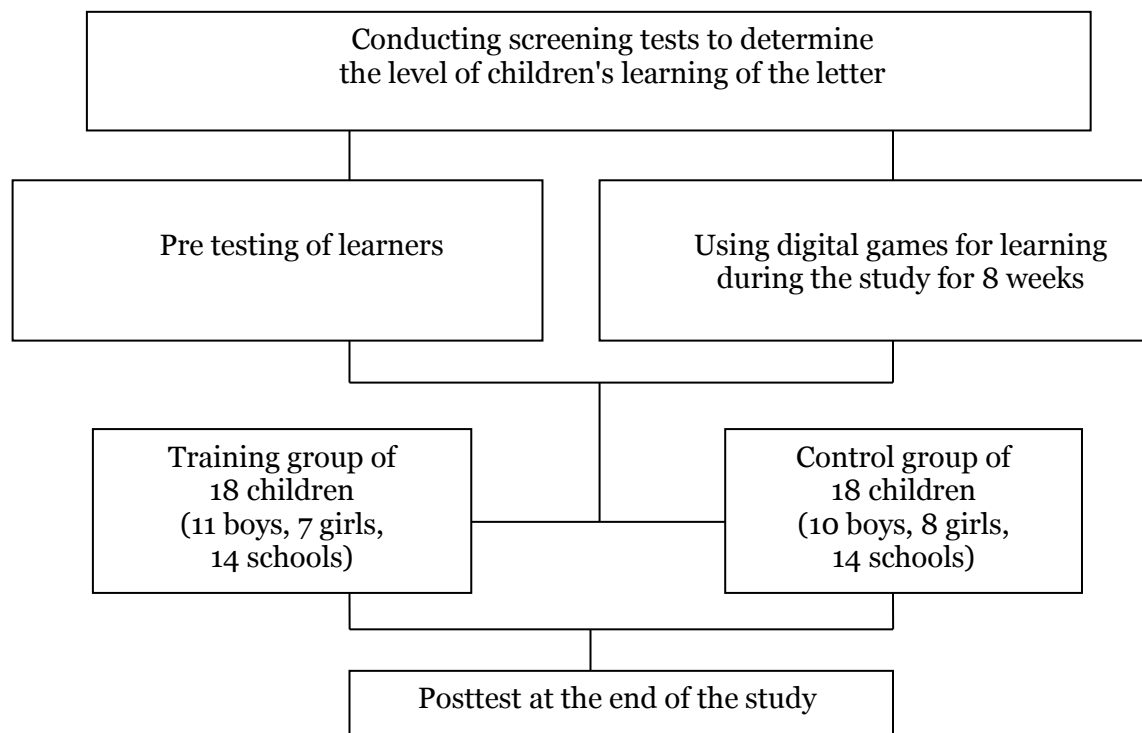


Fig. 2. Procedure of the study

The parents and teachers of the training group were sent instructions by email for installing and using digital game "Qazaqsha logoped". Technical help was also provided via email or phone, social network, when needed. Control over the time of use of the game was transferred to parents and teachers. In accordance with the age characteristics of children in the preparatory group, it is recommended no more than 1 hour per week, that is, 8-10 minutes per day. Short sessions were recommended because of the high amount of repetition in the game, which could lead to boredom if continued for too long. Teachers were encouraged to use the games as a complement to the traditional lesson, and not completely replace it with the digital game "Qazaqsha logoped".

Measures

The study assesses four groups of reading skills of students: word reading, spelling, reading fluency, reading comprehension. The screening was conducted in May 2019 (final month of first grade). The pretest was conducted in early September 2020 and the posttest in December 2020.

Word reading

Tasks for assessing reading skills among students were developed in accordance with the instructional and methodical letter "About the peculiarities of the organization of the educational process in secondary education organizations of the Republic of Kazakhstan" (2019).

Students complete the assignment on a separate sheet. The assignments were translated into Latin. Students are given 45 words to evaluate recognition of words that contain letters that are difficult to pronounce. The student reads the proposed words aloud for 1 minute. Each correctly read word is assigned 1 point. The maximum score is 45. Cronbach's alpha reliabilities for this task were .80, .81 and .82 at the pre-, post and follow-up tests, respectively.

Spelling

Students were asked to write the names of the pictures in order to assess their ability to write correctly. In accordance with the assignment, students write an image dictation. Students write the names of 15 figures on a sheet in the appropriate place on the sheet.

If the name of the picture is spelled correctly, 2 points are given, if there are minor errors, 1 point if the answer is incorrect, and 0 points. The maximum number of points scored is 30. Cronbach's alpha reliability of this task were .83, .84 and .85 at the pre-, post and follow-up tests, respectively.

Reading fluency

On the instructions of students to determine educational skills, students are given 50 obviously true (for example, “round ball”) or obviously false (for example, “strawberry blue”) statements. For each opinion, the student chooses one of the answers “Yes” or “No”. The task takes 2 minutes to complete. The correct answer is 1 point, if the answer is not chosen or the answer is incorrect, then 0 points. Maximum 50 points. Cronbach’s alpha reliability of this task were .84, .85 and .87 at the pre-, post and follow-up tests, respectively.

Reading comprehension

Students receive four texts to complete reading comprehension tasks. After each text, given five questions with three possible answers. Students read the text and choose one of the suggested answers. If the answer is correct, 1 point is given, if not – 0 points. The maximum score is 20. Cronbach’s alpha reliability of this task were .80, .82 and .83 at the pre-, post and follow-up tests, respectively.

A. Data analysis

The main goal of this study was to evaluate the effectiveness of improving children's reading skills using digital game-based learning to learn Latin alphabet.

During the study of learning Latin alphabet, to evaluate indicators of the development of recognition skills, syllables and combined learning, letter recognition, reading fluency and reading comprehension was used point system.

The results of an 8-week experiment gave an answer to the question of whether the use of digital game-based learning improved reading skills in students.

The Shapiro-Wilks test was used as normality test. The assumption of normality for pretest and post-test score in skills of word reading, spelling, reading fluency and reading comprehension is significant, $p > .05$ and normal distribution was observed in both groups.

Pre-assessment of participants' skills in reading and spelling skills

No differences were found between the two groups in initial reading and spelling skills before the intervention ($\alpha = 0.05$). One-way ANOVA was used to evaluate learners' assignment submitted for checking learners' homogeneity in the pre-test. All participants were homogeneous and had equivalent abilities in skills of word reading, spelling, reading fluency and reading comprehension skills before being exposed to the experiment (see [Table 1](#)).

Table 1. ANOVA

		Sum of Squares	Df	Mean Square	F	Sig.
Word reading	Between Groups	4,000	1	4,000	1,248	,272
	Within Groups	109,000	34	3,206		
	Total	113,000	35			
Spelling	Between Groups	4,000	1	4,000	,958	,335
	Within Groups	142,000	34	4,176		
	Total	146,000	35			
Reading fluency	Between Groups	,444	1	,444	,118	,733
	Within Groups	128,111	34	3,768		
	Total	128,556	35			
Reading_c omprehens ion	Between Groups	,694	1	,694	,312	,580
	Within Groups	75,611	34	2,224		
	Total	76,306	35			

Post-assessment of participants' skills in reading and spelling skills

To show participant learners' performance in both groups regarding the skills of word reading spelling, reading fluency and reading comprehension mixed design ANOVA was used for all domains. The results showed that in the mixed design ANOVA for the word reading, the main effect of time and time \times group interaction were significant, $F(1,34) = 71.944, p < 0.001, \eta^2 = 0.679$ and $F(1,34) = 6.664, p < 0.014, \eta^2 = 0.164$ respectively. Paired samples t test separately by group, $t(17) = -9.220, p < 0.001$ and $t(17) = 3.688, p = 0.002 < 0.05$ for the training and the control group, respectively showed that in both groups, the mean level of the word reading level increased during the intervention period. An independent samples t test showed that the training group developed faster than the control group $t(34) = 2.581, p = 0.014 < 0.05$.

Then, to see if the progress in trained word reading had a transfer effect to children's performance regarding the skills of spelling, reading fluency and reading comprehension skills mixed design ANOVA was used for all domains. In the mixed design ANOVA for spelling the main effect of time was significant, $F(1,34) = 19.814, p < 0.001, \eta^2 = 0.368$. But the time \times group interaction was not, $F(1,34) = 1.055, p = 0.312, \eta^2 = 0.030$. Then we had exactly the same results in the mixed design ANOVA for reading fluency and reading comprehension skills. The main effects of time for reading fluency and reading comprehension skills were significant, $F(1,34) = 30.516, p < 0.001, \eta^2 = 0.473$ and $F(1,34) = 34.425, p < 0.001, \eta^2 = 0.503$ respectively, whereas the time group interactions were not, $F(1,34) = 0.105, p = 0.747, \eta^2 = 0.003$ and $F(1,34) = 0.425, p = 0.519, \eta^2 = 0.012$ respectively. Both the training and control groups improved their performance in spelling, reading fluency and reading comprehension skills, but there were no differences in the rate of improvement between the groups.

The Kruskal-Wallis test was used to rule out the potential confounding effect of the training place on the learning outcomes in training group (at home, at school, or at both places) in post-test. The test found no significant differences in the four scores between these three groups trained at different places: word reading ($H = 3.011, df = 2, p = .222$), spelling ($H = 0.753, df = 2, p = .686$), reading fluency ($H = 0.324, df = 2, p = .851$), and reading comprehension ($H = 4.924, df = 2, p = .085$).

In conclusion, the goal of the current study was to examine the effectiveness of digital game-based learning in teaching the Latin alphabet to children with special educational needs. The results of an 8-week study conducted with the help of teachers and parents showed that it had a significant positive effect on students' reading skills. These results complement previous studies (Van de Ven et al., 2017; Van Gory et al., 2016). At the same time, the research work expands the scope of previous research, demonstrating the effectiveness of the use of digital games by students with special educational needs.

During the control period, the positive effect on reading fluency and reading comprehension was slow. To speed it up, we can say that the use of digital game-based learning for a long time gives positive results. This will be considered in our future research. Full, effective use of the time allocated for the game, in turn, contributes to improving the educational skills of students with special educational needs. Digital games are effective in developing the skills of word reading, spelling, reading fluency and reading comprehension. In general, the results of the study are consistent with the results of previous studies (Fredricks et al., 2004; Guthrie et al., 2012). Similar studies, exactly studies on digital game-based learning, have also produced comparable results to our result (Zheng, Spires, 2014; Ronimus et al., 2019).

5. Conclusion

The results of the research work are very effective in providing support to students with special educational needs, using digital games in the formation and development of educational skills. This result shows that the use of digital game-based learning as a new teaching method for traditional teaching methods offered by the school has a positive effect on the development of students' reading skills. The effectiveness of digital games in accordance with the goals of the game is measured by improving literacy skills with reading words letter-by-letter; abrupt syllable, smooth syllable, smooth syllable with a holistic reading of individual, reading in whole words and groups of words. The results of the study indicate the importance of using additional training methods, along with traditional methods of developing other skills. We hope that the results

obtained in this study will help teachers evaluate the effectiveness of digital game-based learning to children with special educational needs and developing their reading skills.

References

[Abdul Jabbar, Felicia, 2015](#) – *Abdul Jabbar, A.I., Felicia, P.* (2015). Game play engagement and learning in game-based learning: A systematic review. *Review of Educational Research*. 85(2): 740-779.

[About the peculiarities..., 2019](#) – About the peculiarities of the organization of the educational, process in secondary education organizations of the Republic of Kazakhstan in the 2019-2020 academic year: Instructional and methodical letter. (2019). Nur-Sultan: National Academy of Education. I. Altynsarin.

[Chapman, 2000](#) – *Chapman, J.W., Tunmer, W.E., Prochnow, J.E.* (2000). Early reading-related skills and performance, reading self-concept, and the development of academic self-concept: A longitudinal study, *Journal of Educational Psychology*. 92(1): 703-708.

[Cheng et al., 2015](#) – *Cheng, M.T., Chen, J.H., Chu, S.J., Chen, S.Y.* (2015). The use of serious games in science education: A review of selected empirical research from 2002 to 2013, *J. Comput. Edu.* 2(3): 353-375.

[Chu, 2014](#) – *Chu, H.C., Chang, S.C.* (2014). Developing an educational computer game for migratory bird identification based on a two-tier test approach. *Educ. Technol. Res. Develop.* 62(2): 147-161.

[Cheung, Slavin, 2013](#) – *Cheung, A., Slavin, R.* (2013). Effects of educational technology applications on reading outcomes for struggling readers: A best-evidence synthesis. *Reading Research Quarterly*. 48: 277-299.

[Eklund et al., 2015](#) – *Eklund, K., Torppa, M., Aro, M., Leppänen, P., Lyytinen, H.* (2015). Literacy skill development of children with familial risk for dyslexia through grades 2, 3, and 8. *Journal of Educational Psychology*. 107(4): 126-140.

[Fromme, 2003](#) – *Fromme, J.* (2003). Computer games as a part of children's culture. *Game Stud.* 3(1): 49-62.

[Fredricks et al., 2004](#) – *Fredricks, J.A., Blumenfeld, P.C., Paris, A.H.* (2004). School engagement: Potential of the concept, state of the evidence, *Review of Educational Research*. 74(2): 59-109.

[Garris et al., 2002](#) – *Garris, R., Ahlers, R., Driskell, J.E.* (2002). Games, motivation, and learning: A research and practice model. *Simulation & Gaming*. 33(5): 441-467.

[Gee, 2007](#) – *Gee, J.P.* (2007). Good video games and good learning: Collected essays on video games, learning and literacy. New York: Peter Lang Publishing.

[Girard et al., 2012](#) – *Girard, C., Ecalle, J., Magnant, A.* (2012). Serious games as new educational tools: How effective are they? A meta-analysis of recent studies. *Journal of Computer Assisted Learning*. 29 (1): 207-219.

[Guthrie et al., 2012](#) – *Guthrie, J.T., Wigfeld, A., You, W.* (2012). Instructional contexts for engagement and achievement in reading. New York: Springer.

[Grushevskaya, 1989](#) – *Grushevskaya, M.S.* (1989). Nedorazvitie rechi u mladshih shkolnikov i ego preodolenie [Underdevelopment of speech in younger learners and its overcoming]. Alma-Ata: Mektep. [in Russian]

[Hwang, Chen, 2017](#) – *Hwang, G.J., Chen, C.H.* (2017). Influences of an inquiry-based ubiquitous gaming design on learners' learning achievements, motivation, behavioral patterns, and tendency towards critical thinking and problem solving. *Brit. J. Educ. Technol.* 48(4): 950-971.

[Hwang et al., 2012](#) – *Hwang, G.J., Sung, H.Y., Hung, C.M., Huang, I., Tsai, C.C.* (2012). Development of a personalized educational computer game based on learners' learning styles. *Educ. Technol. Res. Develop.* 60(4): 623-638.

[Hwang et al., 2013](#) – *Hwang, G.J., Yang, L.H., Wang, S.Y.* (2013). A concept map-embedded educational computer game for improving learners' learning performance in natural science courses. *Comput. Educ.* 69 (1): 121-130.

[Hwang et al., 2014](#) – *Hwang, G.J., Hung, C.M., Chen, N.S.* (2014). Improving learning achievements, motivations and problem-solving skills through a peer assessment based game development approach. *Educ. Technol. Res. Develop.* 62(2): 129-145.

- Juel, 1986 – Juel, C., Griffith, P.L., Gough, P.B. (1986). Acquisition of literacy: A longitudinal study of children in first and second grade. *Journal of Educational Psychology*. 78: 243-255.
- Kenesbayev et al., 2017 – Kenesbayev, S.M., Salgaraeva, G.I., Makhmetova, A.A., Idrissou, S.N., Sabit, B. (2017). Possibilities of using information systems in the corrective work with children with disabilities. *Journal Revista Espacios*. 38(46): 34-41.
- Ke, Abras, 2013 – Ke, F., Abras, T. (2013). Games for engaged learning of middle school children with special learning needs. *British Journal of Educational Technology*. 44: 225-242.
- Kim et al., 2017 – Kim, S., Chang, M., Deater-Deckard, K., Evans, M. A., Norton, A., Samur, Y. (2017). Educational games and learners' game engagement in elementary school classrooms. *Journal of Computers in Education*. 4: 395-418.
- Kornev, 1997 – Kornev, A.N. (1997). Narusheniya chteniya i pisma u detei [Violations of reading and writing in children]. St. Petersburg: MiM. [in Russian]
- Krasilnikova, 2003 – Krasilnikova, O.A. (2003). Razvitie rechi na urokah chteniya [The development of speech in reading lessons]. SPb.: TMU. [in Russian]
- Li, Tsai, 2013 – Li, M.C., Tsai, C.C. (2013). Game-based learning in science education: A review of relevant research. *J. Sci. Educ. Technol*. 22(6): 877-898.
- Lyytinen et al., 2008 – Lyytinen, H., Erskine, J., Ahonen, T., Aro, M., Eklund, K., Guttorm, T., Viholainen, H. (2008). Early identification and prevention of dyslexia: Results from a prospective follow-up study of children at familial risk for dyslexia. In G. Reid, F. Manis, & L. Siegel (Eds.), *The Sage handbook of dyslexia*. N.Y.: Sage. Pp. 121-146.
- Mol, Bus, 2011 – Mol, S.E., Bus, A.G. (2011). To read or not to read: A meta-analysis of print exposure from infancy to early adulthood. *Psychological Bulletin*. 37(1): 267-296.
- Morgan, Fuchs, 2007 – Morgan, P.L., Fuchs, D. (2007). Is there a bidirectional relationship between children's reading skills and reading motivation? *Exceptional Children*. 73: 165-183.
- Pennington, Bishop, 2009 – Pennington, B., Bishop, D. (2009). Relations among speech, language, and reading disorders. *Annual Review of Psychology*. 60(2): 283-306.
- Premsky, 2001 – Premsky, M. (2001). *Digital game-based learning*. New York: McGraw-Hill.
- Premsky, 2003 – Premsky, M. (2003). *Digital game-based learning*. *Comput. Entertainment*. 1: 21-29.
- Qian, Clark, 2016 – Qian, M., Clark, K.R. (2016). Game-based Learning and 21st century skills: A review of recent research. *Comput. Hum. Behav*. 63(4): 50-58.
- Ramus et al., 2003 – Ramus, F., Rosen, S., Dakin, S.C., Day, B.L., Castellote, J.M., White, S., et al. (2003). Theories of developmental dyslexia: Insights from a multiple case study of dyslexic adults. *Brain*. 14(6): 841-865.
- Ronimus et al., 2019 – Ronimus, M., Eklund, K., Pesu, L., Lyytinen, H. (2019). Supporting struggling readers with digital game based learning, *Education Tech Research Development*. 67(8): 639-663.
- Ronimus et al., 2014 – Ronimus, M., Kuala, J., Tulane, A., Lysine, H. (2014). Children's engagement during digital game-based learning of reading: The effects of time, rewards, and challenge. *Computers & Education*. 71(3): 237-246.
- Rosas et al., 2003 – Rosas, R., Nussbaum, M., Cumsille, P., Marianov, V., Correa, M., Flores Salinas M. (2003). Beyond Nintendo: Design and assessment of educational video games for first and second grade learners. *Computers & Education*. 40: 71-94.
- Salgarayeva et al., 2020 – Salgarayeva, G., Makhanova, A., Bazayeva, Zh. (2020). Possibilities of Using Digital Technologies in Teaching Latin Graphics in the Republic of Kazakhstan. 2nd International Scientific and Practical Conference "Modern Management Trends and the Digital Economy: from Regional Development to Global Economic Growth" (MTDE 2020): 64-69.
- Savolainen et al., 2008 – Savolainen, H., Ahonen, T., Aro, M., Tolvanen A., Holopainen L. (2008). Reading comprehension, word reading and spelling as predictors of school achievement and choice of secondary education. *Learning and Instruction*. 18: 201-210.
- Spirova, Yastrebova, 1985 – Spirova, L.F., Yastrebova, A.V. (1985). Uchitel o detyah s narusheniyami rechi [Teacher about children with speech disorders]. Moscow: Education. [in Russian]
- Svetlovskaya, 2001 – Svetlovskaya, N.N. (2001). Izuchenie novykh podhodov v nauke [Exploring new approaches in science]. Moscow: Znanie. [in Russian]

[Tombak, Ateşkan, 2019](#) – Tombak, C.A., Ateşkan, A. (2019). Science Teachers' Beliefs and Attitudes towards the Use of Interactive Whiteboards in Education. *Journal of Turkish Science Education*. 16(3): 394-414.

[Torgesen, 2004](#) – *Torgesen, J.K.* (2004). Avoiding the devastating downward spiral. The evidence that early intervention prevents reading failure. Boston: American Educator.

[Troshin, Zhulina, 2005](#) – *Troshin, O.V., Zhulina, E.V.* (2005). Logopsihologiya: Uchebnik [Logopsychology: Textbook]. Moscow: SC Sphere.

[Van de Ven et al., 2017](#) – *Van de Ven, M., de Leeuw, L., Weerdenburg van, M., Steenbeek-Planting E.G.* (2017). Early reading intervention by means of a multi component reading game, *Journal of Computer Assisted Learning*. 33: 320-333.

[Van Gory et al., 2016](#) – *Van Gory, K., Seers, E., Verhoeven, L.* (2016). Enhancing decoding efficiency in poor readers via a word identification game. *Reading Research Quarterly*. 52(4): 105-123.

[Vakulenko, 2018](#) – *Vakulenko, L.S.* (2018). Vospitanie i obuchenie detei s narusheniyami rechi. Psihologiya detei s narusheniyami rechi: uchebnoe posobie [Education and training of children with speech disorders. Psychology of children with speech disorders: textbook]. Moscow: Forum Infra-M. [in Russian]

[Wouters et al., 2013](#) – *Wouters, P., Van Nimwegen, C., Van Oostendorp, H., Van der Spek, E.D.* (2013). A meta-analysis of the cognitive and motivational effects of serious games. *Journal of Educational Psychology*. 105(2): 249-265.

[Willcutt, Pennington, 2000](#) – *Willcutt, E.G., Pennington, B.F.* (2000). Comorbidity of reading disability and attention-deficit hyperactivity disorder: Differences by gender and subtype. *Journal of Learning Disabilities*. 33: 179-191.

[Wrzesien, Raya, 2010](#) – *Wrzesien, M., Raya, M.A.* (2010). Learning in serious virtual worlds: Evaluation of learning effectiveness and appeal to learners in the E-junior project. *Computers & Education*. 55(1): 178-187.

[Yang, Chang, 2013](#) – *Yang, Y.T., Chang, C.H.* (2013). Empowering learners through digital game authorship: Enhancing concentration, critical thinking, and academic achievement. *Comput. Educ.* 68(4): 334-344.

[Young et al., 2012](#) – *Young, M.F., Slota, S., Cutter, A.B., Jalette, G., Mullin, G., Lai, B., Simeoni, Z., Tran, M., Yukhymenko, M.* (2012). Our princess is in another castle: A review of trends in serious gaming for education. *Rev. Educ. Res.* 82(1): 61-89.

[Zhen, Spires, 2014](#) – *Zhen, M., Spires, H.A.* (2014). Fifth graders' fowl experience in a digital game-based science learning environment. *International Journal of Virtual and Personal Learning Environments*. 5: 69-86.



Copyright © 2021 by Academic Publishing House Researcher s.r.o.

All rights reserved.

Published in the Slovak Republic

European Journal of Contemporary Education

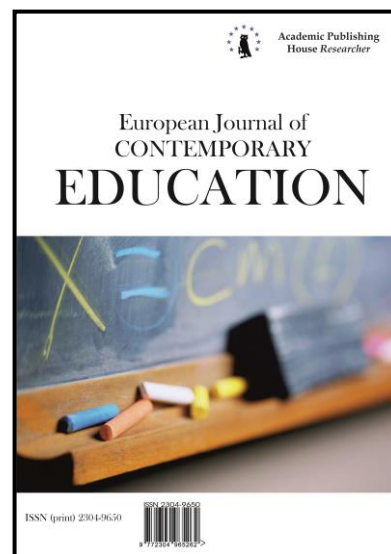
E-ISSN 2305-6746

2021. 10(2): 462-475

DOI: 10.13187/ejced.2021.2.462

www.ejournal1.com

IMPORTANT NOTICE! Any copying, reproduction, distribution, republication (in whole or in part), or otherwise commercial use of this work in violation of the author(s) rights will be prosecuted in accordance with international law. The use of hyperlinks to the work will not be considered copyright infringement.



Developing Computational Thinking of Specialists of the Future Through Designing Computer Games for Educational Purposes

Elena V. Soboleva ^{a,*}, Tatyana N. Suvorova ^a, Svetlana V. Zenkina ^b, Mikhail I. Bocharov ^c

^a Vyatka State University, Kirov, Russian Federation

^b Academy of Public Administration, Moscow, Russian Federation

^c Financial University under the Government of the Russian Federation (Financial University), Moscow, Russian Federation

Abstract

The problem that the given paper aims to solve is associated with the need to resolve the contradiction between the requirements of the digital economy for a high level of computational thinking of specialists of the future and an insufficiently developed methodological base for training graduates that meets these requirements.

The purpose of the research is to theoretically prove and experimentally verify the need for the use of gamification technology in training of specialists of the future to form computational thinking skills which are most in demand in the digital society.

The research methodology includes the analysis and generalization of scientific works on the problem of determining the phenomenon of computational thinking, the use of digital gamification resources in training, and clarifying the requirements for training of highly qualified specialists of the future. The HTML 5 language was used as a software tool. The pedagogical experiment is presented on the example of the assessment of changes in the levels of skills that make up the essence of computational thinking.

Results. The paper clarifies the concept of computational thinking and describes the directions of educational and cognitive activity based on the gamification principles which most effectively form computational thinking. The authors formulate didactic principles for the inclusion of computer games to foster students' cognitive activity, support professional self-determination, and develop systematic and critical thinking. Specific materials are proposed to improve the methods, tools, and organizational forms of the training focused on the formation of computational thinking as the basis for the supra-professional skills of specialists of the future.

* Corresponding author

E-mail addresses: sobolevaelv@yandex.ru (E.V. Soboleva), tn_suvorova@vyatsu.ru (T.N. Suvorova), svetlana_zenkina@mail.ru (S.V. Zenkina), mii@mail.ru (M.I. Bocharov)

In the end, conclusions are made which confirm that the included educational and cognitive activities on game designing in the training of highly qualified specialists of the future fosters the formation of computational thinking skills.

Keywords: computational thinking, gamification technology, educational space, algorithm, game world, HTML 5 language, thought process, professions of the future, digital economy.

1. Introduction

1.1. Relevance of the problem

Training qualified personnel is one of the key directions to improve the country's competitiveness. It is stated in the Strategy for the Development of the Information Society in the Russian Federation for 2017–2030 ([Strategiya razvitiya..., 2017](#)), in the Federal Program "Personnel for the Digital Economy", etc. In order to develop future specialists' professional competencies that are in demand in the digital society, it is necessary to develop and implement new approaches to training ([Karakozov, Ryzhova, 2019](#)). A global trend in modern education is the focus of training on the development of students' computational thinking skills ([Chevalier et al., 2020](#)). E.K. Henner defines computational thinking as a thought process involved in problem setting and its solution, presented in a form that can be effectively implemented using information processing tools ([Khenner, 2016](#)). Information and communication technologies affect all spheres of society, so the desire to study the possibilities of new digital means becomes a prerequisite for the development of modern man ([Soboleva et al., 2020](#)). To use computer devices and digital tools effectively, computational thinking skills are required. Moreover, UNESCO defines the principles of the use of artificial intelligence in education, coding activities and the formation of computational thinking ([Cropley, 2020](#)). This activity involves skills that allow everyone to create a code and solve problems using various algorithms. In addition, modern educational environment requires that a digital school teacher should include game elements and gamification services in educational and cognitive activities ([Legaki et al., 2020](#)). It is the gaming educational space, as proved by N. Legaki, N. Xi, J. Hamari, K. Karpouzis, V. Assimakopoulos, where there are additional opportunities to increase the motivation of the learning generation Z, foster cognitive activity, support professional self-determination, and develop systematic and critical thinking ([Legaki et al., 2020](#)). Designing a virtual game world, developing algorithms for the characters' behavior and their activities, game strategies, writing a code make up the essence of computational thinking ([Papert, 1993](#)). Indeed, it is computational thinking that uses logical and algorithmic approaches to problem formulation, analysis, and its solution.

On the one hand, the development of computational thinking skills, as well as by means of gamification, appears to be an important factor for a graduate's successful professional personal fulfillment in the modern technological society. On the other hand, in Russia until recently, there has been no special research on the concept of computational thinking. The exception is E.K. Henner's research in which this concept is analyzed from foreign authors' points of view and is determined as relevant for domestic education ([Khenner, 2016](#)). He defines that this term in practice aims at updating the teaching content and methods, fosters increasing efforts to form meta-subject results of education.

Thus, there is a contradiction between the requirements of the modern economy for a high level of computational thinking of specialists of the future and an insufficiently developed methodological base for training graduates that meets these requirements. The hypothesis of the research is that the internship in designing and developing computer games for educational purposes included in students' educational and cognitive activities will contribute to the formation of actions that determine the essence of computational thinking.

1.2. Purpose and objectives of research

The purpose of the research is determined by the need to use gamification technology in training specialists of the future in order to form computational thinking skills which are most in demand in the digital society.

Research objectives:

- to study approaches to the definition of computational thinking;
- to clarify the sequence of actions that are characteristic of computational thinking and are most in demand in today's technological society;

- to identify the possibilities of using software and gamification resources to form the actions that determine the essence of computational thinking;
- to describe the implementation of the selected system of actions on the example of a specific internship in designing a computer game world for educational purposes;
- to experimentally prove the effectiveness of the proposed educational and cognitive activities to form computational thinking skills.

2. Relevance

2.1. Literature review

2.1.1. Review of Russian scientific and pedagogical literature

Game elements and digital services included in student' cognitive activity are current trends in the development of the didactic system (Karavaev, Soboleva, 2017). To confirm the need for the formation of computational thinking skills among digital school graduates by means of digital gamification resources, fundamental scientific works were analyzed to identify the essence of computational thinking and to describe the didactic potential of software and gamification tools in terms of thought process, analytical and algorithmic actions.

E. Varshavskaya, E.S. Kotyrlo state that the global digital transformation has a significant impact on the needs of society, business, and the state regarding the professions in demand in the future (Varshavskaya, Kotyrlo, 2019). However, in practice, schools and universities often train graduates without taking into account the trends of long-term planning, competitiveness, and uncertainty of the future. Besides, motivational, psychological, social and economic, and technical conditions for supporting the future specialist's self-determination play a significant role. (Varshavskaya, Kotyrlo, 2019). According to A.V. Khutorskoy, a teacher' personality, their understanding and ability to design a digital educational space which meets the challenges of global transformation should remain consistently leading (Khutorskoy, 2017). It is the digital school mentor who can and should choose innovative teaching technologies that work as much as possible to form the type of thinking and way of action that is in demand in the digital society.

M.V. Solodikhina, A.A. Solodikhina prove that specialists who possess forecasting and planning skills under the conditions of uncertain future, the ability to independently formulate a problem and offer its best solution, the ability to develop a solution algorithm and implement it using software and hardware will be in great demand in the digital transformation era. (Solodikhina, Solodikhina, 2019). E.V. Soboleva, T.N. Suvorova, S.V. Zenkina, E.K. Gerasimova clarify that a professional of the future should also be able to use the solution of the problem to solve another problem in the future (Soboleva et al., 2020). All these characteristics form the basis of computational thinking.

According to M.M. Klunnikova, the term *computational thinking* is borrowed for Russian literature, science and practice (Klunnikova, 2019). She introduces the concept of mathematical computational thinking which is considered as a thought process that consists of a sequentially activated human memory chains of object images and mental schemes from mathematics and computer science to formulate the problem and effectively solve it using abstract tools.

M.V. Solodikhina, A.A. Solodikhina define computational thinking as "thinking involving problem solving, system design, and understanding human behavior based on concepts fundamental to computer science" (Solodikhina, Solodikhina, 2019). Computational thinking, according to E.K. Henner, involves mental activity when formulating a problem to make a computational decision (Khenner, 2016).

Indirectly, separate components of computational thinking were considered in the works of Russian scientists: mathematical (Kholodnaya, Gelfman, 2016) and algorithmic (Leontiev et al., 2017).

Analyzing approaches to the development of computational thinking by means of digital technologies, we noted three main areas of research: the definition of computational thinking as a cognitive thought process (Kholodnaya, Gelfman, 2016); a hybrid of other ways of thinking (Klunnikova, 2019); the use of information processing tools for modeling processes studied in other disciplines (Borissova et al., 2020). As mentioned above, E.K. Henner in his works, innovative for Russia, proves that the computational thought process involves special methods to

formulate a problem, includes such principles as abstraction, decomposition, generalization, and pattern recognition to solve it (Khenner, 2016).

In terms of the current Russian research on gamification in education, T.N. Suvorova, N.I. Isupova should be noted. The authors convincingly prove that the digital technologies based on gamification principles included in educational and cognitive activities not only meet the goals and challenges of the education system, but also allow training in-demand and competitive professionals of the future for the country's economy (Isupova, Suvorova, 2018). E.V. Soboleva, M.S. Perevozchikova prove that designing interactive quest rooms as organizational forms of cognition and educational technology is not only one of the ways to gamify the digital educational space, but also contributes to the formation of the individual's intellectual competence (Soboleva, Perevozchikova, 2019). E.V. Soboleva and N.L. Karavaev analyze various didactically potential game services and platforms in terms of developing relevant skills (Karavaev, Soboleva, 2017). E.V. Soboleva continues her research and highlights the gamification principles the implementation of which is necessary to achieve the desired educational and cognitive effect in accordance with digital economy challenges (Soboleva, Perevozchikova, 2019).

D. Borissova, D. Keremedchiev, and G. Tuparov claim that working with the program and its interface contributes to the formation of users' communication abilities (Borissova et al., 2020). This confirms the theories that modern man's digital literacy necessarily includes a communicative component (Gruzdev et al., 2018). These assertions are also proved by O.V. Semenykhina and Y.O. Rudenko who study the experiment and information interaction in the development of mobile applications, game educational spaces (Semenykhina, Rudenko, 2018).

Thus, while the formation of the computational thinking of a highly qualified and competitive specialist is a priority of the modern educational space (Varshavskaya, Kotyrlo, 2019), there is a need to implement the didactic potential of digital technologies (including those based on the gamification principles) for the development of skills that determine the essence of the corresponding thought process.

2.1.2. Review of foreign research

In foreign theory and practice, it is noted that the term *computational thinking* was first used by Seymour Papert who proposed using computers to incorporate programming ideas into everyday life (Papert, 1993). Subsequently, the author called it *procedural thinking* (Papert, 1996).

In F. Hotyat, computational thinking is considered as thinking that includes a great number of skills which are necessary for programming (Hotyat, 1952). Theoretically, computational thinking also includes computer science concepts such as algorithm, recursion, decomposition, optimization, etc. (Barr, Stephenson, 2011).

J.M. Wing formulated a new definition of computational thinking as thought processes involved in problem setting and solving presented in a form that can be effectively implemented using information processing tools (Wing, 2017).

M. Chevalier, C. Giang, A. Piatti, F. Mondada develop this idea and add that the solution can be performed by a person or a machine, or, more generally, by both people and machines (Chevalier et al., 2020). A. Finkel notes that working in an information educational environment involves performing a sequence of actions characteristic of computational thinking: analyzing the task (formulating the task as a computational problem); decomposing the problem into small logical steps; algorithm development (identification and refinement of the steps required to solve a problem); analysis and evaluation of this algorithm (Finkel, 2017).

S. Bocconi, A. Chiocciariello, J. Earp prove that developing program learning is one of the trends in global education policy (Bocconi et al., 2018). L. Ilomäki, M. Lakkala determine digital school trends and if modern educational systems correspond to these trends (Ilomäki, Lakkala, 2018). They identify mobile technologies, artificial intelligence, gamification of learning, video conferencing, cybersecurity, expansion of the educational space beyond the audience as prioritizing. A. Cropley studies the issues and processes of transformation of the global education system and proves the need for a comprehensive adaptation of digital schools to global realities and new approaches to learning (Cropley, 2020). The author analyzes the reasons why some educational institutions introduce innovative teaching technologies while others refuse to do it. K. Bovermann, T.J. Bastiaens provide statistical data for visual analysis and understanding of educational market trends (Bovermann, Bastiaens, 2020).

According to O.C. Yung, S.N. Junaini, A.A. Kamal, L.F. Md Ibharim, digital learning gamification resources are highly effective in the formation of skills for independent development of new technologies and evaluating their possibilities, existence in online and offline reality, constant knowledge updating and the acquisition of new skills and competencies (Yung et al., 2020). The authors claim that a teacher who loves their subject will not always be able to arouse a modern student's interest (overload with fundamental concepts and laws, focusing only on a specific curriculum without variable pace of work, limited communication channels). Digital learning gamification resources allow abandoning the authoritarian style of communication, removing the time and spatial limitations of the traditional class, etc. J.C. Paiva, J.P. Leal, R. Queirós note that currently it is important for a digital school mentor to possess minimal programming skills in order to apply gamification tools, effectively provide teaching in the online community (Paiva et al., 2020). There is a wide range of educational gaming platforms available to support teaching activities (Yung et al., 2020).

K. Bovermann, T.J. Bastiaens describe game mechanics, features of designing game educational spaces (Bovermann, Bastiaens, 2020): the plot component; requirements to selecting the content of the world; the specifics of the task system; the need to train qualified game teachers; emotional design supported by the rules for scoring points, the rating system. O.C. Yung, S.N. Junaini, A.A. Kamal, L.F. Md Ibharim consider designing and developing computer games for educational purposes in relation to teaching mathematics (Yung et al., 2020).

In J.C. Paiva, J.P. Leal, R. Queirós, it is convincingly proved that programming supports the development of analytical abilities (Paiva et al., 2020). F. Hotyat proves the importance of the ability to critically evaluate the result obtained and work under the conditions of uncertain future (Hotyat, 1952). Moreover, if applied correctly, this approach makes it possible to qualitatively increase the effectiveness of the acquired learning material and to stimulate students' cognitive activity, to foster their professional personal fulfillment (Helmlinger et al., 2020).

However, the literature review has shown that the practical implementation of game mechanics in the development of software applications that take into account the principles of didactics and contribute to the formation of students' computational thinking causes certain difficulties for technical specialists (Hsu et al., 2019). It should be noted that it is necessary to allocate additional time and labor resources, work with the application educational content, the basic knowledge of didactics and its practical use, select the software tools (Bocconi et al., 2018), the organization of information interaction in the game environment, the rationale for inclusion of this work in training, etc.

Therefore, there is a problem related to the need to implement digital gamification resources in order to form computational thinking.

3. Materials and methods

3.1. Theoretical and empirical methods

To obtain theoretical generalizations, we used the analysis of research papers on the problem of determining the phenomenon of computational thinking, the use of digital gamification resources in training.

The system and activity approach was used as the main research method. The activity system is considered in a virtual game environment supported by the appropriate software: the use of the functional capabilities of the digital gamification resource by students for data analysis, problem setting, building an information and mathematical model, developing an optimal solution algorithm and its computer-based effective implementation.

The stages of the corresponding activity are described on the example of designing and developing computer games for educational purposes using HTML 5 tools. This specification is chosen because it provides innovative interfaces for application programming and allows making more intensive, faster, or more indeterminable web pages.

The research methodology is complemented by the principles of the learning gamification methodology: gradual presentation of information; the principle of gradual complication; puzzles; instant feedback; storytelling; achievements and points; ratings; open profiles.

When designing and developing computer games for educational purposes, the principles that determine the essence of computational thinking were taken into account: decomposition; abstraction; pattern selection; creation of an algorithm.

Empirical methods (observation, analysis of the results of working with a digital gamification resource) to obtain up-to-date information about changes in the level of computational thinking skills constitute a specific group. A special entrance and final testing was developed and conducted, it included 5 tasks (each was evaluated from a maximum of 3 points). Statistical analysis of the reliability of the results of the pedagogical experiment was evaluated using Pearson's χ^2 (chi-square).

3.2. The base of research

In the course of the pedagogical experiment, we evaluated the effectiveness of the students' educational and cognitive activities to design and develop computer games for educational purposes for the formation of computational thinking skills.

To formulate the system of tasks, design a computer game world for educational purposes, 40 fourth-year students, 01.03.02 training program, Applied Mathematics and Computer Science (bachelor's degree), Vyatka State University (Kirov), were involved. The testing was carried out within the framework of Game Theory during the academic training and experience internship for obtaining professional skills. The average respondents' age was 22.

To fulfill the rules of probabilistic selection, the same teacher supervised all the students in developing computer games for educational purposes. The development was carried out in the same classrooms, using the same hardware and software. To carry out control measures, the authors developed test tasks. All questions meet the requirements of the State Federal Educational Standard for the specified training program.

3.3. Stages of research

The research was conducted in three stages.

At the first stage, the sequence of actions characteristic of computational thinking and the list of skills most in demand in the modern technological society were clarified. To assess the input conditions, we used the special test that took into account the priorities of the digital society, the competencies of the atlas of new professions. All questions and tasks were developed by the authors in accordance with the requirements of the State Federal Educational Standard. In the test, students were asked to solve 5 problems. A student received 3 points if they had solved each problem correctly and completely. With the help of the test results, it was possible to collect experimental data on the students, 01.03.02 training program, Applied Mathematics and Computer Science. Describing the sample, it should be noted that the experimental group consisted of 58 % of females and 42 % of males. Further, the participants were divided into groups (there were 20 students in the experimental group and 20 students in the control group) to ensure that each group had the same skills and personality traits that form the basis of computational thinking, and their equal distribution.

At the second stage, we determined the directions of educational and cognitive activities for the design and development of the computer game world for educational purposes with the programming language tools that as much as possible foster the development of skills to independently acquire new technologies and evaluate their possibilities, interact in virtual game reality, constantly update knowledge. Concurrently, we worked with complex systems and large amounts of data.

The third stage of the research involves experimental teaching and application of HTML 5 tools to form computational thinking skills.

4. Results

4.1. Clarification of basic concepts

The authors propose the following approach to the definition of computational thinking: this is a thought process that consists in the sequential execution of a set of actions: activation of a system of object images and connections between them from a person's memory for a specific subject area; problem setting taking into account the uncertainty of the future; development of a solution algorithm and its effective implementation using digital technology tools. The proposed approach takes into consideration all the characteristics that determine the essence of computational thinking.

In addition, we claim that the specialist of the future with developed computational thinking skills should be prepared to carry out activities to design, create and use innovative information and computer technologies to solve a wide range of research, technical, economic and managerial

tasks. Based on the requirements of society, the state and business, we reasonably conclude that highly qualified personnel of the digital economy should be ready to use software information processing tools (including gamification services) in their research and design developments. The most important in such training is the use of digital technologies in order to gain the necessary experience, to apply it in practice.

The proposed approach to include digital gamification resources is focused not just on the development of practical techniques, functional capabilities of game mechanics, computer game technologies, but on the definition of a methodologically sound scientific base.

The game world of educational purpose in the framework of the given research will be considered as a digital model for solving a problem-based educational problem built on the principles of game mechanics.

The synthesis of scientific and theoretical knowledge and the applied nature of the development of the game world for educational purposes will support a competitive digital school graduate under the conditions of uncertain future when they get oriented in promising innovative developments, acquire and effectively apply them while solving a wide range of tasks.

4.2. Educational and cognitive activities for the design and development of computer games for educational purposes

To form computational thinking skills by means of digital gamification resources, the HTML 5 language was chosen. Technically, it is not just a formalized way of writing an algorithm according to certain rules and syntax. Moreover, it is not just a set of commands, operators, and their values. Methodologically, it is an additional language that represents the content of the virtual space, which is intuitive, emotionally attractive to the user (the student of the generation Z). This content may include images, videos, animations, and communication tools. In practice, HTML 5 makes it possible to link the transmitted information for educational purposes with the channels of perception. As a result, there is a powerful didactic effect. Through the game activity of manipulating virtual objects, a student carries out educational and cognitive activities and receives skills that are in demand in the digital society of the present and future.

Figure 1 gives an example of an implemented gaming educational space focused on the development of computational thinking.

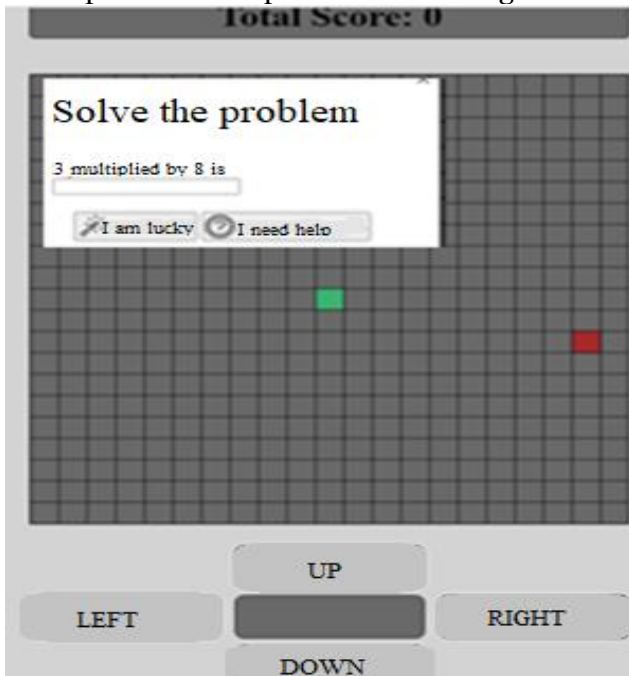


Fig. 1. Mathematical game for educational purposes

During the implementation, both didactic principles and game mechanics were taken into account.

1. Consistent material (splitting complex tasks into simpler ones without losing motivation to study a particular topic).

2. The principle of gradual complication. Students are involved while doing simple tasks. In order for the user to see progress while being in a dynamic state of thinking, it is necessary to gradually increase the complexity of tasks. Only in this case, educational, cognitive and mental activity, expressed through a sense of progress, will give pleasure, involve in the game educational space. At the same time, the number of simple tasks should be limited to avoid a quick loss of interest and make the students realize that they need to make efforts to achieve the desired goal. The latter can be not only ratings, points, awards, but also the social status, recognition in the group.

3. Puzzle type tasks which seem difficult at first glance, but suggest an obvious solution. The HTML and CSS code in this case can be publicly available, but the students need to choose the appropriate commands/operators to solve the puzzle. Most theoretical problems look differently and motivate the search, scientific discovery.

4. Instant feedback assuming that the student receives an immediate program response after running the code. This reaction can be implemented through the output of the result, receiving a message, a visual effect, etc. The principle implemented allows reducing the cost of error when writing code since the participant works in small iterations while completing the task. In addition, there is also the effect of professional orientation. Indeed, the student gets a practical experience similar to that of programmers. The skills of step-by-step program detailing, debugging and testing are formed. As for the methodological complexity, it should be noted that the student can spend a large amount of time when the problem solving method is already clear.

5. Storytelling game mechanics which involves combining a system of tasks with a common idea or scenario for educational purposes. For example, when studying the rules for calculating derivatives in a mathematics course, after completing all the levels and tests of the game world, participants receive a Reminder. As a result, complex theoretical material is supported by an emotionally attractive game situation (e.g., to save the world/girl and become a superhero).

6. The principle of awarding points, changing the rating to increase the status in the game space. All the researchers on the problem of education gamification previously mentioned necessarily note this condition. The desired didactic effect is achieved only when it is performed.

7. Open Profiles game mechanics which allows community members to view other students' the profiles. Such access makes it possible to maintain competitiveness, compare achievements, motivate and encourage new knowledge.

Thus, the given system of actions for the development of a game educational space allows forming computational skills, gaining experience in project research activities; using theory to solve applied problems; simulating work in popular professions. Therefore, a digital school graduate becomes competitive and as prepared as possible for the challenges and uncertainties of the future.

The use of HTML 5 in the design and development of the game educational space not only corresponds to the priorities of digital technologies, but also convincingly shows the didactic potential of game mechanics, for the formation of computational thinking in particular.

The obtained conclusions about the didactic potential of digital gamification resources in terms of improving the quality of learning and the formation of computational thinking are confirmed by M. M. Klunnikova (Klunnikova, 2019). The significant result of the research is the description of the basic ideas of the approach that expand the ideas of J.C. Paiva, J.P. Leal, and R. Queirós (Paiva et al., 2020 Paiva et al., 2020) about the possibilities of languages and programming tools in the development of such thought processes as decomposition, abstraction, pattern extraction, and algorithm development.

4.3. Experimental evaluation

4.3.1. The ascertaining stage of the experiment

At the first stage of the experiment, the materials of the special test were used to assess the input conditions taking into account the priorities of the digital society, the competencies of the atlas of new professions. All questions and tasks were developed by the authors in accordance with the requirements of the State Federal Educational Standard. In the test, students were asked to solve 5 problems. If the student solved each problem correctly and completely, they received 3 points.

1. During the distance learning period, student N. completed a task on mathematical logic and sent it to the teacher for verification. After some time, the teacher sent a response letter which said that some lines in the sent document took the wrong place and the table was incomplete. To the great misfortune of student N., the file with the completed task was not saved on his computer. The task is to help the student recover the information so that they do not have to complete the task again. In the answer, you should write down the letters x, y, z, w in the order corresponding to the columns.

2. Vasya N. is going to visit the buildings of the Vyatka State University. When moving, he leaves a trace in the form of a straight line. The actor has a fixed set of commands (with their description). Vasya N. is next to building 1 (at the origin). Vasya N. is given the following algorithm: to move by vector (5,2); to move by vector (-3, 3); to repeat 3 [to move by vector (1,0)]; to move by vector (3, 1). At what distance from building 1 will Vasya N be after performing this algorithm?

3. The cash register in the canteen of building 14 works according to the algorithm given below, where s is the number of purchased dishes, n is the number of apples that are attached to these dishes. The task is to determine at what the smallest number of dishes you can get 64 apples.

4. To store the bitmap image "Group PODB-5301-60-00", 128×320 pixels, 20 Kbytes of memory are given without taking into account the size of the file header. The same number of bits is used to encode the color of each pixel, and the pixel codes are written to the file one by one without gaps. What is the maximum number of colors you can use in the image?

5. Using the text editor, determine how many times, not counting footnotes, the word "must" or "Must" occurs in the text of the Federal State Educational Standard of basic general education. Other forms of the word "must" should not be taken into account. In the answer, specify only the number.

The maximum possible number of points was 15. If the student received more than 13 points, the level of the skills under study was defined as "high"; the range from 6 to 12 (inclusive) corresponded to "average", according to the rest of the results, the "low" level was registered.

Thus, we managed to collect experimental data on 40 students, 01.03.02 training program, Applied Mathematics and Computer Science. As a result of the entrance control, almost the same initial level of readiness of students participating in the pedagogical experiment was revealed. We can consider them as a total sample of 40 people. Therefore, the experimental (20 students) and control (20 students) groups were formed. Describing the sample, it should be noted that the experimental group consists of 58 % of females and 42 % of males.

4.3.2. Forming stage of the experiment

At the forming stage of the experiment, the teacher analyzed the requirements of the digital economy for the training of students of engineering and technical areas. The provisions of the current State Federal Educational Standard determine that within the framework of general professional competencies a student must be able to consult and use fundamental knowledge in the field of computer science in professional activities; find, analyze, implement software and use mathematical algorithms in practice, including the use of modern digital technologies.

Taking into account the specified requirements for the level of computational thinking skills, the following levels were defined.

The "high" level implied that the student was independent in setting the problem, identifying objects, phenomena and relationships between them in the subject area of the research problem; compiled information, mathematical and computer models without errors; applied the method of step-by-step detailing when compiling the algorithm, performing the necessary analytical and synthetic operations; technically competent and rational approach to writing the algorithm in the software; critically evaluated the result and made appropriate adjustments to the solution model.

The "average" level was registered if the student could formulate the problem at the required level of abstraction, identify the modeling objects and their essential properties only with third-party help; made one or two non-critical errors in modeling; the technical implementation of the algorithm was not optimal, but led to a solution; could not always critically evaluate the result, but when indicating shortcomings, made appropriate adjustments to the model.

In all other cases, the level of computational thinking was defined as "low".

Further, in the control and experimental group, Game Theory classes were held, educational and work experience internship was organized to obtain professional skills.

The students of the experimental group were offered possible topics of projects for the development of game worlds for educational purposes (“Quest for Future Professions”, “Flying Dutchman”, “Journey to Netland”, etc.), from which they chose those that met their professional aspirations, cognitive interests, abilities, educational achievements. They started to implement the program after studying the relevant theoretical material not only on game theory, but also on the principles of didactics. Further, they studied the specifics of the HTML 5 language, the software implementation of algorithmic constructs. They were given one to two months to implement the concept/idea of the computer game for educational purposes.

For the control group, training was conducted in the traditional mode: the study of the basic concepts of game theory and constraints related to mathematical formalization; strategies and game mechanics. Further, the students solved classical problems (matrix and bimatrix games; cooperation in games with a discrete set of strategies, games with continuous strategies; Cournot, Bertrand, Stackelberg’ games, etc.). The tasks to compile information and computer models, to implement them using the programming language were completed. Analysis and discussion of the results were compulsory.

4.3.3. Control stage of the experiment

At the control stage of the experiment, a repeated measurement was carried out – a test paper including 5 tasks, each of which was evaluated by 3 maximum points. The level of the computational thinking was determined using the criteria mentioned above.

Statistical analysis of the reliability of the results of the pedagogical experiment was evaluated using Pearson’s χ^2 (chi-square).

Let us formulate the hypothesis:

Ho: after the internship in designing and developing computer games for educational purposes by means of gamification resources was included in students’ educational and cognitive activities, the level of the computational thinking skills remained unchanged.

H1: the level of the computational thinking skills has increased.

Table 1 contains the results of the measurement before and after the experiment for the students of the control and experimental groups.

We calculate the value of the criterion statistics before ($\chi^2_{ob.1}$) and after ($\chi^2_{ob.2}$) the experiment using the online resource <http://medstatistic.ru/calculators/calchit.html>. We choose the significance level $\alpha = 0.05$. In this case, $c = 3$, so the number of degrees of freedom $v = c - 1 = 2$. According to the distribution tables, χ^2 for $v = 2$ and $\alpha = 0.05$ the critical value of the statistics is 5.99. Thus, we get: $\chi^2_{ob.1} < \chi^2_{crit}$ ($2.63 < 5.99$), a $\chi^2_{ob.2} > \chi^2_{crit}$ ($7.14 > 5.99$).

Table 1. The results of the test

Level	The number of tested (people)			
	Experimental group (20 students)		Control group (20 students)	
	Before	After	Before	After
High	1	6	1	1
Average	7	13	12	13
Low	12	1	7	6

According to the decision-making rule, this means that before the experiment, the hypothesis Ho is true, and after the experiment, the hypothesis H1 is true. Therefore, Ho is rejected and the hypothesis H1 is accepted. In other words, designing gaming educational space by means of digital gamification resources has contributed to the development of computational thinking.

5. Discussion

The sample of students was not probabilistic since the experimental and control groups were formed in such a way that each group had the same skills and personality qualities which form the basis of computational thinking, and their equal distribution. For diagnostics, the results of the input control were taken into account. The selection of participants for the experiment and the sample size are justified by the specifics of the research: the study of game theory, the principles of

gamification and their implementation by means of digital technologies is included in the training program for a limited number of specialties. Throughout the experiment, the work on the design and development of the game educational space using HTML 5 was carried out by the same teacher, on the same software in special classrooms. During the implementation, both didactic principles and game mechanics were taken into account.

In general, the dynamics of the values by level indicates a qualitative improvement in the learning indicators and the formation of the monitored personality qualities in the experimental group (see Figure 2).

Performing a quantitative analysis of the given results, we can conclude that after the experiment was completed, 33 % of the students in the experimental group had a high level of skills that form the basis of computational thinking, while initially this percentage was 13 %. The share of students, the level of computational thinking, which was initially determined to be low, qualitatively decreased from 62 % to 20 %. It can be stated that the majority of such participants are those respondents who initially had an average level, i.e., they made mistakes in analytical work, at the decision-making level, writing code, and evaluating the result.

The dynamics of changes in the control group is less significant. Thus, only 20 % of the control group students at the control stage of the experiment had a high level of computational thinking skills. Initially, this percentage was 15 %. The share of students, the level of computational thinking, which was initially determined to be low, qualitatively decreased from 58 % to 44 %.

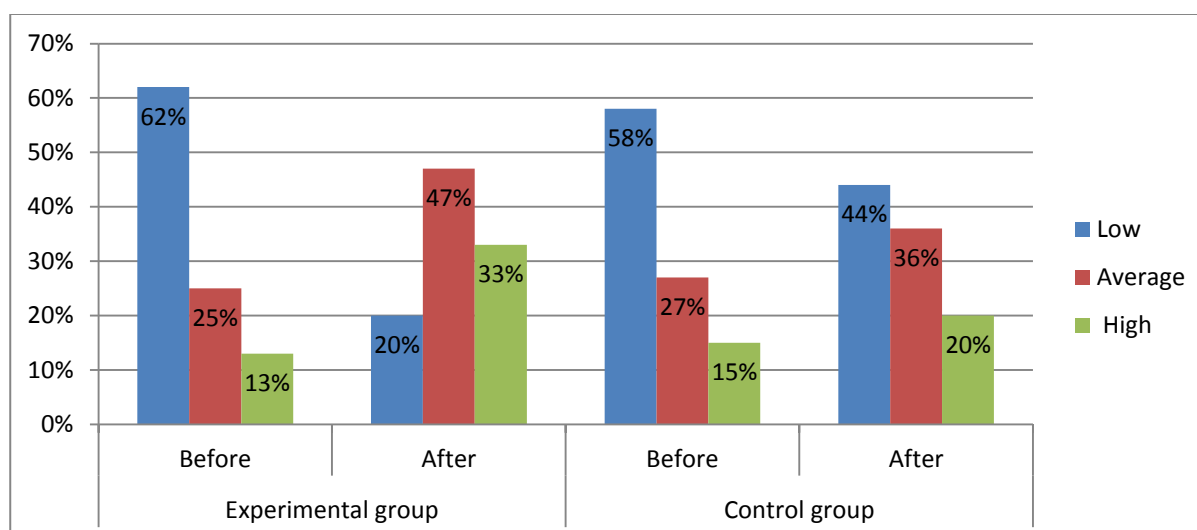


Fig. 2. Dynamics of changes in the level

Thus, the described system of actions for the development of game educational space allows forming computational skills, gaining experience in project research activities; using theory to solve applied problems; simulating work in popular professions. Therefore, a digital school graduate becomes competitive and as prepared as possible for the challenges and uncertainties of the future.

6. Conclusion

The study presents the solution to the problem caused by the need to expand the goals of the education system, update the tools and methods based on digital technologies. The corresponding digital learning environment should facilitate the activation of a sequence of images from a person's memory, support the process of problem setting, and develop an effective solution algorithm. In order to form the appropriate computational thinking skills, the authors propose to include the internship in developing game educational spaces by means of digital gamification resources in the system of students' activities.

We described the sequence of game educational and cognitive actions which involves the experience of mathematical modeling, designing and creating one's own software product. Scientific and theoretical facts, mathematical laws and methods, logic, game theory, etc. as presented are the necessary fundamental basis for high-quality training of a competitive

professional of the future. Students activate their cognitive abilities, understand the fundamental scientific principles that constitute all digital technologies.

In the presented system of educational and cognitive activities for designing a virtual game world, it is important to obtain up-to-date information on advanced technological developments, digital tools and resources; their reasoned choice, effective application at a high technical level; analysis of the result obtained and its practical application.

Software and technical support is provided by the description of the work using the HTML 5 language. The effectiveness of the proposed approach is proved by the pedagogical experiment.

The paper summarizes the conditions that affect the formation of computational thinking: obtaining relevant scientific and theoretical facts, patterns, information on innovative methods and tools; their reasoned choice, effective implementation at a high technical level; analysis of the result and its practical application. Computational thinking uses a special method of problem formulation and applies principles such as abstraction, decomposition, generalization, and pattern recognition to solve the problem.

Thus, while designing and developing educational game projects, students gain computational thinking skills. They learn how to use computers to solve problems of an applied nature, make informed decisions with the help of digital resources. In the digital age, it is necessary to develop students' computational thinking since it is an important competence that determines success and professional personal fulfillment in the modern technological society.

References

- [Barr, Stephenson, 2011](#) – Barr, V., Stephenson, C. (2011). Bringing computational thinking to K-12: what is Involved and what is the role of the computer science education community? *ACM Inroads*. 2. DOI: 10.1145/1929887.1929905
- [Bocconi et al., 2018](#) – Bocconi, S., Chiocciariello, A., Earp, J. (2018). The Nordic approach to introducing computational thinking and programming in compulsory education. *Report prepared for the Nordic@BETT2018 Steering*. DOI: <https://doi.org/10.17471/54007>
- [Borissova et al., 2020](#) – Borissova, D., Keremedchiev, D., Tuparov, G. (2020). Multi-criteria model for questions selection in generating e-education tests involving gamification. *TEM Journal*. 9(2): 779-785. DOI: 10.18421/TEM92-47
- [Bovermann, Bastiaens, 2020](#) – Bovermann, K., Bastiaens, T.J. (2020). Towards a motivational design? Connecting gamification user types and online learning activities. *Research and Practice in Technology Enhanced Learning*. 15(1): 4-18. DOI: 10.1186/s41039-019-0121-4
- [Chevalier et al., 2020](#) – Chevalier, M., Giang, C., Piatti, A., Mondada, F. (2020). Fostering computational thinking through educational robotics: A model for creative computational problem solving. *International Journal of STEM Education*. 7(1): 1-18. DOI: 10.1186/s40594-020-00238-z
- [Cropley, 2020](#) – Cropley, A. (2020). Creativity-focused technology education in the age of Industry 4.0. *Creativity Research Journal*. 32(1): 1-8. DOI: 10.1080/10400419.2020.1751546
- [Finkel, 2017](#) – Finkel, A. (2017). Cognitive analysis, digital psychology and training of university teachers. *Pratiques Psychologiques*. 23(3): 303-323. DOI: 10.1016/j.prps.2017.05.006
- [Gruzdev et al., 2018](#) – Gruzdev, M.V., Kuznetsova, I.V., Tarkhanova, I.Yu., Kazakova, E.I. (2018) University Graduates' Soft Skills: The Employers' Opinion. *European Journal of Contemporary Education*, 7-4: 690-698. DOI: <https://doi.org/10.13187/ejced.2018.4.690> (date of access: 01.07.20)
- [Helmlinger et al., 2020](#) – Helmlinger, B., Sommer, M., Feldhammer-Kahr, M., Wood, G., Arendasy, M.E., Kober, S.E. (2020). Programming experience associated with neural efficiency during figural reasoning. *Scientific Reports*. 10(1): 13351. DOI: 10.1038/s41598-020-70360-z
- [Hotyat, 1952](#) – Hotyat, F. (1952). The weakness in mathematical thinking in adolescents. *Enfance; Psychologie, Pédagogie, Neuropsychiatrie, Sociologie*. 5(4): 273-300. DOI: 10.3406/enfan.1952.1247
- [Hsu et al., 2019](#) – Hsu, YC., Irie, N.R., Ching, YH. (2019). Computational Thinking Educational Policy Initiatives (CTEPI) Across the Globe. *TechTrends*. 63: 260-270. DOI: 10.1007/s11528-019-00384-4
- [Ilomäki, Lakkala, 2018](#) – Ilomäki, L., Lakkala, M. (2018). Digital technology and practices for school improvement: innovative digital school model. *Research and Practice in Technology Enhanced Learning*. 13: 25. DOI: <https://doi.org/10.1186/s41039-018-0094-8>

Isupova, Suvorova, 2018 – *Isupova, N.I., Suvorova, T.N.* (2018). Sozdanie sistemy uchebnykh situatsii s ispol'zovaniem tekstovogo labirinta [Creating a system of learning situations using text labyrinth]. *Informatika i obrazovanie*. 4: 37-41 [in Russian]

Karakozov, Ryzhova, 2019 – *Karakozov, S.D., Ryzhova, N.I.* (2019). Information and Education Systems in the Context of Digitalization of Education. *Journal of Siberian Federal University. Humanities & Social Sciences*. 12(9): 1635-1647. DOI: <https://doi.org/10.17516/1997-1370-0485>

Karavaev, Soboleva, 2017 – *Karavaev, N.L., Soboleva, E.V.* (2017). Analiz programmnykh servisov i platform, obladayushchikh potentsialom dlya geimifikatsii obucheniya [Analysis of software services and platforms that have the potential to gamify learning]. *Nauchno-metodicheskii elektronnyi zhurnal Kontsept*. 8. DOI: <http://doi.org/10.24422/mcito.2017.8.6960> [in Russian].

Khenner, 2016 – *Khenner, E.K.* (2016). Vychislitel'noe myshlenie [Computational Thinking]. *Obrazovanie i nauka*. 2(131). DOI: [10.17853/1994-5639-2016-2-18-33](https://doi.org/10.17853/1994-5639-2016-2-18-33) [in Russian]

Kholodnaya, Gelfman, 2016 – *Kholodnaya, M.A., Gelfman, E.G.* (2016). Development focused educational texts as a basis for learners' intellectual development in studying mathematics (DET technology). *Psychology in Russia: State of the Art*. 9(3): 24-37. DOI: <https://doi.org/10.11621/pir.2016.0302> (date of access: 10.01.2021).

Klunnikova, 2019 – *Klunnikova, M.M.* (2019). Metodika razvitiya vychislitel'nogo myshleniya studentov pri izuchenii kursa «Chislennye metody» na osnove smeshannogo obucheniya [Methods of developing students' computational thinking when studying Numerical methods course on the basis of mixed learning]. *Informatika i obrazovanie*. 6: 34-41. DOI: [10.32517/0234-0453-2019-34-6-34-41](https://doi.org/10.32517/0234-0453-2019-34-6-34-41) [in Russian]

Khutorskoy, 2017 – *Khutorskoy, A.V.* (2017). Metodologicheskie osnovaniya primeneniya kompetentnostnogo podhoda k proektirovaniyu obrazovaniya [Methodological basis for the use of competence-based approach to the design of education]. *Vysshee obrazovanie v Rossii*. 12(218): 85-91. [Electronic resource]. URL: <https://vovr.elpub.ru/jour/article/view/1228/1047> (date of access: 11.01.21). [in Russian]

Legaki et al., 2020 – *Legaki, N., Xi, N., Hamari, J., Karpouzis, K., Assimakopoulos, V.* (2020). The effect of challenge-based gamification on learning: An experiment in the context of statistics education. *International Journal of Human Computer Studies*. 144: 102496. DOI: [10.1016/j.ijhcs.2020.102496](https://doi.org/10.1016/j.ijhcs.2020.102496)

Leontiev et al., 2017 – *Leontiev, D.A., Lebedeva, A.A., Kostenko, V.Yu.* (2017). Traektorii lichnostnogo razvitiya: rekonstruktsiya vzglyadov L. S. Vygotskogo [Pathways of personality development: following Lev Vygotsky's guidelines]. *Voprosy Obrazovaniya*. 2: 98-112. DOI: [10.17323/1814-9545-2017-2-98-112](https://doi.org/10.17323/1814-9545-2017-2-98-112) [in Russian]

Paiva et al., 2020 – *Paiva, J.C., Leal, J.P., Queirós, R.* (2020). Fostering programming practice through games. *Information (Switzerland)*. 11(11): 1-20. DOI: [10.3390/info11110498](https://doi.org/10.3390/info11110498)

Papert, 1993 – *Papert, S.* (1993). *Mindstorms: children, computers, and powerful ideas*. New York: Basic Books, 230 p.

Papert, 1996 – *Papert, S.* (1996). An Exploration in the Space of Mathematics Educations. *International Journal of Computers for Mathematical Learning*. 1(1): 95-123. [Electronic resource]. URL: <http://papert.org/articles/AnExplorationintheSpaceofMathematicsEducations.html>

Paterson, 2017 – *Paterson, R.E.* (2017). Intuitive cognition and models of human–automaton interaction. *Human Factors: The Journal of the Human Factors and Ergonomics Society*. 59(1): 101-115. DOI: [10.1177/0018720816659796](https://doi.org/10.1177/0018720816659796)

Semenykhina, Rudenko, 2018 – *Semenykhina, O.V., Rudenko, Y.O.* (2018) Problems of educating to programming of students and way of their overcoming. *Information Technologies and Learning Tools*. 66(4): 54-64. DOI: [http://doi.org/10.33407/itlt.v66i4.2149](https://doi.org/10.33407/itlt.v66i4.2149)

Solodikhina, Solodikhina, 2019 – *Solodikhina, M.V., Solodikhina, A.A.* (2019). Razvitie kriticheskogo myshleniya magistrantov s pomoshch'yu stem-keisov [Development of critical thinking of master's degree students using stem cases]. *Obrazovanie i Nauka*. 21(3): 125-153. DOI: [10.17853/1994-5639-2019-3-125-153](https://doi.org/10.17853/1994-5639-2019-3-125-153) [in Russian]

Soboleva et al., 2020 – *Soboleva, E.V., Suvorova, T.N., Zenkina, S.V., Gerasimova, E.K.* (2020). Razvitie kriticheskogo myshleniya cherez vovlechenie uchashchikhsya v sorevnovatel'nyu robototekhniku (iz opyta raboty) [The development of critical thinking through the involvement of

pupils in competitive robotics (from work experience)]. *Perspektivy nauki i obrazovania – Perspectives of Science and Education*, 44(2): 268-284. DOI: 10.32744/pse.2020.2.21 [in Russian]

[Soboleva, Perevozchikova, 2019](#) – Soboleva, E.V., Perevozchikova, M.S. (2019). Osobennosti podgotovki budushchikh uchitelei k razrabotke i primeneniyu mobil'nykh igrovykh prilozhenii s obuchayushchim kontentom [Features of training future teachers to develop and use mobile gaming applications with educational content]. *Perspektivy nauki i obrazovania – Perspectives of Science and Education*. 41(5): 428-440. DOI: <http://dx.doi.org/10.32744/pse.2019.5.30> [in Russian]

[Strategiya razvitiya..., 2017](#) – Strategiya razvitiya informacionnogo obshchestva v Rossijskoj Federacii na 2017 – 2030 gody [Strategy of the Information Society Development in the Russian Federation for 2017 – 2030]. 2017. [Electronic resource]. URL: <http://www.kremlin.ru/acts/bank/41919>

[Varshavskaya, Kotyrlo, 2019](#) – Varshavskaya, E., Kotyrlo, E.S. (2019). Graduates in Engineering and Economics: Between Demand and Supply. *Voprosy Obrazovaniya*. 2: 98-128. DOI: <https://doi.org/10.17323/1814-9545-2019-2-98-128>

[Wing, 2017](#) – Wing, J.M. (2017). Computational thinking's influence on research and education for all. *Italian Journal of Educational Technology*. 25(2): 7-14. DOI: 10.17471/2499-4324/922

[Yung et al., 2020](#) – Yung, O.C., Junaini, S.N., Kamal, A.A., Md Ibharim, L.F. (2020). I slash 100%: Gamification of mathematics with hybrid QR-based card game. *Indonesian Journal of Electrical Engineering and Computer Science*. 20(3): 1453-1459. DOI: 10.11591/ijeecs.v20.i3.pp1453-1459



Copyright © 2021 by Academic Publishing
House Researcher s.r.o.
All rights reserved.
Published in the Slovak Republic
European Journal of Contemporary Education
E-ISSN 2305-6746
2021. 10(2): 476-484
DOI: 10.13187/ejced.2021.2.476
www.ejournal1.com

IMPORTANT NOTICE! Any copying, reproduction, distribution, republication (in whole or in part), or otherwise commercial use of this work in violation of the author(s) rights will be prosecuted in accordance with international law. The use of hyperlinks to the work will not be considered copyright infringement.



Examining the Relations among Extraversion, Neuroticism, and School Bullying among Lithuanian Adolescents

Ilona Tilindiene ^a, Saulius Sukys ^{a,*}, Aurelijus Zuoza ^a, Aleksandras Alekrinskis ^a

^a Lithuanian Sports University, Kaunas, Lithuania

Abstract

School bullying still remains an important concern. While there is growing knowledge about the nature, extent and effects of school bullying, we still lacking research on personality traits and involvement in bullying. This article seeks to examine the relations between personality traits (extraversion and neuroticism) and being involved in school bullying (as bully, victim, or bully-victim) among Lithuanian adolescents. We expected that higher scores on extraversion will be more positively related with adolescent bullying, as neuroticism will be more positively related with victimization. Additionally, we expected that both personality traits would predict adolescents' involvement in bullying (being bullies and victims). A sample of 766 adolescents (418 girls and 348 boys; ages between 13- and 15 years old) completed measures of extraversion and neuroticism, as well as measures of bullying in school. Results indicated that bullying in school remains a serious issue as more than half of adolescents' experience victimization and almost half of them were bullies themselves. Using logistic regression analyses, it was found that higher extraversion was positive predictor of being bullies, but not related with victimization. Higher neuroticism was positive predictor of victimization. The results reveal that both higher extraversion and neuroticism are positive predictors of being bully and victim. Taking together, the results added to scientific evidence that both personality traits could be predictors of adolescents' involvement in school bullying.

Keywords: school, extraversion, neuroticism, bullying, victimization, school violence, adolescent.

1. Introduction

A lot of attention has been paid to the psychosocial health of a person. A person with a good psychosocial health is capable of coping with life's difficulties and accepts oneself with both one's advantages and disadvantages, has good social skills, is interested in other people and has a good

* Corresponding author

E-mail addresses: saulius.sukys@lsu.lt (S. Sukys), ilona.tilindiene@lsu.lt (I. Tilindiene), aurelijus.zuoza@lsu.lt (A. Zuoza), aleksandras.alekrinskis@lsu.lt (A. Alekrinskis)

relationship with them as well as has the desire to achieve the best results in their activities (Martikainen et al., 2002; Segrin, Taylor, 2007; van Harmelen et al., 2017).

However, the problem of psychosocial health becomes very relevant when a person is exposed to an atmosphere of danger, stress that results from emotional and/or physical violence (Craig, Harel, 2004). Violence (including bullying) is deeply damaging to the psychosocial health of not only victims but also those who observe it. Research shows that the positions of a victim, or an abuser, or an observer are positively associated with a child's post-traumatic anxiety disorder, depression, rage, social isolation, and become a significant predictor of subsequent aggression (McDougall, Vaillancourt, 2015; Swearer, Hymel, 2015; Tfofi et al., 2012).

The problem of bullying in schools is observed in different countries of the world. This is confirmed by research in the USA (Lovegrove et al., 2012), Canada (Marini et al., 2006), Japan (Hilton et al., 2010), Spain (Cerezo, 2009), Sweden (Modin et al., 2015), Greece (Bibou-Nakou et al., 2014), Romania (Beldean-Galea et al., 2010) Germany (Scheithauer et al., 2006) and others. According to the Health Behaviour in School-Aged Children Study (Inchley et al., 2016), among the 40 European countries, Lithuania is the leader in schoolchildren's bullying, with results showing that 45-70 % of children of all ages are bullied.

When examining the psychology of aggressive behavior, it is important to note that individual personality traits play an important role in a child's adaptation to school, influence one's communication with peers, adults, and are associated with other psychological problems (Gendron et al., 2011; Hemphill et al., 2014; Sanson et al., 2004; Wang et al., 2009). For instance, most reserved, neurotic adolescents have been found to experience social anxiety and communication problems with peers, they also appear to have low social skills, low self-esteem and self-confidence, and, thus, often become subject to bullying and isolation (Houbre et al., 2006; Sanson et al., 2004).

A link was found between the child's personality traits and social functionality: their own perceptions of health, motivation, skills and communication quality – the children with considerable extraversion and self-regulation (control of attention, behavior, and emotions) may be characterized by increased resistance to psychological and social difficulties, positive emotionality, high academic achievement, high peer appreciation, and prosocial behavior (Sanson et al., 2004; Sanson et al., 2009; Sterry et al., 2010). Low levels of neuroticism and loneliness are associated with higher levels of a personality's stability and existential fullness (Hutchinson et al., 2010).

Previous research has been limited to studies on the relationship between bullying and various social factors (Hemphill et al., 2014; Marini et al., 2006), personality traits (Bjornebekk, 2007; Gendron et al., 2011; Simon et al., 2017), mental well-being (Mark et al., 2019) and health (Klomek et al., 2007; Modin et al., 2015). Moreover, results from studies focused on relation between such personality traits (i.e., extraversion and neuroticism) and bullying added insight on better understanding on personality factors and antisocial behavior, but at the same time some contradicting issues still remain. Specifically, some studies have found a positive weak relationship between extraversion and traditional bullying, but did not find significant relation between neuroticism and bullying (van Geel et al., 2017). Other research aimed to examine moderating roles of extraversion and neuroticism in victims of bullying (Calvete et al., 2016). Study results indicated a weak association between bullying victimization and social anxiety symptoms for adolescents with higher extraversion, but no interaction between neuroticism and bullying victimization was established. Contrary to aforementioned studies, De Angelis et al. (2016) study with adolescents found a direct effect of neuroticism and extraversion on bullying. Therefore, relation between neuroticism and bullying remains unclear, but effect of extraversion is also not so obvious. As meta-analytic review conducted by Mitsopoulou and Giovazolias (2015) revealed a positive relation between extraversion and bullying, but effect size was small. Given the available research, the link between bullying and personality traits should be further examined. Further studies are as important as previous ones focused on bullying (bullies) or victims, but there is a scarcity of research focused on bullies, victims and also involved in bullying (i.e., those, who are bullies and victims). Finally, culture factors are also important while analysing bullying behaviour (Volk et al., 2018). In this case, such studies with Lithuanian adolescents are particularly important as evidence revealed schoolchildren's bullying remaining a serious issue.

The current study aims to examine the relationship between personality traits and bullying in school among Lithuanian adolescents. We focused on extraversion and neuroticism. Regarding bullying, we focused on relationship between extraversion and neuroticism on adolescent

experiences being bullies, victims, and also being bullies and victims. We expected that higher scores on extraversion will be more positively related with adolescent bullying, as neuroticism will be more positively related with victimization. Finally, we hypothesized, that adolescent involvement in bullying (i.e., being bullied and bullying others) will be predicted by extraversion and neuroticism.

2. Materials and methods

2.1. Participants and Procedures

Secondary schools from different regions of Lithuania were invited to participate in the study about personality traits and bullying. Of 15 schools approached, 11 schools agreed to give permission to conduct survey. The sample consisted of 766 adolescents (418 girls and 348 boys) ranging in age from 13 to 15 years ($M = 13.95$, $SD = 0.81$). Prior data collection, written permission from parents was obtained. Only those students, whose parents gave permission were invited to study. At the beginning of the lessons students were informed about the aim of the study and that participation is voluntary and anonymous. The questionnaires were administered during the lessons under the supervision of one of the researchers. Students were debriefed after completion of the study and informed about possibilities to contact researchers for further questions related with the study. This study was approved by the University social research ethic committee.

2.2. Measures

Participants were asked to give information on demographics (gender, age), followed by questionnaires pertaining to bullying and personality traits (extraversion and neuroticism).

Bullying

Questionnaire developed by Jankauskiene et al. (2008) was used in this study. Questionnaire contains six questions related with victimization (e.g., “How many times within the last two months were you hurt physically, pushed, or touched by other students in order to humiliate you?”, “How many times within the last two months have lies about you been told in order to make others not associate with you?”), and six questions related with bullying (e.g., “How many times within the last two months have you called others names in order to humiliate them?”). In both cases, a five points scale (never, once per month, once per week, several times per week) was used. The reliability of this questionnaire have been reported to be good ($\alpha = .80$) (Jankauskiene et al., 2008). All participants were divided into groups of victims, bullies, and bully-victims. Students were categorized as victims if they admitted that they were bullies less than once per week or several times per week on one item or one time per month in four items. The opposite classification was used for categorization of bullies (for more details see Jankauskiene et al., 2008). The third group included those students who were classified both as bullies and victims. Therefore, three bullying binary variables were created: being a victim (0 = No, 1 = Yes), being a bully (0 = No, 1 = Yes), and being a bully and a victim (0 = No, 1 = Yes).

Extraversion and Neuroticism

Eysenck Personality Questionnaire (EPQ) developed by Eysenck and Eysenck (1975) was applied in this study. Specifically, two EPQ subscales, namely Neuroticism and Extraversion, were used. The Neuroticism (with 23 items) and Extraversion (with 21 items) subscales are scored either 1 or 0 assigned to either “yes” or “no” to a given question, were chosen. Extraversion measures the extent of an individual social interaction with other people. Neuroticism measures the extent of an individual’s emotional instability and an imbalance in neuropsychic processes. Both subscales have demonstrated adequate reliability ($\alpha = .80$ for Neuroticism, and $\alpha = .70$ for Extraversion) in previous studies (Baniene, Sinkariova, 2015).

2.3. Statistical Analyses

Data were analysed using the IBM SPSS Statistics version 23. Descriptive statistics (means and percentages) were performed. Chi-square test and One-Way ANOVA was used to compare differences of bullying and personal traits (neuroticism and extraversion) by gender and age. A logistic regression analysis was applied to estimate the effect of extraversion and neuroticism on bullying. More specifically, three separate logistic regression analysis were conducted separately for bullies, victim and bullies/victim. In each analysis first predictor variables of gender and age was included, next extraversion, and finally neuroticism. Extraversion and introversion were used as continuous variables. The odds ratios are presented with confidence intervals (CI) of 95 %. OR was considered as statistically significant if 1 did not fall in the CI.

3. Results

Overall, 48.0 % (n = 368) of adolescents were classified as bullies, 60.6 % (n = 464) as victims, and 37.9 % (n = 290) as bully-victims. Table 1 summarizes the prevalence of bullying behaviour by gender and age groups. When comparing distribution by gender among bullies, victims, and also bullies-victims, no statistically significant differences were found. Comparison by age groups showed that being a victim decrease by age ($\chi^2 = 7.67$, $p < 0.05$). Students of 13-year-old tended to become victims more often than older adolescents. However, statistically significant age differences among bullies and bully-victims were not established.

Table 1. Distribution of bullying by gender and age

Study variables		Bullies % (n)	χ^2	Victims % (n)	χ^2	Bully-victims % (n)	χ^2
Gender	Boys	50.0 (174)	0.98	62.6 (218)	1.14	40.2 (140)	1.52
	Girls	46.4 (194)		58.9 (246)		35.9 (150)	
Age	13-year-olds	48.5 (130)	0.89	67.2 (180)	7.67*	38.1 (102)	0.21
	14-year-olds	45.9 (122)		57.9 (154)		36.8 (98)	
	15-year-olds	50.0 (116)		56.0 (130)		38.8 (90)	

Note. * $p < .05$

It was found that the mean value for extraversion was 14.36 ($SD = 3.46$) and for neuroticism 11.57 ($SD = 4.65$). Comparing by gender it was found that value of extraversion was significantly higher among girls comparing to boys, $F(1,764) = 14.02$, $p < 0.001$, partial $\eta^2 = .02$ (Table 2). Moreover, value of neuroticism was also higher among girls than boys, $F(1,764) = 34.32$, $p < 0.001$, partial $\eta^2 = .04$. Comparing extraversion and neuroticism by age statistically significant differences were not found.

Table 2. Distribution of extraversion and neuroticism by gender and age

Study variables		Extraversion <i>M</i> (<i>SD</i>)	<i>F</i>	Neuroticism <i>M</i> (<i>SD</i>)	<i>F</i>
Gender	Boys	13.85 (3.41)	14.02***	10.52 (4.34)	34.32***
	Girls	14.75 (3.45)		12.46 (4.73)	
Age	13-year-olds	14.24 (3.88)	0.67	11.08 (4.79)	2.32
	14-year-olds	14.29 (3.25)		11.83 (4.65)	
	15-year-olds	14.58 (3.19)		11.85 (4.47)	

Note. *** $p < .001$. *M* = mean; *SD* = standard deviation.

Next we analysed effect of extraversion and neuroticism on bullying behaviour (separately for being bullies, victims, and bully-victims) (Table 3). In each analysis variables of gender and age were included. It was found that higher extraversion was positive predictor of being bullies. Also gender, specifically boys were more tended to be bullying others. This model was statistically significant ($\chi^2 = 16.25$, $p < 0.05$) and as a whole explained between 16.7 % (Cox and Snell R squared) and 19.8 % (Nagelkerke R squared) of the variance in being bullies and correctly classified 58 % of cases.

With victim as dependent variables, we found that neuroticism was significant predictor of being bullied (Table 3). Extraversion was not significantly related with victimization. Those with higher neuroticism were more likely became a victim of bullying. Being a boy and also younger of age associated with higher prevalence of being victimization. This model was statistically significant ($\chi^2 = 21.56$, $p < 0.01$) and as a whole explained between 15.7 % (Cox and Snell R squared) and 22.1 % (Nagelkerke R squared) of the variance in being bullied and correctly classified 60 % of cases.

Finally, it was found that both personality traits were significantly associated with being bully-victims (Table 3). This suggests that both higher extraversion and neuroticism are positive predictors of involvement in bullying, together with gender as boy more often likely to be bully-victims. This model was statistically significant ($\chi^2 = 15.91$, $p < 0.01$) and as a whole explained between 13.2 % (Cox and Snell R squared) and 19.8 % (Nagelkerke R squared) of the variance in being bullied and correctly classified 62 % of cases.

Table 3. Prediction of involvement in bullying by social-demographics and extraversion and neuroticism

Study variables	Bullies	Victims	Bully-victims
	OR [CI 95 %]	OR [CI 95 %]	OR [CI 95 %]
Gender ^a	1.47 [1.08; 2.01]*	1.37 [1.01; 1.86]*	1.51 [1.11; 2.07]**
Age	0.99 [0.83; 1.20]	0.76 [0.63; 0.91]***	0.98 [0.82; 1.18]
Extraversion	1.19 [1.13; 1.24]***	0.98 [0.94; 1.02]	1.09 [1.05; 1.14]***
Neuroticism	1.04 [1.01; 1.07]*	1.09 [1.06; 1.13]***	1.07 [1.04; 1.11]***

Note: OR, odds ratio; CI, confidence interval. * $p < .05$, ** $p < .01$, *** $p < .001$.

^a 0 – girl

4. Discussion

The survey found that half of the adolescents bully other schoolchildren and approximately 61 % of them claimed that they were bullied at school themselves. More than a third of adolescent bully others and at the same time have been bullied by their peers. These high rates of bullying among adolescents have been confirmed by numerous studies around the world, and three groups can be distinguished: those who bully others (bullies, abusers), those who are bullied (victims) and those who are both aggressors and victims (Craig, Harel, 2004; Farmer et al., 2010; Gendron et al., 2011; Hamarus, Kaikkonen, 2008; Modin et al., 2015; Mark et al., 2019).

Gender comparisons did not show statistical differences in our study, which is in contrast to studies showing that boys initiate bullying more frequently than girls do and that this is most often the case with physical bullying (Foster et al., 2019). Boys are determined to use violence in order to resolve conflict or to demonstrate the superiority of their physical strength in maintaining social status (Espelage, Swearer, 2003). De Bruyn et al. (2010) found correlations between social anxiety, peer perception, and increased victimization of bullying since the 5-6th years of age. These processes intensify in early adolescence, followed by a downward trend, which also emerged in our study.

The results showed significant links among extraversion expression scores by gender – higher scores found in adolescent girls than in boys. In addition, girls have a higher neuroticism score compared to boys. These data confirm the results of research showing that girls are more open and active than their male counterparts, they like school more, they achieve higher academic achievement, but at the same time they are under more pressure at school and in a family – teachers, peers, and parents (Låftman, Modin, 2011; Mpofu et al., 2010). For example, girls, unlike boys, often remain in an aggressive relationship with an aggressor or continue to be bullied to avoid the risk of social isolation (Simmons, 2010), which can increase neuroticism.

Gender, extraversion, and neuroticism have been found to be predictors of bullying initiation – the gender aspect, in this case, male gender – double the likelihood of bullying from others. We also determined that increases in extraversion and neuroticism enhance the likelihood of bullying initiation. This fact suggests that extraversion contributes to the initiation of bullying

among adolescents, as extroverts exhibit increased activity and this often leads them to behave recklessly, ignoring the potential for serious consequences or the threat of punishment (Bjornebekk, 2007). Connolly and O'More (2003) also found that aggressors exhibited higher levels of psychoticism, extraversion, and neuroticism than those who did not participate in bullying and, on the other hand, being victimized was positively related to emotionality and negatively to extraversion (Pronk et al., 2021).

The analysis showed that the gender dimension, namely being a boy, doubles the likelihood of being bullied. This does not support the results of other studies where gender differences in victimization have not been identified (Arıcak, 2009; Faris, Felmlee, 2011). Our findings that increased neuroticism increases the likelihood of bullying are supported by other studies (Dracic, 2009; Sanson et al., 2004), which indicate that in stressful situations, emotional instability of the child can lead to uncontrolled expression of behavior, meaning that in bullying situations, uncontrolled emotions or reactions are factors that increase the risk of victimization. Cook et al.'s findings (2010) confirm the tendencies that have emerged over the last 20 years that there is a significant relationship between personality traits and bullying victimization.

Gender (boys), extraversion, and neuroticism were found to predict the likelihood of bullying (initiation and victimization). At the beginning of the study we expected a positive relation between extraversion and adolescents' bullying. Accordingly, several studies showed that children with weaker psychosomatic health become aggressors or victims (or both) (Dracic, 2009; Hamarus, Kaikkonen, 2008; Modin et al., 2015). Studies analyzing the negative effects of bullying on mental health and personality behavior found that bullied children often suffer from depression and suicidal thinking (Klomek et al., 2007; Klomek et al., 2011). On the other hand, bullying alone increases the anxiety and aggressiveness of children. Thus, bullied victims themselves "turn into" aggressors. As we expected, the current study revealed, that victimization is positively related with higher scores on neuroticism. Additionally, findings extend previous studies on personality traits and bullying behavior by shedding light on how important are both extraversion and neuroticism in predicting adolescents' involvement in bullying.

The current study is not without limitation. The primary limitation of the current study is that only self-report questionnaires were included to measure the variables of interest. Also cross-sectional nature of the study does not allow for definitive conclusions about causality. Future studies should also include other data collection techniques, i.e., qualitative interviews for better understanding of students' involvement in bullying behaviour. Finally, the regression effects of extraversion and neuroticism were small, and thus some caution should be placed on related conclusions. Nonetheless, the current study adds to a growing body of literature that demonstrates that personality traits are predictors of antisocial behaviour. By continuing studies, it would be important to focus on how personality traits are related not only with traditional bullying, but cyberbullying. As recent studies found that such personality trait as sadism was related to cyberbullying (van Geel et al., 2017). As culture can be an important factor analyzing relations between personality traits and bullying behavior (Volk et al., 2018), cross-cultural studies remain to be important as well.

5. Conclusion

We examined the relationship between extraversion and neuroticism, and bullying in school among Lithuanian adolescents. We found that extraversion was more than neuroticism related with bullying, as neuroticism emerged as significant predictor of victimization. Our results also add that both personality traits significantly predict being involved in bullying. This study also showed, that bullying in school still remains a serious issue as more than half of adolescents' experience victimization and almost half of them were bullies themselves.

References

- Arıcak, 2009 – Arıcak, O.T. (2009). Psychiatric symptomatology as a predictor of cyberbullying among university students. *Eğitim Araştırmaları-Eurasian Journal of Educational Research*. 34: 167-184.
- Baniėnė, Sinkariova, 2015 – Baniėnė, I., Sinkariova, L. (2015). Moterų, sergančių krūties vėžiu, asmenybės bruožų bei streso, susijusio su liga, įveikimo strategijų sąsajos su sveikata susijusia gyvenimo kokybe [Women with breast cancer personality traits and stress of caused

illness coping strategies coherency with health life quality]. *Health Sciences in Eastern Europe*. 25: 11-16. DOI: 10.5200/sm-hs.2015.042 [in Lithuanian]

[Beldean-Galea et al., 2010](#) – *Beldean-Galea, I.E., Jurcău, N., Țigan, S.I.* (2010). Frequency of bullying behaviors in secondary schools in Cluj-Napoca. *Applied Medical Informatics*. 27(4): 62-66.

[Bibou-Nakou et al., 2014](#) – *Bibou-Nakou, I., Asimopoulos, Ch., Hatzipemou, Th., Soumaki, E., Tsiantis, J.* (2014). Bullying in Greek secondary schools: prevalence and profile of bullying practices. *International Journal of Mental Health Promotion*. 16(1): 3-18.

[Bjornebekk, 2007](#) – *Bjornebekk, G.* (2007). Dispositions related to sensitivity in the neurological basis for activation of approach – avoidance motivation, antisocial attributes and individual differences in aggressive behavior. *Social Behavior and Personality: An international journal*. 35: 1251-1264. DOI: 10.2224/sbp.2007.35.9.1251

[Calvete et al., 2016](#) – *Calvete, E., Orue, I., Gamez-Guadix, M.* (2016). Do extraversion and neuroticism moderate the association between bullying victimization and internalizing symptoms? A three-wave longitudinal study. *Journal of School Psychology*. 56: 1-11. DOI: 10.1016/j.jsp.2016.02.003

[Cerezo, 2009](#) – *Cerezo, F.* (2009). Bullying: análisis de la situación en las aulas españolas [Analysing bullying in Spanish schools]. *International Journal of Psychology and Psychological Therapy*. 9(3): 367-378.

[Connolly, O'Moore, 2003](#) – *Connolly, I., O'Moore, M.* (2003). Personality and family relations of children who bully. *Personality and Individual Differences*. 35: 559-567.

[Cook et al., 2010](#) – *Cook, C.R., Williams, K.R., Guerra, N.G., Kim, T.E., Sadek, S.* (2010). Predictors of bullying and victimization in childhood and adolescence: A meta-analytic investigation. *School Psychology Quarterly*. 25: 65-83. DOI: 10.1037/a0020149

[Craig, Harel, 2004](#) – *Craig, W.M., Harel, Y.* (2004). Bullying, physical fighting and victimization. Health policy for children and adolescents. Young people's health in context. *Health Behavior in School Aged Children (HBSC) study: international report from the 2001/2002 survey*. 4: 133-144.

[De Angelis et al., 2016](#) – *De Angelis, G., Bacchini, D., Affuso, G.* (2016). The mediating role of domain judgement in the relation between the Big Five and bullying behaviours. *Personality and Individual Differences*. 90: 16-21. DOI: 10.1016/j.paid.2015.10.029

[De Bruyn et al., 2010](#) – *De Bruyn, E.H., Cillessen, A.H.N., Wissinck, I.B.* (2010). Associations of peer acceptance and perceived popularity with bullying and victimization in early adolescence. *The Journal of Early Adolescence*. 30: 543-566. DOI: 10.1177/0272431609340517

[Dracic, 2009](#) – *Dracic, S.* (2009). Bullying and peer victimization. *Materia Socio Medica*. 21(4): 216-219.

[Eysenck, Eysenck, 1975](#) – *Eysenck, H.J., Eysenck, S.B.G.* (1975). Manual of the Eysenck Personality Questionnaire (Junior and Adult). London: Hodder & Stroughton.

[Espelage, Swearer, 2003](#) – *Espelage, D.L., Swearer, S.M.* (2003). Research on school bullying and victimization: What have we learned and where do we go from here? *School Psychology Review*. 32(3): 365-383.

[Faris, Felmlee, 2011](#) – *Faris, R., Felmlee, D.* (2011). Status struggles: Network centrality and gender segregation in same- and cross-gender aggression. *American Sociological Review*. 76: 48-73. DOI: 10.1177/0003122410396196

[Farmer et al., 2010](#) – *Farmer, T.W., Petrin, R.A., Robertson, D.L., Fraser, M.W., Hall, C.M., Day, S.H., Dadisman, K.* (2010). Peer relations of bullies, bully-victims and victims: The two social worlds of bullying in second-grade classrooms. *The Elementary School Journal*. 110: 364-392. DOI: 10.1086/648983

[Foster et al., 2019](#) – *Forster, M., Gower, A.L., Gloppen, K., Sieving, R., Oliphant, J., Plowman, S., ... , McMorris, B.J.* (2019). Associations between dimensions of school engagement and bullying victimization and perpetration among middle school students. *School mental health*. 12: 296-307. DOI: 10.1007/s12310-019-09350-0

[Gendron et al., 2011](#) – *Gendron, B.P., Williams, K.R., Guerra, N.G.* (2011). An analysis of bullying among students within schools: Estimating the effects of individual normative beliefs, self-esteem, and school climate. *Journal of School Climate*. 10: 150-164. DOI: 10.1080/15388220.2010.539166

[Hamarus, Kaikkonen, 2008](#) – Hamarus, P., Kaikkonen, P. (2008). School bullying as a creator of pupil peer pressure. *Educational Research*. 50: 333-345. DOI: 10.1080/00131880802499779

[Hemphill et al., 2014](#) – Hemphill, S.A., Tollit, M., Herrenkohl, T.I. (2014). Protective factors against the impact of school bullying perpetration and victimization on young adult externalizing and internalizing problems. *Journal of School Violence*. 13: 125-145. DOI: 10.1080/15388220.2013.844072

[Hilton et al., 2010](#) – Hilton, J.M., Anngela-Cole, L., Wakita, J. (2010). A cross-cultural comparison of factors associated with school bullying in Japan and the United States. *Family Journal*. 18: 413-422. DOI: 10.1177/1066480710372919

[Houbre et al., 2006](#) – Houbre, B., Tarquinio, C., Thuillier, I., Hergott, F.E. (2006). Bullying among students and its consequences on health. *European Journal of Psychology of Education*. 21(2): 183-208.

[Hutchinson et al., 2010](#) – Hutchinson, A.M.K., Stuart, A.D., Pretorius, H.G. (2010). Biological contributions to well-being: The relationships among temperament, character strengths and resilience. *Journal of Industrial Psychology*. 36: 1-10. DOI: 10.4102/sajip.v36i2.844

[Inchley et al., 2016](#) – Inchley, J., Currie, D., Young, T., Samdal, O., Torsheim, T., Augustson, L., Barnekow, V. (2016). Growing up unequal: gender and socioeconomic differences in young people's health and well-being. *Health Behaviour in School-aged Children (HBSC) study: International report from the 2013/2014*, Health behaviour in school-aged children (HBSC) study: International Report from the 2013/2014 survey. *Health Policy for Children and Adolescents*. 7: 197-205.

[Jankauskiene et al., 2008](#) – Jankauskiene, R., Kardelis, K., Sukys, S., Kardeliene, L. (2008). Associations between school bullying and psychosocial factors. *Social Behavior and Personality: An international journal*. 36: 145-162. DOI: 10.2224/sbp.2008.36.2.145

[Klomek et al., 2011](#) – Klomek, A.B., Kleinman, M., Altschuler, E., Marrocco, F., Amakawa, L., Gould, M.S. (2011). High school bullying as a risk for later depression and suicidality. *Suicide and Life-Threatening Behavior*. 41: 501-516. DOI: 10.1111/j.1943-278X.2011.00046.x

[Klomek et al., 2007](#) – Klomek, A.B., Marrocco, G., Kleinman, M., Schonfeld, I., Gould, M. (2007). Bullying, depression and suicidality in adolescents. *Journal of American Academy of Child and Adolescent Psychiatry*. 46: 40-49. DOI: 10.1097/01.chi.0000242237.84925.18

[Låftman, Modin, 2011](#) – Låftman, B.S., Modin, B. (2011). School-performance indicators and subjective health complaints: Are there gender differences? *Sociology of Health and Illness*. 34: 608-625. DOI: 10.1111/j.1467-9566.2011.01395.x

[Lovegrove et al., 2012](#) – Lovegrove, P.J., Henry, K.L., Slater, M.D. (2012). Examination of the predictors of latent class typologies of bullying involvement among middle school students. *Journal of School Violence*. 11: 75-93. DOI: 10.1080/15388220.2011.631447

[Marini et al., 2006](#) – Marini, Z.A., Dane, A.V., Bosacki, S.L. (2006). Direct and indirect bully-victims: Differential psychosocial risk factors associated with adolescents involved in bullying and victimization. *Aggressive Behavior*. 32: 551-569. DOI: 10.1002/ab.20155

[Mark et al., 2019](#) – Mark, L., Värnik, A., Sisask, M. (2019). Who suffers most from being involved in bullying—bully, victim, or bully-victim? *Journal of School Health*. 89: 136-144. DOI: 10.1111/josh.12720

[Martikainen et al., 2002](#) – Martikainen, P., Bartley, M., Lahelma, E. (2002). Psychosocial determinants of health in social epidemiology. *International Journal of Epidemiology*. 31: 1091-1093. DOI: 10.1093/ije/31.6.1091

[McDougall, Vaillancourt, 2015](#) – McDougall, P., Vaillancourt, T. (2015). Long-term adult outcomes of peer victimization in childhood and adolescence. *American Psychologist*. 70: 300-310. DOI: 10.1037/a0039174

[Mitsopoulou, Giovazolias, 2015](#) – Mitsopoulou, E., Giovazolias, T. (2015). Personality traits, empathy and bullying behavior: A meta-analytic approach. *Aggression and Violent Behavior*. 21: 61-72. DOI: 10.1016/j.avb.2015.01.007

[Modin et al., 2015](#) – Modin, B., Låftman, S. B., Östberg, V. (2015). Bullying in context: An analysis of psychosomatic complaints among adolescents in Stockholm. *Journal of School Violence*. 14: 1-23. DOI: 10.1080/15388220.2014.928640

- [Mpofu et al., 2010](#) – Mpofu, E., Oakland, T., Gwirayi, P. (2010). Temperament styles in Zimbabwean early adolescents: a Rasch measurement model analysis. *South African Journal of Psychology*. 40: 44-53. DOI: 10.1177/008124631004000105
- [Pronk et al., 2021](#) – Pronk, J., Olthof, T., de Vries, R.E., Goossens, F.A. (2021). HEXACO personality correlates of adolescents' involvement in bullying situations. *Aggressive Behaviour*. 47: 320-331. DOI: 10.1002/ab.21947
- [Sanson et al., 2004](#) – Sanson, A., Hemphill, S.A., Smart, D. (2004). Connections between temperament and social development: A review. *Social Development*. 13: 142-170. DOI: 10.1046/j.1467-9507.2004.00261.x
- [Sanson et al., 2009](#) – Sanson, A., Smart, D., Prior, M., Toumbourou, J.W., Oberklaid, F. (2009). Associations between early childhood temperament clusters and later psychosocial adjustment. *Merrill-Palmer Quarterly*. 55: 26-54. DOI: 10.1353/mpq.0.0015
- [Scheithauer et al., 2006](#) – Scheithauer, H., Hayer, T., Petermann, F., Jugert, G. (2006). Physical, verbal, and relational forms of bullying among German students: age trends, gender differences, and correlates. *Aggressive Behavior*. 32: 261-275. DOI: 10.1002/ab.20128
- [Segrin, Taylor, 2007](#) – Segrin, C., Taylor, M. (2007). Positive interpersonal relationships mediate the association between social skills and psychological well-being. *Personality and Individual Differences*. 43: 637-646. DOI: 10.1016/j.paid.2007.01.017
- [Simon et al., 2017](#) – Simon, J.B., Nail, P.R., Swindle, T., Bihm, E.M., Joshi, K. (2017). Defensive egotism and self-esteem: A cross-cultural examination of the dynamics of bullying in middle school. *Self and Identity*. 16: 270-297. DOI: 10.1080/15298868.2016.1232660
- [Sterry et al., 2010](#) – Sterry, T.W., Reiter-Purtill, J., Gartstein, M.A., Gerhardt, C.A., Vannatta, K., Noll, R.B. (2010). Temperament and peer acceptance. The mediating role of social behavior. *Merrill-Palmer Quarterly*. 56: 189-219. DOI: 10.1353/mpq.0.0047
- [Swearer, Hymel, 2015](#) – Swearer, S.M., Hymel, S. (2015). Understanding the psychology of bullying: Moving toward a socialecological diathesis-stress model. *American Psychologist*. 70: 344-353. DOI: 10.1037/a0038929
- [Ttofi et al., 2012](#) – Ttofi, M.M., Farrington, D.P., Lösel, F. (2012). School bullying as a predictor of violence later in life: A systematic review and meta-analysis of prospective longitudinal studies. *Aggression and Violent Behavior*. 17: 405-418. DOI: 10.1016/j.avb.2012.05.002
- [van Geel et al., 2017](#) – van Geel, M., Goemans, A., Toprak, F., & Vedder, P. (2017). Which personality traits are related to traditional bullying and cyberbullying? A study with the Big Five, Dark Triad and sadism. *Personality and Individual Differences*. 106: 231-235. DOI: 10.1016/j.paid.2016.10.063
- [van Harmelen et al., 2017](#) – van Harmelen, A.L., Kievit, R.A., Ioannidis, K., Neufeld, S., Jones, P., B., Bullmore, E., ... & NSPN Consortium. (2017). Adolescent friendships predict later resilient functioning across psychosocial domains in a healthy community cohort. *Psychological Medicine*. 47: 2312-2322. DOI: 10.1017/S0033291717000836
- [Volk et al., 2018](#) – Volk, A.A., Schiralli, K., Xia, X., Zhao, J., Dane, A.V. (2018). Adolescent bullying and personality: A cross-cultural approach. *Personality and Individual Differences*. 125: 126-132. DOI: doi.org/10.1016/j.paid.2018.01.012
- [Wang et al., 2009](#) – Wang, J., Iannotti, R.J., Nansel, T.R. (2009). School bullying among adolescents in the United States: Physical, verbal, relational, and cyber. *Journal of Adolescent Health*. 45: 368-375. DOI: 10.1016/j.jadohealth.2009.03.021



Copyright © 2021 by Academic Publishing
House Researcher s.r.o.

All rights reserved.

Published in the Slovak Republic

European Journal of Contemporary Education

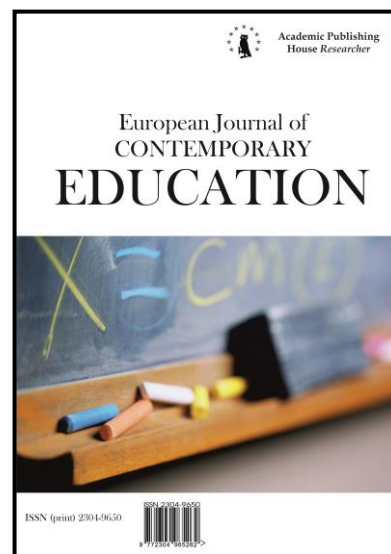
E-ISSN 2305-6746

2021. 10(2): 485-495

DOI: 10.13187/ejced.2021.2.485

www.ejournal1.com

IMPORTANT NOTICE! Any copying, reproduction, distribution, republication (in whole or in part), or otherwise commercial use of this work in violation of the author(s) rights will be prosecuted in accordance with international law. The use of hyperlinks to the work will not be considered copyright infringement.



Actual Problems of Students' Education with Disabilities at the University

Olga L. Voroshilova ^{a,*}, Olga V. Chernyshova ^b

^a Kursk Academy of State and Municipal Service, Kursk, Russian Federation

^b Southwestern State University, Kursk, Russian Federation

Abstract

Nowadays inclusive education is developing in Russian society. A great contribution to the study of the problem of teaching children and teenagers with disabilities was made by the following scientists: L.S. Vygotsky, L.P. Grigorieva, V.V. Davydov, A.I. Kaplan, A.N. Leontiev, A.V. Petrovsky, D.B. Elkonin, etc. Special conditions are created for the education of students with disabilities and with disabilities at the Southwest State University. The University has established a Center for Supporting Inclusive Education. In 2015, a program was developed to create an accessible environment for the disabled and low-mobility groups of the population at the university facilities. At the first stage, a pilot study was conducted, a survey of university teachers and students in order to identify the problems of teaching students with disabilities at the university. From 2018 to 2020, there was organized and conducted a research of the socio-psychological aspects of teaching students of four groups of Southwest State University, including those with disabilities. The aim of the study was to study the impact of a set of psychological and pedagogical measures for the development of social adaptation of students with disabilities and with disabilities on the psychological qualities and personal characteristics of young men and women. The conducted research revealed the following: students of gr. JR-81 «b» and gr. FL-81 «b» (experimental groups) have higher indicators of the development of sociability, communication skills, high educational motivation, more adequate self-esteem, professional inclinations than boys and girls gr. GO-81 «b» and gr. KF-81 «b» (control groups). The empirical data were processed using standard methods of mathematical statistics.

Keywords: socio-psychological aspects, students' education at the university, inclusive education, students with disabilities.

* Corresponding author

E-mail addresses: o_voroshilova@mail.ru (O.L. Voroshilova),
chernyshova_olga_70@mail.ru (O.V. Chernyshova)

1. Introduction

Nowadays there are a significant number of people with disabilities in our country, including children and young people. In 2020, the number of disabled people in Russia amounted to 11875 people ([Polozhenie invalidov, 2020](#)). According to Rosstat, there are about 670 thousand disabled children in our country ([Inklyuzivnoe obrazovanie, 2020](#)). So at the present time the problem of students' education with disabilities is relevant. Russian President V.V. Putin on 4 January 2021 gave a new order the Cabinet of Ministers: «Need to ensure the inclusion in the legislation of the Russian Federation of changes, in accordance with which the persons who have become disabled in working age and in need of getting a new profession (qualification) are guaranteed the opportunity to obtain a second secondary professional or higher education free of charge» ([Putin, 2021](#)).

Inclusive education is developing in Russian society. This is the process of «developing an extremely accessible education for each person, forming the learning process with the setting of adequate goals for all students, eliminating various barriers to the greatest support for each individual, and maximizing his potential» ([Grebennikova, 2015](#)). A great contribution to the study of the problem of teaching children and teenagers with disabilities was made by the following scientists: L.S. Vygotsky, L.P. Grigorieva, V.V. Davydov, A.I. Kaplan, A.N. Leontiev, A.V. Petrovsky, D.B. Elkonin, etc. Investigating the problem of the relationship between learning and mental development, Lev Semyonovich wrote: «This process should be considered not only as the formation of skills, but also as an intellectual activity aimed at identifying and transferring the structural principles found in solving one problem to a number of others» ([Vygotsky, 1934](#)).

Researches by N.A. Agadzhanian, O.F. Alekseeva, V.I. Karandashev, V.I. Krutov, S.M. Madorskaya, Yu.A. Samarin, E.I. Tretyakova, M.S. Yanitsky showed that students with disabilities need psychological support in solving problems of personal and professional self-determination, preservation and development of mental health. Professor N. A. Aghajanyan and his colleagues had been investigating the «problem of health, adaptation and stress of students at the university for many years» ([Aghajanyan, 2000](#)).

E. Yarskaya-Smirnova and P. Romanov conducted a research on the conditions of students' education in 2002–2003 and found that «most Russian universities are not provided with the necessary conditions for the education of disabled people. They relate to the architecture of buildings and classrooms, doorways and stairs, furniture and equipment, the arrangement of dining rooms, libraries and toilets, the lack of rest rooms and chairs in the corridors, medical offices» ([Yarskaya-Smirnova et al., 2003](#)).

O.A. Tarasova conducted a study of the problem of teaching disabled people at St. Petersburg State Polytechnic University in 2004. According to the author, the main «component of the technology of integration of persons with disabilities in the educational process of the university is distance learning, as one of the most important directions for improving the organization of the educational process for disabled students at the university» ([Tarasova, 2004](#)).

L.O. Rokotyanskaya conducted an experiment on the formation of sociality of students with disabilities in higher education. In the process of «training the formation of sociality of students with disabilities is subject to psychological and pedagogical features of their development (biological, physical defects and acquired injuries; psychological: lack of motivation, low level of aspiration, increased anxiety; social-pedagogical: the relationship in student staff, orientation plans, employment problems). The effectiveness of the implementation of the model for the formation of sociality of students with disabilities in higher education is provided by organizational and pedagogical conditions: organizational and functional and psychological and pedagogical» ([Rokotyanskaya, 2019](#)).

In 2015, a program was developed to create an accessible environment for the disabled and low-mobility groups of the population at the university facilities. It is planned to «gradually change the territory and all buildings of the Southern State University from 2016 to 2030» ([Usloviya polucheniya obrazovaniya..., 2020](#)). A developing social environment had been created for the effective implementation of educational activities at the university. To create it, the following measures were developed and implemented: the organization of the management system in the university on a democratic basis, the active development of student self-government, the formation of spiritual and moral values in the university by introducing all employees and students to high life goals and values, psychological and pedagogical support of the educational process in the

university (psychological education, counseling, diagnostics, etc.), the inclusion of educational groups of «students in developing social environments such as a social oasis, joint creative, scientific, research activities of teachers and students, the formation of a favorable psychological climate in educational groups and in the university as a whole» (Chernyshev, 1998).

In 2017, A.A. Belousova conducted a research on the features of psychological support for students with disabilities at the stage of adaptation to training on the basis of the Saratov National Research University named after N.G. Chernyshevsky. According to the author, «the purpose of the system of social and psychological support in the university is to ensure optimal professional and personal development of the student, successful integration into society, the development of effective life strategies (forms of purposeful organization of a person's own life, including his attitude to his own opportunities and resources, their actualization and implementation)» (Belousova, 2017).

2. Materials and methods

Psychological and pedagogical support of students' education is carried out in the process of students' education at the Southern State University. Psychological assistance is provided in solving actual problems of development, socialization, psychological support of educational programs, correction of personal development of students.

At the first stage, a pilot study was conducted, a survey of university teachers (100 hours) and students (150 hours) in order to identify the problems of teaching students with disabilities at the university. Several questions were asked to the students: 1) «Do you like studying at our university?»; 2) «What, in your opinion, should be done at the university to make it convenient for students with disabilities to study and stay at the university?»

From 2018 to 2020, there was organized and conducted a research of the socio-psychological aspects of teaching students of four groups of Southwest State University, including those with disabilities. The following methods were used: «Motivation of educational activity», the method «Value orientations», the method «Communicative and organizational abilities», «The method of self-attitude research» (S.R. Pantelev), «The Questionnaire of socio-psychological adaptation of K. Rogers and R. Diamond», the method «The Questionnaire of professional preferences» (D. Holland), the analysis of literary sources, the method of conversation, observation, analysis of university documentation (journal of academic performance, personal cards of students). The empirical data were processed using standard methods of mathematical statistics.

The hypothesis of the experiment was formulated: a set of psychological and pedagogical measures for the development of social adaptation of students with disabilities has a positive effect on the development of sociability, sociability, on the formation of educational motivation, on the success of educational activities, on the adequacy of self-esteem and the actualization of professional orientation.

The article analyzes one-dimensional and two-dimensional distributions of features, which allows obtaining the characteristics necessary for the correct formation of conclusions. When characterizing the relationships of the features under consideration, nonparametric statistical criteria are used, in particular, the Pearson's chi-square coefficient – χ^2 .

Two control groups (gr. GO-81 «b», gr. KF-81 «b») and two experimental groups (gr. JR-81 «b», gr. FL-81 «b») were selected. Each group has several students with disabilities. With students with disabilities gr. JR – 81 «b» and gr. FL- 81 «b» for three years a set of measures was taken to develop their social adaptation. In the middle of the school year, students were tested in the first, second and third years.

The number of students studied: gr. GO-81 «b» (24 human), gr. KF-81 «b» (18 human), gr. JR-81 «b» (23 human), FL-81 «b» (25 human). Total: 90 boys and girls, nine of them have limited health opportunities.

Group GO – students who are trained in the direction of training «Hotel service», group KF – students in the direction of training «Conflictology». Experimental groups: JR – students who are studying in the direction of training «Journalism», group FL – students in the direction of training «Fundamental and applied Linguistics».

3. Results

Four groups were explored: two experimental and two control groups. The results of the study showed that in the first year, students face problems in educational activities, a new point-rating system of training. Also, they must adapt to the new teaching staff, new teachers. At the end of the second year and at the beginning of the third year, there is an increase in academic performance, educational and professional self-assessments of students. Increasing educational and academic «requirements force them to engage in their professional development. Educational and cognitive motivation begins to dominate, and new forms of educational activity are being developed» (Voroshilova, 2019).

Due to the dominance of the level of emotional assessment of the experience of the disease by students with disabilities, there is a predominance of intrapsychic conflicts, a low level of integration of the image of «I». The emotional response to their illness in this group of students is often correlated with high levels of personal anxiety. «There is a development of destructive defensive forms of behavior (denial of reality, rationalization, regression, reactive formations)» (Belousova, 2017).

The study of students communicative and organizational abilities was conducted (Table 1).

Table 1. Results of the research of students communicative and organizational abilities

The level of development of communication and organizational skills	Students of gr. JR-81b	Students of gr. FL-81b	Students of gr. GO-81b	Students of gr. KF-81b
2018				
High level of development of communication and organizational skills	13,1 %	14,4 %	10,1 %	11,2 %
Average level of development of communication and organizational skills	56,6 %	55,7 %	51,5 %	50,7 %
Low level of development of communication and organizational skills	30,3 %	29,9 %	30,7 %	31,5 %
2019				
High level of development of communication and organizational skills	21,2 %	20,7 %	11 %	12,2 %
Average level of development of communication and organizational skills	56,5 %	57,8 %	59,8 %	59,1 %
Low level of development of communication and organizational skills	22,3 %	21,5 %	29,2 %	28,7 %
2020				
High level of development of communication and organizational skills	25,5 %	23,3 %	11,8 %	17,4 %
Average level of development of communication and organizational skills	60,7 %	64,6 %	51,5 %	56,7 %
Low level of development of communication and organizational skills	13,8 %	12,1 %	21,7 %	25,9 %

Research of first-year students showed the following results: gr. JR-81 «b» (56.6 %) and FL-81 «b» (55.7 %) have an average level of communication and organizational skills. Some

students gr. JR-81 «b» (13.1 %) and gr. FL-81 «b» (14.4 %) have a high level of communication and organizational skills. These abilities are poorly developed in 30.3 % of boys and girls gr. JR-81 «b» and 29.9 % gr. FL-81 «b».

The first-year students of gr. KF-81 «b» and gr. GO-81 «b»: the average level of communicative and organizational skills was found in 50.7 % and 51.5 %, respectively. Some students gr. KF-81 «b» (11.2 %) and gr. GO-81 «b» (10.1 %) have a high level of communication and organizational skills. A low level of these abilities in 31.5 % of boys and girls gr. KF-81 «b» and 30.7 % gr. GO-81 «b».

In the process of studying the communicative and organizational abilities of third-year students, the following results were obtained:

- most of the students gr. JR-81 «b» and gr. FL-81 «b» have an average level of communicative and organizational skills (60.7 % and 64.6 % respectively), 25.5 % of students gr. JR-81 «b» and 23.3 % were gr. FL-81 «b» have a high level of development of these abilities, and 13.8 % and 12.1 %, respectively – have a low level of sociability and interpersonal skills;

- the majority of young men and women of gr. GO-81 «b» and gr. KF-81 «b» have an average level of development of communicative and organizational abilities (50.7 %), 35.9 % of students have a low level of sociability, 13.4 % – a high level of the above qualities.

The study of the indicators of communicative and organizational abilities of third-year students using the χ^2 criterion showed that there are significant statistically significant differences between the level of communicative and organizational abilities of gr. JR-81 «b» and gr. KF-81 «b» ($\chi_1^2 = 8.68$; $p < 0.05$), between the level of communicative and organizational abilities gr. FL-81 «b» and gr. GO-81 «b» ($\chi_1^2 = 9.12$; $p < 0.05$).

So, students of gr. JR-81 «b» and gr. FL-81 «b» have higher indicators of the development of sociability and sociability than students of gr. GO-81 «b» and gr. KF-81 «b».

A research of self-assessment of students of two groups was conducted (Table 2).

Table 2. Results of the student self-assessment research

The level of self-esteem formation	Students of gr. JR-81b	Students of gr. FL-81b	Students of gr. KF-81b	Students of gr. GO-81b
	2018			
Inflated level of self-esteem	19,2 %	18,4 %	19,8 %	20,1 %
Adequate level of self-esteem development	61,9 %	62,5 %	62,1 %	60,3 %
Low level of self-esteem	18,9 %	19,1 %	18,1 %	19,6 %
	2019			
Inflated level of self-esteem	11,3 %	14,3 %	13,6 %	15,9 %
Adequate level of self-esteem development	75,1 %	68 %	69,4 %	66 %
Low level of self-esteem	13,6 %	17,7 %	17 %	18,1 %
	2020			
Inflated level of self-esteem	9,9 %	8,4 %	12,1 %	14,3 %
Adequate level of self-esteem development	81,7 %	79,7 %	70,8 %	69,9 %
Low level of self-esteem	8,4 %	11,9 %	17,2 %	15,8 %

According to the study, a larger number of first-year students have adequate self-esteem: 61.9 % of students gr. JR-81 «b», 62.5 % of boys and girls gr. FL-81 «b», 19.2 % and 18.4 %, respectively, have an overestimated self-esteem, 18.9 % and 19.1 % have a low self-esteem. Most of the first year students gr. KF-81 «b» (62.1%) and gr. GO-81 «b» (60.3 %) have adequate self-esteem, 19.8 % of students gr. KF-81 «b» and 20.1 % – gr. GO-81 «b» revealed an overestimated self-esteem, 18.1 % and 19.6 %, respectively, have an underestimated self-esteem.

As a result of the research of students, the following results were obtained:

- a significant number of third-year students of gr. JR-81 «b» have adequate self-esteem (81.7 %), a small number of boys and girls have high self-esteem (9.9 %) and low self-esteem (8.4 %),

- most of the students of the gr. FL-81 «b» have an adequate self-esteem (79.7 %), 8.4 % of students have an overestimated self-esteem, 11.9 % - have an underestimated self-esteem;

- the majority of boys and girls of the grades gr. KF-81 «b» and gr. GO- 81 «b» have adequate self-esteem (70.8 % and 69.9 %, respectively), some students have high self-esteem (12.1 % and 14.3 %, respectively) and low self-esteem (17.2 % and 15.8 %, respectively).

Therefore, students of gr. JR-81 «b» and gr. FL-81 «b» have more adequate self-esteem than students of gr. GO-81 «b» and gr. KF-81 «b».

The study of self-esteem indicators of third-year students using the χ^2 criterion showed that there are statistically significant differences between self-esteem of gr. JR-81 «b» and gr. KF-81 «b» ($\chi_1^2 = 6.97$; $p < 0.05$), self-esteem gr. FL-81 «b» and gr. GO-81 «b» ($\chi_2^2 = 7.23$; $p < 0.05$).

The dominant cognitive motivations of 3rd year students are: «I study because I want to know more» (62 %) and «I study because I'm interested» (63.4 %). Among the social motives of teaching, the first rank was taken by the statement «I study because it will be easier to get a job» (73.4 %), 19.2 % of respondents indicated the motive – «I study because now everyone is learning» (a social motive, the desire to imitate others). A «study of the educational motivation of first-year students showed that only 22.3 % of students strive for self-education» (Voroshilova, 2019).

A research on the socio-psychological adaptation of students was conducted by using the «Questionnaire of socio-psychological adaptation of K. Rogers and R. Diamond (Table 3).

Table 3. Results of the research of socio-psychological adaptation of students

Indicators of adaptation	Students of gr. JR-81b	Students of gr. FL-81b	Students of gr. KF-81b	Students of gr. GO-81b
2018				
Adaptation	31,1 %	29,3 %	21,5 %	19,9 %
The adoption of other	51,3 %	48,9 %	50,6 %	42,5 %
Internality	50,2 %	52,6 %	51,1 %	49,8 %
Self-perception	50,9 %	49,6 %	48,6 %	42,8 %
Emotional comfort	30,6 %	28,8 %	20,9 %	19,1 %
Striving for dominance	41,1 %	40,9 %	39,8 %	36,7 %
2019				
Adaptation	60,2 %	61,4 %	59,8 %	48,9 %
The adoption of other	61,9 %	60,1 %	59,6 %	49,6 %
Internality	51,4 %	52 %	51,3 %	50,2 %
Self-perception	52,8 %	50,4 %	49,9 %	49,3 %
Emotional comfort	58,9 %	56,7 %	55,6 %	44,5 %
Striving for dominance	45,2 %	46,5 %	41,3 %	40,2 %
2020				
Adaptation	79 %	80,1 %	68 %	61 %
The adoption of other	70,8 %	70,3 %	68 %	60,9 %
Internality	68 %	69 %	62 %	51 %
Self-perception	72 %	71 %	69,7 %	59,8 %
Emotional comfort	73 %	72 %	69 %	57,6 %
Striving for dominance	49 %	50,1 %	49,9 %	46,1 %

The results of the research showed that by the third year, boys and girls are better adapted to the educational process. The adaptation rates of third-year students of gr. JR-81 «b» and gr. FL-81 «b» significantly increased (79 % and 80.1 %, respectively) compared to the first year of study (31.1 % and 29.3 %, respectively). Emotional comfort increases among students from the first to the third year: gr. JR-81 «b» (from 30.6 % to 73 %), gr. FL-81 «b» (from 28.8 % to 72 %).

Lower adaptation rates were found in the third-year students of the group KF-81 «b» and the group GO-81 «b» (68 % and 61 %, respectively). In the first year students of these groups had adaptation values: 21.5 % (gr. KF-81 «b») and 19.9 % (gr. GO-81 «b»). The educational environment has a beneficial effect on the emotional comfort of students. The results of the study

revealed an increase in this characteristic among students of gr. KF-81 b (from 20.9 % to 69 %) and gr. GO-81 b (from 19.1 % to 57.6 %).

The study of the indicators of adaptation of third-year students to the educational process using the χ^2 criterion showed that there are significant statistically significant differences between the adaptation indicators of gr. JR-81 «b» and gr. KF-81 «b» ($\chi_1^2 = 10.15$; $p < 0.05$), the adaptation indicators of gr. FL-81 «b» and gr. GO-81 «b» ($\chi_2^2 = 8.11$; $p < 0.05$).

The research of educational motivation was conducted by using the questionnaire «Motives of educational activity», the methodology «Ability to learn» for three years. Changes in cognitive motivation were revealed when comparing the values of third-year and first-year students. In the third year, learning motivation increases, and new forms of learning activities are mastered. The social adaptation of young men and women to the new educational environment, the curriculum at the university, has a positive effect on educational motivation. According to the study, in the first year of Russian universities, as a rule, from 3 % to 5 % of students are expelled.

To study the impact of psychological and pedagogical support on academic performance, a study was conducted through the study of documents (journals of academic performance (Table 4).

Table 4. Results of the research of academic performance

Academic performance	Students of gr. JR-81b	Students of gr. FL-81b	Students of gr. KF-81b	Students of gr. GO-81b
	2018			
Learn «perfectly»	16 %	15,1 %	15,7 %	13 %
Learn «well»	72 %	71,5 %	71,4 %	72,4 %
Learn «satisfactorily»	12 %	13,4 %	12,9 %	14,6 %
	2019			
Learn «perfectly»	17,7 %	16,3 %	16 %	14,3 %
Learn «well»	70,4 %	70,7 %	70,9 %	71,6 %
Learn «satisfactorily»	11,9 %	13 %	13,1 %	14,1 %
	2020			
Learn «perfectly»	21 %	20,3 %	19,8 %	16 %
Learn «well»	67,8 %	67,3 %	65,9 %	70,4 %
Learn «satisfactorily»	11,2 %	12,4 %	14,3 %	13,6 %

A significant number of third-year students of gr. JR-81 «b» and gr. FL-81 «b» study well (67.8 % and 67.3 %, respectively), 21 % and 20.3 % of respondents, respectively, study perfectly, some of them (11.2 % and 12.4 %) have grades «satisfactory». The study revealed an increase in the educational performance of the respondents. In the first year there were significantly lower indicators: gr. JR-81 «b»: 16 % studied «excellent», 72 % – «good», gr. FL-81 «b»: 15.1 % studied «excellent», 71.5 % – «good».

A smaller number of third-year students of gr. KF-81 «b» and gr. GO-81 «b» study perfectly, compared with students of gr. JR-81 «b» and gr. FL-81 «b» (19.8 % and 16 %, respectively) and more boys and girls have grades «satisfactory» (14.3 % and 13.6 %, respectively).

The study of academic performance indicators of third-year students using the χ^2 criterion showed that there are significant statistically significant differences between the adaptation indicators of gr. JR-81 «b» and gr. KF-81 «b» ($\chi_1^2 = 9.33$; $p < 0.05$), the adaptation indicators of gr. FL-81 «b» and gr. GO-81 «b» ($\chi_2^2 = 8.99$; $p < 0.05$).

Thus, it was revealed that by the third year of study, the academic performance of students increases, especially in gr. JR-81 «b» and gr. FL-81 «b».

In order to study the influence of psychological and pedagogical support on the development of professional inclinations of students, a research of these qualities was conducted using the method «Questionnaire of Professional Preferences» (D. Holland) for three years (Table 5).

Table 5. Results of the research of professional preferences

Professional preferences	Students of gr. JR-81b	Students of gr. FL-81b	Students of gr. KF-81b	Students of gr. GO-81b
2018				
Realistic type	11 %	9,3 %	12 %	11,3 %
Research type	18 %	20,8 %	15,6 %	14,5 %
Artistic type	15 %	12 %	10,1 %	15,6 %
Social type	31 %	19 %	31,6 %	33,8 %
Entrepreneurial type	10 %	12 %	10,9 %	11,1%
Conventional type	15 %	26,9 %	19,8 %	13,7 %
2019				
Realistic type	11,2 %	9,8 %	11,2 %	11,9 %
Research type	18,6 %	21 %	16 %	14,3 %
Artistic type	13 %	12,2 %	10 %	15 %
Social type	32 %	19,6 %	31,9 %	34 %
Entrepreneurial type	9,8 %	11,2 %	11 %	11,8 %
Conventional type	15,4 %	26,2 %	19,9 %	13 %
2020				
Realistic type	12,3 %	9,9 %	11 %	12 %
Research type	18 %	21 %	17 %	14,2 %
Artistic type	12 %	11,8 %	9,8 %	11,3 %
Social type	33 %	20 %	32 %	34,9 %
Entrepreneurial type	8,7 %	11 %	11 %	15,1 %
Conventional type	16 %	26 %	19,2 %	12,5 %

The results of the study in 2018 showed that most of the students of gr. JR-81 «b» have inclinations for social (31 %), research (18 %) and conventional activities (15 %). The professional preferences of young men and women of the group FL-81 «b» are expressed differently: 26.9 % chose the conventional type, 20.8 % of respondents have the research type, 19 % – the social type.

Students of group KF-81 «b» have inclinations to social (31.6 %), conventional (19.8 %) and research activities (15.6 %). For this type of personality, the most effective areas of activity are the following professions: a conflict analyst, a psychologist, a mediator, the head of a counseling center or a psychological center.

The research of professional aptitudes in 2019 and 2020 revealed the actualization of professionally important qualities of students in each study group. More pronounced were the tendencies to social (33 %), research (18 %) and conventional activities (16 %) of the students of gr. JR-81 «b». This corresponds to the future professional activity: journalist, correspondent, columnist, analyst, editor, TV presenter.

The numerical indicators of boys and girls of the group FL-81 «b» have changed: conventional (26 %), research (21 %), and social inclinations (20 %) have increased. For this type of personality, the most effective areas of activity are: linguist, philologist, linguist, translator, teacher of foreign languages.

Future conflictologists (gr. KF-81 «b») have increased social (32 %), research inclinations (17 %), minor changes occurred in the students of gr. GO-81 «b». The prevailing social type (34.9 %), entrepreneurial (15.3 %), research (14.2 %). This corresponds to the professions: hotel service manager, administrator, head of the reservation and service department, restaurateur.

The study of the indicators of professional inclinations of third-year students using the χ^2 criterion showed that there are significant statistically significant differences between the indicators of professional inclinations of gr. JR-81 «b» and gr. KF-81 «b» ($\chi_1^2 = 9.33$; $p < 0.05$), the indicators of professional inclinations of gr. FL-81«b» and gr. GO-81 «b» ($\chi_2^2 = 8.99$; $p < 0.05$).

The actualization of professionally important qualities of students can be explained by the positive influence of psychological and pedagogical support of the educational process at the university.

4. Discussion

An important condition for preparing students for future professional activities is the implementation of a system – activity approach to the organization of training sessions, «which implies the need to teach them the ability to plan, organize, control their activities, fully learn, communicate» (Voroshnina, 2016). The success of such work largely depends on taking into account in the educational process the component composition of the structural organization of educational activities: motivation, educational tasks, educational actions, control and evaluation.

A research of life values first-year students at SWSU revealed that the most significant for most of them is health, the second grade is love and happy family life, the third grade – the availability of good and true friends, the fourth grade – financially – secure life. Less important values: knowledge, creativity, the beauty of nature and art, an active, active life.

Negative factors of the learning process of students are: maladaptation in the group, society, dependence on alcohol, tobacco smoking, toxic and narcotic substances, low educational motivation, inadequate self-esteem, not the right choice of future profession, etc.

As a result of the research, similar results were obtained by E.V. Voevodina. In the course of the survey of students, it was revealed that the main stressors in the process of adaptation of students with disabilities to the conditions of the university include environmental barriers—a low degree of accessibility of space and organization of the living environment, as well as social barriers caused by the difference in the lifestyle of disabled people and their peers. Despite the fact that the «process of social adaptation of students with disabilities to the conditions of the university is accompanied by a number of designated stressors, this category prefers co-education with peers without disabilities. On the other hand, non-disabled students tend to support a segregated learning environment» (Vojvodina, 2011).

Thus, the study revealed the following: students of gr. JR-81 «b» and gr. FL-81 «b» (experimental groups) have higher indicators of sociability, sociability, high educational motivation, more adequate self-esteem, professional inclinations than boys and girls of gr. GO-81 «b» and gr. KF-81 «b» (control groups). Students gr. KF-81 «b» have higher rates in comparison with students gr. GO-81 «b» according to the criteria: psychological adaptation of students, self-perception, emotional comfort. This can be explained by the constant psychological and pedagogical support of the teachers of the Department of communicology and psychology of the university, where future conflictologists are trained.

The research confirmed the hypothesis of our experiment, that is, a set of psycho-pedagogical activities for the development of psychological adaptation of students with disabilities positively affects the development of sociability, interpersonal skills, organizational ability, training motivation, the adequacy of self-esteem, actualization of professional orientation.

As a result of the research, the positive impact of social and psychological support on the training of students with disabilities was revealed.

5. Conclusion

For three years, the main problems of educating students with disabilities at the university have been studied and identified in the course of three years:

- it is necessary to retrain teachers and staff of the university to work with people with disabilities and with people with disabilities;
- it is necessary to change the curricula and teaching materials for effective training of people with disabilities;
- to create a social and developing environment in the university for a successful process of adaptation and learning.

The research conducted over three years (2018–2020) at Southwest State University revealed the following: students of gr. JR-81 «b» and gr. FL-81 «b» (experimental groups) have higher indicators of sociability, sociability, high academic motivation, more adequate self-esteem, professional inclinations than boys and girls of gr. GO-81 «b» and gr. KF-81 «b» (control groups). That is, a set of psychological and pedagogical measures for the development of psychological adaptation of students with disabilities has a positive effect on the development of sociability, sociability, organizational skills, educational motivation, the adequacy of self-esteem, and the actualization of professional orientation.

6. Recommendations

As a result of the study, the positive impact of psychological and pedagogical support, the activities of the Center for Supporting Inclusive Education at Southwest State University on the learning process of students with disabilities was revealed. Successful work experience can be used in other universities of our country and abroad.

References

- Agadzhanyan i dr., 2000 – Agadzhanyan, N.A., Baevskii, R.M., Berseneva, A.P. (2000). Uchenie o zdorov'e i problemy adaptatsii (Teoriya i praktika valeologicheskikh issledovaniy) [Teaching about health and problems of adaptation (Theory and practice of valeological research)]. M.-Stavropol' : Izd-vo Stavrop. gos. un-ta, 203 p. [in Russian]
- Belousova, 2017 – Belousova, A.A. (2017). Psikhologicheskoe soprovozhdenie studentov s ogranichennymi vozmozhnostyami zdorov'ya na etape adaptatsii k obucheniyu [Psychological support of students with disabilities at the stage of adaptation to learning]: avtoref. kvalifikatsionnoi vypusknoi diplomnoi raboty bakalavra. Saratov. P. 10. [Electronic resource]. URL: http://www.Elibrary.squ.ru/VKR/2017/44-03-03_006.pdf (date of access: 26.11.18). [in Russian]
- Chernyshev, Lunev, 1998 – Chernyshev, A.S., Lunev, Yu.A. (1998). Optimizatsiya zhiznedeyatel'nosti kak osnova sotsial'no-psikhologicheskoi pomoshchi molodezhi [Optimization of life as a basis for social and psychological assistance to young people]. Kursk: izdatel'stvo Kurskogo gospeduniversiteta. P. 21. [in Russian]
- Grebennikova, 2015 – Grebennikova, V.M. (2015). Development of inclusive education in the Russian Federation: problems and prospects. *Basic research*. 24292 [Electronic resource]. URL: <https://fundamental-research.ru/ru/article/view?id=37946> (date of access: 22.10.2020). [in Russian]
- Inklyuzivnoe obrazovanie, 2020 – Inklyuzivnoe obrazovanie [Inclusive education]. [Electronic resource]. URL: <http://www.Wikipedia.org/wiki/.htm> (date of access: 20.10.20). [in Russian]
- Polozhenie invalidov, 2020 – Polozhenie invalidov. Ofitsial'naya statistika [The situation of the disabled. Official statistics]. Federal'naya sluzhba gosudarstvennoi statistiki [Electronic resource]: URL: <http://www.qks.ru/wps/wcm/connect/rosstat.htm> (date of access: 20.10.20). [in Russian]
- Putin, 2021 – Putin, V.V. (2021). Putin V.V. poruchil predostavit' invalidam novye vozmozhnosti dlya obrazovaniya i trudoustroistva [Putin instructed to provide disabled people with new opportunities for education and employment]. [Electronic resource]. URL: <https://tass.ru/obschestvo/10404149> (date of access: 14.01.21). [in Russian]
- Rokotyanskaya, 2019 – Rokotyanskaya, L.O. (2019). Formirovanie sotsial'nosti obuchayushchikhsya s invalidnost'yu v usloviyakh vysshei shkoly [Formation of the sociality of students with disabilities in a higher school abstract of the thesis]: avtoref. dis.... kand. ped. nauk. Yalta. P. 4 [Electronic resource]. URL: <https://www.dissercat.com/content/formirovanie-sotsialnosti-obuchayushchikhsya-s-invalidnostyu-v-usloviyakh-vysshei-shkoly> [in Russian]
- Tarasova, 2004 – Tarasova, O.A. (2004). Tekhnologiya integratsii lits s ogranichennymi fizicheskimi vozmozhnostyami v uchebnyi protsess vuza [Technology of integration of persons with disabilities into the educational process of the university]: avtoref. dis. kand. ped. nauk. Sankt-Peterburg. P. 4. [Electronic resource]. URL: <http://nauka-pedagogika.com/pedagogika-13-00-08/dissertatsiya-tehnologiya-integratsii-lits-s-ogranichennymi-fizicheskimi-vozmozhnostyami-v-uchebnyy-protsess-vuza#ixzz6kXFzm2ss> [in Russian]
- Usloviya polucheniya obrazovaniya..., 2020 – Usloviya polucheniya obrazovaniya invalidam i litsam s ogranichennymi vozmozhnostyami zdorov'ya. YuZGU [The terms for obtaining education for people with disabilities and persons with disabilities. Southwest State University]. [Electronic resource]. URL: <https://swsu.htm> (date of access: 05.11.18). [in Russian]
- Voevodina, 2011 – Voevodina, E.V. (2011). Issledovanie sotsial'noi adaptirovannosti studentov s ogranicheniyami zhiznedeyatel'nosti k usloviyam vuza: sostoyanie problemy i vozmozhnye puti optimizatsii [Research of social adaptation of students with disabilities to the conditions of the university: state of the problem and possible ways of optimization]. *Servis plus*. 3: 21. [Electronic resource]. URL: <https://cyberleninka.ru/article/n/issledovanie-sotsialnoy-adaptirovannosti-studentov-s-ogranicheniyami-zhiznedeyatel'nosti-k-usloviyam-vuza-sostoyanie-problemy-i> [in Russian]

[Voevodina, Grebennikova, 2015](#) – Voevodina, E.V., Grebennikova, V.M. (2015). Razvitie inklyuzivnogo obrazovaniya v Rossiiskoi Federatsii: problemy i perspektivy [Development of inclusive education in the Russian Federation: problems and prospects]. *Fundamental'nye issledovaniya*. 2: 4292. [Electronic resource]. URL: <https://fundamental-research.ru/ru/article/view?id=37946> (date of access: 22.10.2020). [in Russian]

[Voroshilova, Chernyshova, 2019](#) – Voroshilova O.L., Chernyshova, O.V. (2019). Sotsial'no-psikhologicheskie aspekty obucheniya studentov s ogranichennymi vozmozhnostyami zdorov'ya [Socio-psychological aspects of teaching students with disabilities]. *Izvestiya Yugo-Zapadnogo gosudarstvennogo universiteta. Seriya: Lingvistika i pedagogika*. T. 9. 1(30): 152-153. [in Russian]

[Voroshnina, Gavrilova, 2016](#) – Voroshnina, O.R., Gavrilova, E.V. (2016). Sistemno-deyatel'nostnyi podkhod kak osnova organizatsii samostoyatel'noi raboty studentov [System-activity approach as the basis for organizing students' independent work]. *Permskii pedagogicheskii zhurnal*. 8: 54. [Electronic resource]. URL: <https://cyberleninka.ru/article/n/sistemno-deyatelnostnyy-podhod-kak-osnova-organizatsii-samostoyatelnoy-raboty-studentov> [in Russian]

[Vygotskii, 1983](#) – Vygotskii, L.S. (1983). Sbranie sochinenii: v 6 t. Osnovy defektologii [Collected works: in 6 volumes. Fundamentals of defectology]. T.5. SPb.: Lan'. P. 25. [in Russian]

[Yarskaya-Smirnova, Romanov, 2003](#) – Yarskaya Smirnova, E., Romanov, P. (2003). Vysshee obrazovanie invalidov : politika i opyt [Higher education of disabled people: policy and experience]. *Vysshee obrazovanie v Rossii*. 7: 38. [Electronic resource]. URL: <https://cyberleninka.ru/article/n/vysshee-obrazovanie-invalidov-politika-i-opyt> (date of access: 20.10.2020). [in Russian]



Copyright © 2021 by Academic Publishing
House Researcher s.r.o.

All rights reserved.

Published in the Slovak Republic

European Journal of Contemporary Education

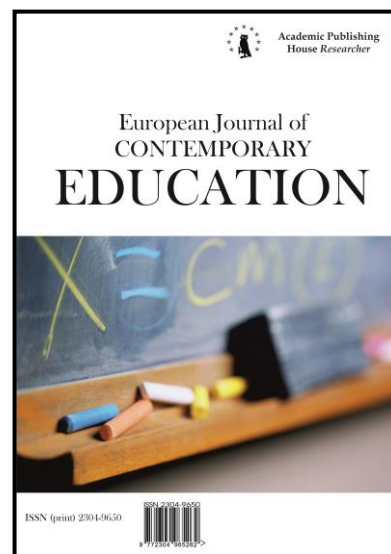
E-ISSN 2305-6746

2021. 10(2): 496-508

DOI: 10.13187/ejced.2021.2.496

www.ejournal1.com

IMPORTANT NOTICE! Any copying, reproduction, distribution, republication (in whole or in part), or otherwise commercial use of this work in violation of the author(s) rights will be prosecuted in accordance with international law. The use of hyperlinks to the work will not be considered copyright infringement.



Self-Reflection of Digital Literacy of Primary and Secondary School Teachers: Case Study of Slovakia

Ján Záhorec ^a, Alena Hašková ^{b,*}, Michal Munk ^b

^a Comenius University, Bratislava, Slovakia

^b Constantine the Philosopher University, Nitra, Slovakia

Abstract

Development of new digital means requires teachers to dispose such level of didactic technological competences to be prepared properly to implement them into their teaching practice and to be not afraid to use them within their lessons. These facts evoke a need continuously to innovate curricula of the relevant part of teacher trainee study programs, to acquaint future teachers with the newest kinds and versions of available didactic tools and with advantages of their use to support both teaching and learning processes. A question how to design an optimal model of teacher training in the area of teacher trainees' didactic technological competences evoked a need to assess strengths and weaknesses of in-service teachers as to their professional digital literacy

The paper presents a case study the aim of which was to assess level of the digital literacy of primary and secondary school teachers in Slovakia based on their self-reflection. Research sample of the case study consisted of 173 teachers, participants of teacher continuous education, representing three of eight regions of Slovakia. The teachers were asked to assess level of their digital literacy in relation to 17 of selected software applications used in teaching practice, i.e. to assess how skilled they are to use these means in their own teaching practice. Analysis of the teacher self-reflection was done in dependence on their majors (subjects they are qualified to teach) and teaching staff category they belong to.

Results of statistical analysis of the collected data pointed out some important facts that should be reflected in innovations of the relevant area of curricula of teacher study programs at universities, or also in programs of further education of in-service teachers. However, data collection to the presented research was carried out before the corona pandemics. Nowadays, when under the corona pandemics conditions education is moving into the virtual reality and dominantly

* Corresponding author

E-mail addresses: ahaskova@ukf.sk (A. Hašková), mmunk@ukf.sk (M. Munk), zahorec@fedu.uniba.sk (J. Záhorec)

using on-line forms we see that even more important than to train teachers to use digital technologies in general is to train them to work with different application systems used in on-line education processes.

Keywords: curricula innovation, didactic technological competences of teachers, digital literacy, pre-service teacher training, software applications used in teaching.

1. Introduction

Digital didactic means represent very important teaching aids in teacher practice in general. This regards both teachers' preparation for a lesson, as well as their performance during a lesson itself (Klement et al., 2017). Development of new digital means – teaching aids, didactic software applications, virtual learning environments – all this requires teachers to dispose such level of didactic technological competences to be prepared properly to implement them into their teaching practice and they would not be afraid to use them within their lessons (Kosová et al., 2012). Moreover, it is also a general social requirement (Kobylarek, 2018). These facts have to be reflected in pre-service teacher training, what evokes a need continuously to innovate curricula of the relevant part of teacher trainee study programs, to acquaint future teachers with the newest kinds and versions of available didactic tools and with advantages of their use to support both teaching and learning processes (Vezirov, Kostina, 2016; Krumsvik et al., 2016; Petrová, Duchovičová, 2013). A question is how to design an optimal model of teacher training in this area (development of teacher trainees' didactic technological competences), which didactic means should be incorporated into the teacher training and which aspects of their use in teaching should be stressed. Within this context, and also with regard to approaching complex accreditation process of higher education institutions in Slovakia (2024), there was prepared and carried out a broad-scaled research coordinated by the Faculty of Education of Comenius University in Bratislava to create a platform for a proposal of an optimal model of pre-service teacher training in the area of development of teacher trainees' didactic technological competences, especially in the focus on formation their professional digital literacy (O agentúre). Intended innovation has been understood at two levels, level of the relevant subject contents (curricula) and level of time allocation of these subjects (Záhorec et al., 2020). Particular tasks solved within the research were the following ones:

- identification of current needs of pedagogical practice with regard to formation of professional digital literacy of teacher trainees from the point of view of teachers;
- identification of current needs for innovation of pre-service teacher preparation in the area of formation their professional digital literacy from the point of view of teacher trainees;
- analysis of incorporation of the particular subjects focused on application of digital technologies in educational processes into the teaching study programs;
- formulation of recommendations creating a platform to design a model of optimal pre-service teacher training to develop teacher trainee digital literacy (required knowledge and skills to be able to act successfully in their consequent teacher career).

The starting point of the research was to identify in-service primary and secondary school teachers' needs and requirements to upgrade and improve their professional abilities and skills within their digital literacy (i.e. their didactic technological competences). Identification of these needs and requirements was made by screening opinions of in-service teachers (with different length of teaching practice) on importance of the use of different interactive didactic means in teaching with regard to teaching efficiency increase. Subject of the research was:

- to find out which types of software applications teachers use most often in their pedagogical practice (Záhorec et al., 2019);
- to find out for which purposes and in which ways teachers incorporate digital didactic means and with them related interactive educational activities in teaching (Záhorec et al., 2019);
- to find out level of teachers' digital literacy in the use of some specified software applications and digital didactic means in their pedagogical practice.

To find out level of teachers' digital literacy in the use of some specified software applications and digital didactic means in their pedagogical practice there was carried out a survey of self-reflection of digital literacy of primary and secondary school teachers, results of which are presented hereinafter.

2. Methods

Research sample of the carried out survey consisted of 173 teachers – participants of teacher continuous education. The participants were primary and secondary school teachers representing primary and secondary schools in three of eight regions of Slovakia (Nitra region, Trnava region and Bratislava region, regions for participants from which the continuous education was done).

From the total number of 173 participants of the teacher continuous education – members of the research sample, 68 teachers were teachers of primary schools (ISCED 1), 69 teachers of lower secondary education (ISCED 2) and 19 teachers of upper secondary education (ISCED 3). From the total number of 173 teachers 50.29 % had the pedagogical practice within the scale from 5 up to 20 years.

Subjects which the teachers have been teaching at schools were classified into five categories according to their character:

- natural science subjects,
- foreign languages,
- social science subjects,
- artwork and educational subjects,
- professional (vocational) subjects.

From the research sample 133 teachers have taught natural science subjects, 108 social science subjects, 107 foreign languages, 100 artwork and educational subjects and 18 professional (vocational or technical) subjects. The total sum of these numbers is higher than the total number of the participating teachers – members of the research sample (173), as most of them have been teaching two subjects which character had not been of the same character. This means that those teachers who have been teaching subjects of different characters (e.g. math and foreign language) are included in both of the relevant groups (e.g. among the teachers of natural science subjects as well as in the group of foreign language teachers).

Within the carried out survey to collect necessary research data a questionnaire was used. Respondents of the questionnaire inquiry (research sample teachers) were asked to assess level of their professional digital literacy in relation to a set of 17 selected software applications, digital didactic tools (D1 – D17) utilized in teaching practice (i.e. the respondents were asked to assess how skilled they are to use these means in their own teaching practice). List of the selected digital means D1 – D17 is presented in [Table 1](#).

Respondents' self-assessment was based on the use of a five-point scale with a point rating from 0 to 4, with the following meanings:

- 1 – *I have insufficient knowledge and skills,*
- 2 – *I have rather insufficient knowledge and skills,*
- 3 – *I have rather sufficient knowledge and skills,*
- 4 – *I have sufficient knowledge and skills.*

Additionally, besides these four possible alternative responses to each of the items D1 – D17 respondents could choose also the fifth alternative answer (evaluation) which was the scale value 0 with the meaning:

- 0 – *I do not consider it necessary for my profession performance.*

This response expressed a strong attitude of the respondent, his or her belief that for the successful performance of teaching profession acquisition of knowledge and skills of working with the relevant software application (digital didactic tool) is not necessary.

Table 1. List of the digital didactic tools (software applications) in relation to which teachers evaluated their professional digital literacy

Questionnaire item	Digital didactic tools
D1	<i>ActivInspire – creating of interactive teaching materials</i>
D2	<i>Flow!Works – creating of interactive teaching materials</i>
D3	<i>SMART Notebook – creating of interactive teaching materials</i>
D4	<i>Prezi – creating of dynamic presentations</i>
D5	<i>Mindomo – creating of mind maps</i>

D6	<i>FreeMind – creating of mind maps</i>
D7	<i>ActivExpression2 – voting system</i>
D8	<i>ActiVote – voting system</i>
D9	<i>QRF700/900 – voting system</i>
D10	<i>TurningPoint – voting system</i>
D11	<i>Socrative 2.0 – creating of online tests and voting</i>
D12	<i>Alf – creating of interactive tests</i>
D13	<i>Google Documents – collaborative creating through sharing of online documents</i>
D14	<i>LEGO – educational sets</i>
D15	<i>Microsoft PowerPoint – creating of didactical presentations with educational content</i>
D16	<i>Microsoft Word – usage of tools of advanced word processing</i>
D17	<i>Microsoft Excel – usage of tools of advanced data processing</i>

Those teachers who have taught only one subject or two subjects, but both of the same character, stated one answer (responded to each of the questionnaire items D1 – D17 only once). The rest of the respondents, i.e. those who have taught subjects of different characters (e.g. math and foreign language), stated two answers – one response for each of the two subjects they have taught at each of the questionnaire items D1 – D17.

Character of the subjects taught by the respondents (natural science subject, foreign language, social science subject, artwork or educational subject, professional subject) and teacher category which the respondents belong to (primary school teacher, lower secondary education teacher and upper secondary education teacher) were used as segmentation factors in dependence on which responses of respondents were analysed. So besides analysis of responses to the questionnaire items D1 – D17 stated by the research sample as a whole (without any differentiation of the respondents based on the stated segmentation factors), we also analysed differences among the responses of particular groups of the respondents formed on the basis of the given segmentation factors.

3. Results

In [Table 2](#) there are summarized results of the evaluation of the level of knowledge and skills of working with the selected kinds of digital teaching aids and software applications (questionnaire items D1 – D17) for the whole research sample of teachers, i.e. without differentiating them into groups with respect to any segmentation factor.

Table 2. Results of teachers' self-evaluation (for the research sample as a whole, without any differentiation of the respondents)

Item	Mean	Absolute and relative frequency of teachers' responses									
		<i>I have sufficient knowledge and skills</i>		<i>I have rather sufficient knowledge and skills</i>		<i>I have rather insufficient knowledge and skills</i>		<i>I have insufficient knowledge and skills</i>		<i>I do not consider it necessary for my profession performance</i>	
		%	%	%	%	%	%	%	%		
D1	2.60	39	22.54	65	37.57	31	17.92	37	21.39	1	0.58
D2	2.29	33	19.08	49	28.32	29	16.76	60	34.68	2	1.16
D3	2.18	27	15.61	49	28.32	27	15.61	69	39.88	1	0.58
D4	2.00	26	15.03	28	16.18	41	23.70	76	43.93	2	1.16
D5	2.35	33	19.08	50	28.90	35	20.23	54	31.21	1	0.58
D6	2.53	44	25.43	53	30.64	29	16.76	44	25.43	3	1.73
D7	1.76	11	6.36	32	18.50	42	24.28	81	46.82	7	4.05
D8	1.76	19	10.98	29	16.76	25	14.45	92	53.18	8	4.62

D9	1.69	16	9.25	26	15.03	30	17.34	91	52.60	10	5.78
D10	1.73	12	6.94	35	20.23	30	17.34	87	50.29	9	5.20
D11	1.77	16	9.25	30	17.34	33	19.08	87	50.29	7	4.05
D12	1.96	25	14.45	33	19.08	30	17.34	80	46.24	5	2.89
D13	2.53	32	18.50	67	38.73	36	20.81	36	20.81	2	1.16
D14	2.09	24	13.87	43	24.86	37	21.39	63	36.42	6	3.47
D15	3.88	101	58.38	50	28.90	8	4.62	14	8.09	0	0.00
D16	3.56	113	65.32	47	27.17	10	5.78	3	1.73	0	0.00
D17	3.29	86	49.71	55	31.80	28	16.18	4	2.31	0	0.00

As it is clear from the presented results (Table 2), teachers evaluate their professional digital literacy as sufficient exclusively in relation to Microsoft applications *Word*, *PowerPoint* and *Excel* (at these items mean values of the achieved scores are above the scale value 3 – *I have rather sufficient knowledge and skills*). An interesting finding is that teachers evaluate level of their skills to work with the software application *Microsoft Word* lower in comparison with their skills to work with *Microsoft PowerPoint*. In our opinion this could be related to the possibility that teachers, for the needs to support their teaching processes, prepare themselves mainly educational presentations, at creation of which they utilize a broader scope of possibilities (tools) offered by *PowerPoint* in comparison with the use of only limited diapason of possibilities offered by *Word*. In other words, we assume that working with *Microsoft Word*, teachers use only a certain limited number of the tools (functions) offered by this application.

A question is whether teachers acquire appropriate level of skills to use these three software applications within their pre-service training, or whether it is a result of their subsequent practice and self-education (consequent further "self-learning" after they enter into pedagogical practice). This question importance is increased also by other findings (presented in Kosová et al., 2012), namely by significantly powerful demands of teacher trainees to include work with these applications in curricula of teaching study programs.

More or less sufficient level of teachers` digital literacy is indicated by recorded mean values at three other digital tools, namely *ActivInspire*, *FreeMind* and *Google Documents* (values of the recorded means above 2.50). Further three applications *Mindomo*, *Flow!Works*, *SMART Notebook*, and education sets *LEGO* are assessed rather at the level of the scale value 2 – *I have rather insufficient knowledge and skills* (values of means recorded at these items are within the range 2.09 – 2.35).

Of course, the presented values of the recorded means need to be considered in relation to school equipment with appropriate digital means and possibilities of teachers to use these means at all. The rate of availability of the relevant equipment may be indicated in part by the percentage of respondents who assessed their digital literacy in relation to the given items through the scale values 3 or 4. In case of the applications *Microsoft Word*, *Microsoft PowerPoint* and *Microsoft Excel* it is minimum 80 % of respondents (*Microsoft Word* 92 %, *Microsoft PowerPoint* 87 %, *Microsoft Excel* 80 %), in case of the applications *ActivInspire*, *FreeMind* and *Google Documents* maximally 60 % of respondents (*ActivInspire* 60 %, *FreeMind* 57 %, *Google Documents* 56 %).

Opinions that it would not be necessary to acquire work with any of the assessed tools for the teaching profession performance were very rare. They did not occur at all in case of the applications *Microsoft Word*, *Microsoft PowerPoint* and *Microsoft Excel*. For the other items, absolute frequency of this opinion ranged from 1 to 10, with the „highest" frequency of this opinion recorded at the items *QRF700/900* (10), *TurningPoint* (9), *ActiVote* (8) and *ActivExpression2* and *Socrative 2.0* (both 7).

What we were interested in was whether these results are the same for all teachers or whether there are differences among the groups of teachers of different subjects, e.g. whether teachers of natural science subjects or professional (technical) subjects dispose in some cases with a higher level of digital literacy (according to teachers` self-evaluations).

Analysis of teachers` self-evaluation dependence on the subject taught

Similarly, as Table 3 presents results of the self-evaluation recorded for all respondents, i.e. for the whole research sample, without any differentiation of respondents according to any

segmentation factor, Tables 4-8 present results of the self-evaluation of teachers recorded for the particular groups of teachers differentiated according the segmentation factor of their major subjects.

Table 3. Results of digital literacy self-evaluation of natural science subject teachers

Item	Mean	Absolute and relative frequency of teachers' responses									
		<i>I have sufficient knowledge and skills</i>		<i>I have rather sufficient knowledge and skills</i>		<i>I have rather insufficient knowledge and skills</i>		<i>I have insufficient knowledge and skills</i>		<i>I do not consider it necessary for my profession performance</i>	
		%	%	%	%	%	%	%	%		
D1	2.69	36	27.07	47	35.34	24	18.05	25	18.80	1	0.75
D2	2.38	28	21.05	39	29.32	23	17.29	42	31.58	1	0.75
D3	2.26	21	15.78	42	31.58	21	15.78	48	36.09	1	0.75
D4	2.04	21	15.78	23	17.29	31	23.31	56	42.11	2	1.50
D5	2.35	25	18.80	37	27.82	31	23.31	39	29.32	1	0.75
D6	2.60	36	27.07	43	32.33	21	15.78	31	23.31	2	1.50
D7	1.83	9	6.77	28	21.05	33	24.81	57	42.86	6	4.51
D8	1.81	16	12.03	23	17.29	21	15.78	66	49.62	7	5.26
D9	1.70	11	8.27	23	17.29	23	17.29	67	50.38	9	6.77
D10	1.75	9	6.77	30	22.56	21	15.78	65	48.87	8	6.02
D11	1.76	12	9.02	24	18.05	23	17.29	68	51.13	6	4.51
D12	2.00	20	15.04	27	20.30	23	17.29	59	44.36	4	3.01
D13	2.50	26	19.55	49	36.84	25	18.80	31	23.31	2	1.50
D14	2.11	19	14.29	35	26.32	26	19.55	48	36.09	5	3.76
D15	3.35	78	58.65	37	27.82	5	3.76	13	9.77	0	0.00
D16	3.54	87	65.41	34	25.56	9	6.77	3	2.25	0	0.00
D17	3.30	70	52.63	37	27.82	22	16.54	4	3.01	0	0.00

Table 4. Results of digital literacy self-evaluation of social science subject teachers

Item	Mean	Absolute and relative frequency of teachers' responses									
		<i>I have sufficient knowledge and skills</i>		<i>I have rather sufficient knowledge and skills</i>		<i>I have rather insufficient knowledge and skills</i>		<i>I have insufficient knowledge and skills</i>		<i>I do not consider it necessary for my profession performance</i>	
		%	%	%	%	%	%	%	%		
D1	2.63	27	25.00	39	36.11	18	16.67	23	21.30	1	0.93
D2	2.33	22	20.37	29	26.85	21	19.44	35	32.40	1	0.93
D3	2.26	16	14.82	33	30.56	22	20.37	37	34.25	0	0.00
D4	2.02	15	13.89	19	17.59	28	25.93	45	41.67	1	0.93
D5	2.36	20	18.52	30	27.78	27	25.00	31	28.70	0	0.00
D6	2.63	30	27.78	35	32.41	18	16.67	23	21.30	2	1.85

D7	1.82	7	6.48	21	19.44	31	28.70	44	40.74	5	4.63
D8	1.78	11	10.19	20	18.52	18	16.67	52	48.15	7	6.48
D9	1.71	11	10.19	16	14.81	19	17.59	55	50.93	7	6.48
D10	1.70	4	3.70	26	24.07	18	16.67	54	50.00	6	5.56
D11	1.73	8	7.41	18	16.67	23	21.30	55	50.93	4	3.70
D12	1.98	14	12.96	22	20.37	22	20.37	48	44.44	2	1.85
D13	2.56	23	21.30	39	36.11	22	20.37	24	22.22	0	0.00
D14	2.17	18	16.67	25	25.00	24	22.22	39	36.11	2	1.85
D15	3.31	60	55.56	32	29.63	6	5.56	10	9.26	0	0.00
D16	3.53	70	64.81	28	25.93	7	6.48	3	2.78	0	0.00
D17	3.25	54	50.00	31	28.70	19	17.59	4	3.70	0	0.00

Table 5. Results of digital literacy self-evaluation of foreign language teachers

Item	Mean	Absolute and relative frequency of teachers' responses									
		<i>I have sufficient knowledge and skills</i>		<i>I have rather sufficient knowledge and skills</i>		<i>I have rather insufficient knowledge and skills</i>		<i>I have insufficient knowledge and skills</i>		<i>I do not consider it necessary for my profession performance</i>	
		%	%	%	%	%	%	%	%		
D1	2.68	29	27.10	40	37.38	14	13.08	23	21.50	1	0.93
D2	2.36	24	22.43	27	25.23	21	19.63	34	31.78	1	0.93
D3	2.31	18	16.82	36	33.64	14	13.08	39	36.45	0	0.00
D4	2.03	17	15.89	16	14.95	28	26.17	45	42.06	1	0.93
D5	2.36	19	17.76	33	30.84	23	21.50	32	29.91	0	0.00
D6	2.66	32	29.91	32	29.91	19	17.76	23	21.50	1	0.93
D7	1.80	8	7.48	17	15.89	31	28.97	48	44.86	3	2.80
D8	1.79	11	10.28	19	17.76	19	17.76	53	49.53	5	4.67
D9	1.70	11	10.28	13	12.14	22	20.56	55	51.40	6	5.61
D10	1.73	3	2.80	27	25.23	20	18.69	52	48.60	5	4.67
D11	1.75	8	7.48	17	15.89	25	23.36	54	50.47	3	2.80
D12	1.94	11	10.28	24	22.43	22	20.56	48	44.86	2	1.87
D13	2.57	20	18.69	43	40.19	23	21.50	20	18.69	1	0.93
D14	2.13	13	12.15	29	27.10	26	24.30	37	34.58	2	1.87
D15	3.35	62	57.94	30	28.04	5	4.67	10	9.34	0	0.00
D16	3.52	68	63.55	30	28.04	6	5.61	3	2.80	0	0.00
D17	3.28	56	52.34	29	27.10	18	16.82	4	3.74	0	0.00

Table 6. Results of digital literacy self-evaluation of artwork and educational subject teachers

Item	Mean	Absolute and relative frequency of teachers' responses									
		<i>I have sufficient knowledge and skills</i>		<i>I have rather sufficient knowledge and skills</i>		<i>I have rather insufficient knowledge and skills</i>		<i>I have insufficient knowledge and skills</i>		<i>I do not consider it necessary for my profession performance</i>	
		%	%	%	%	%	%	%	%		
D1	2.64	27	27.00	34	34.00	16	16.00	22	22.00	1	1.00
D2	2.37	22	22.00	27	27.00	19	19.00	30	30.00	2	2.00
D3	2.31	17	17.00	32	32.00	16	16.00	35	35.00	0	0.00
D4	2.06	17	17.00	16	16.00	24	24.00	42	42.00	1	1.00
D5	2.34	16	16.00	31	31.00	24	24.00	29	29.00	0	0.00
D6	2.60	26	26.00	34	34.00	16	16.00	22	22.00	2	2.00
D7	1.88	8	8.00	23	23.00	22	22.00	43	43.00	4	4.00
D8	1.85	13	13.00	19	19.00	14	14.00	48	48.00	6	6.00
D9	1.79	13	13.00	15	15.00	17	17.00	48	48.00	7	7.00
D10	1.80	7	7.00	25	25.00	15	15.00	47	47.00	6	6.00
D11	1.82	11	11.00	17	17.00	19	19.00	49	49.00	4	4.00
D12	2.01	16	16.00	19	19.00	18	18.00	44	44.00	3	3.00
D13	2.44	18	18.00	35	35.00	21	21.00	25	25.00	1	1.00
D14	2.17	15	15.00	25	25.00	25	25.00	32	32.00	3	3.00
D15	3.31	56	56.00	29	29.00	5	5.00	10	10.00	0	0.00
D16	3.53	65	65.00	26	26.00	6	6.00	3	3.00	0	0.00
D17	3.29	53	53.00	27	27.00	16	16.00	4	4.00	0	0.00

Table 7. Results of digital literacy self-evaluation of professional (technical) subject teachers

Item	Mean	Absolute and relative frequency of teachers' responses									
		<i>I have sufficient knowledge and skills</i>		<i>I have rather sufficient knowledge and skills</i>		<i>I have rather insufficient knowledge and skills</i>		<i>I have insufficient knowledge and skills</i>		<i>I do not consider it necessary for my profession performance</i>	
		%	%	%	%	%	%	%	%		
D1	2.83	6	33.33	6	33.33	3	16.67	3	16.67	0	0.00
D2	2.22	3	16.67	5	27.78	3	16.67	7	38.89	0	0.00
D3	2.33	3	16.67	6	33.33	3	16.67	6	33.33	0	0.00
D4	2.00	2	11.11	4	22.22	4	22.22	8	44.44	0	0.00
D5	2.11	1	5.56	6	33.33	5	27.78	6	33.33	0	0.00
D6	2.50	3	16.67	7	38.89	4	22.22	4	22.22	0	0.00
D7	2.22	3	16.67	6	33.33	2	11.11	6	33.33	1	5.56
D8	2.06	3	16.67	5	27.78	1	5.56	8	44.44	1	5.56
D9	2.06	3	16.67	5	27.78	1	5.56	8	44.44	1	5.56
D10	1.89	2	11.11	4	22.22	3	16.67	8	44.44	1	5.56
D11	2.00	3	16.67	4	22.22	2	11.11	8	44.44	1	5.56
D12	2.06	4	22.22	3	16.67	2	11.11	8	44.44	1	5.56
D13	2.72	5	27.78	7	38.89	3	16.67	2	11.11	1	5.56
D14	2.50	5	27.78	4	22.22	5	27.78	3	16.67	1	5.56

D15	3.72	13	72.22	5	27.78	0	0.00	0	0.00	0	0.00
D16	3.67	12	66.67	6	33.33	0	0.00	0	0.00	0	0.00
D17	3.50	10	55.56	7	38.89	1	5.56	0	0.00	0	0.00

As to the software applications *Microsoft Word*, *Microsoft PowerPoint* and *Microsoft Excel* results of the digital literacy self-evaluation in case of all five segmentation groups of teachers (differentiated based on the subject they teach) are the same as in case of the results achieved for the whole research sample (without any segmentation of the respondents). The only „deviation“ is the group of professional (technical) subject teachers, in case of which the recorded mean of the digital literacy self-assessment related to the application *Microsoft PowerPoint* is of a higher value than the mean of the digital literacy self-assessment related to the application *Microsoft Word*. However, difference between the two recorded values is not a significant one (also with respect to the low number of these respondents), i.e. the level of the digital literacy of this group of teachers is in principle the same with respect to all three given Microsoft applications.

With regard to digital teaching means at which the overall digital literacy of teachers was recorded (i.e. without distinguishing the teachers according to the subjects they teach) at a more or less sufficient level or at least at the level of the scale value 2 – *I have rather insufficient knowledge and skills*, results of all groups of the teachers segmented according the taught subjects also copy results recorded for the whole research sample. Digital literacy at the level of the scale value of 2 was recorded in case of all five groups of teachers, besides the applications *Mindomo*, *Flow!Works*, *SMART Notebook* and education sets *LEGO* also at the application *Prezi* (2.00 – 2.06). In case of natural science subject teachers and artwork and educational subject teachers it was recorded furthermore at the application *Alf* (2.00 – 2.01), and in case of professional (technical) subject teachers also at the tools *ActiVote* (2.06), *QRF700/900* (2.06) and *Socrative 2.0* (2.00).

In case of artwork and educational subject teachers and professional (technical) subject teachers as some „deviations“ can be understood results recorded at the items *Google Documents* and *ActivExpression2*. In comparison with the other groups, artwork and educational subject teachers state a lower level of their digital literacy in relation to *Google Documents* (2.44, i.e. below the limit 2.5 of the used scale value). Contrary to this, professional subject teachers unlike the other groups of teachers state a relatively high, in principal sufficient, level of their digital literacy in relation to the use of the vote system *ActivExpression2* (2.22).

Analysis of teachers` self-evaluation dependence on teacher staff category

In frame of the research data processing and evaluating there was verified a statistical null hypothesis:

H_0 : Respondents` answers to the particular items D_i ($i = 1, 2, \dots, 17$) do not depend on the teacher category which a respondent belongs to.

This hypothesis de facto represents 17 partial null hypotheses formulated for the particular kinds of the digital didactic means and software applications (D1 – D17, Table 1). All 17 partial null hypotheses were verified at 5 % level of significance. Independence of digital literacy in regard to the given digital tools on the segmentation factor of teacher category which the respondents belong to was tested through both parametric as well as nonparametric tests (Kuna et al., 2017).

Hereinafter only results of the items D2, D5, D6 and D15 are presented and discussed, as these were the items at which the tested dependence (partial null hypotheses formulated for them) was proved.

Following results of the analysis of variance of simple sort as well as its nonparametric alternative Kruskal Wallis test, in case of the items D2: $H(2, N = 173) = 6.698562, p = 0.0351$; D5: $H(2, N = 173) = 8.693615, p = 0.0129$; D6: $H(2, N = 173) = 8.961734, p = 0.0113$; and D15: $H(2, N = 173) = 6.406162, p = 0.0406$ the partial statistical null hypotheses stating that the differences at evaluation of the questionnaire item D2, as well as D2, D6 and D15 among the groups of the respondents is not statistically significant were rejected ($p < 0.05$). This means that the variables D2 (declared level of teachers` digital literacy related to the application *Flow!Works – creating of interactive teaching materials*), D5 (declared level of teachers` digital literacy related to the application *Mindomo – creating of mind maps*), D6 (declared level of teachers` digital literacy related to the application *FreeMind – creating of mind maps*) and D15 (declared level of teachers` digital literacy related to the application *Microsoft PowerPoint – creating of didactical*

presentations with educational content) are dependent on the factor of the category of pedagogical employee (teaching staff) to which the teacher belongs.

After the null hypothesis H_0 for the items D2, D5, D6 and D15 was rejected, we were interested among which teacher categories of respondents differences of their responses to the given items are statistically significant. Results of their multiple comparison are summarized in Table 8.

Table 8. Multiple comparison for items D2, D5, D6 and D15 in dependence on the factor of teaching staff category

Item D2				Item D5			
Factor value	A4a	A4b	A4c	Factor value	A4a	A4b	A4c
A4a		0.043721	1.000000	A4a		0.119763	0.584702
A4b	0.043721		0.596108	A4b	0.119763		0.031892
A4c	1.000000	0.596108		A4c	0.584702	0.031892	

Item D6				Item D15			
Factor value	A4a	A4b	A4c	Factor value	A4a	A4b	A4c
A4a		0.021931	1.000000	A4a		1.000000	0.046628
A4b	0.021931		0.156387	A4b	1.000000		0.131432
A4c	1.000000	0.156387		A4c	0.046628	0.131432	

Notes: A4a – primary education teachers; A4b – lower secondary education teachers; A4c – upper secondary education teachers

Identified statistically significant differences ($p < 0.05$) among the groups of the respondents differentiated according to the factor of teaching staff category are in Table 8 highlighted.

Box graphs in Figures 1-4 present evaluation of the items D2, D5, D6 and D15 in a graphical form. There are given median, quartile range (half of the range of the upper and lower quartile) and variation range (interval in scope of which particular values of respondents' responses to the given item were recorded) of these items.

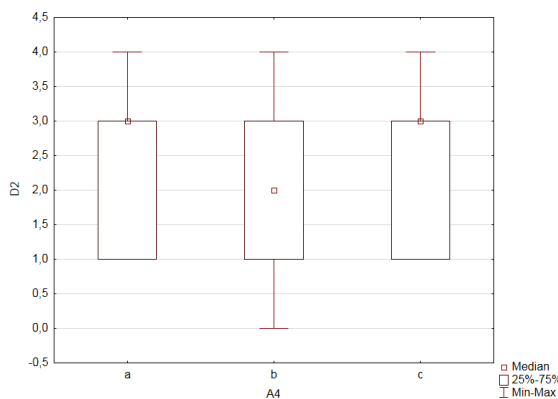


Fig. 1. Visualization of responses to item D2

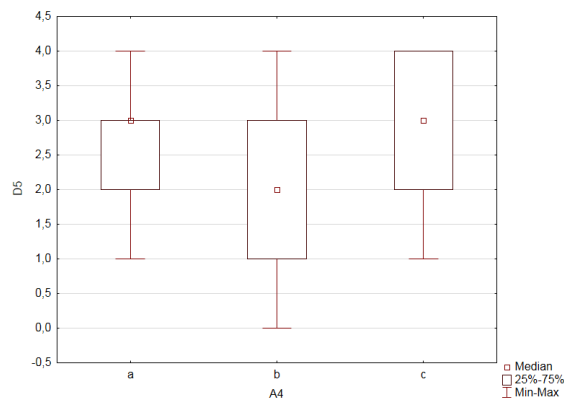


Fig. 2. Visualization of responses to item D5

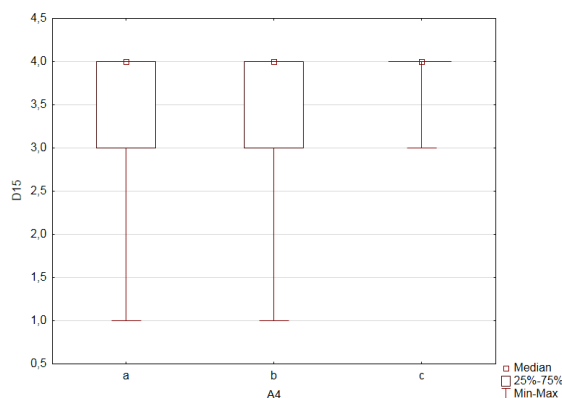
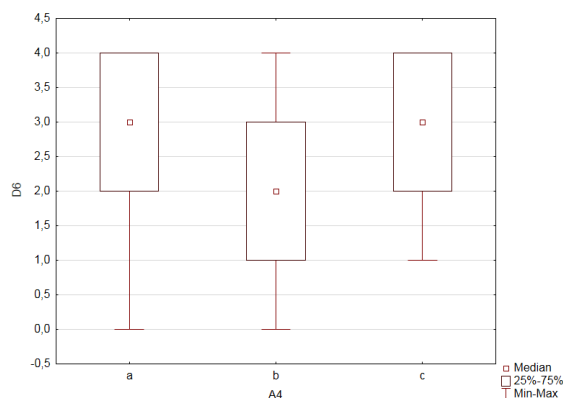


Fig. 3. Visualization of responses to item D6 **Fig. 4.** Visualization of responses to item D15

Note: A4a – primary education teachers; A4b – lower secondary education teachers; A4c – upper secondary education teachers

As the graphs in Figures 1-4 show, the lowest quartile range (value of the quartile range 0) was recorded at the item D15 (*creating of didactical presentations with educational content in the application of Microsoft PowerPoint*) in the group of *upper secondary education teachers* (A4c – value of the quartile range 0), i.e. in this group the highest homogeneity of responses to the concerned item among all four tested variables was recorded (D2: Figure 1; D5: Figure 2; D6: Figure 3; D15: Figure 4).

4. Discussion

At the item D2, 50 % of responses in all three groups of respondents is at the level *I have rather sufficient knowledge and skills* (scale value 3) up to *I have insufficient knowledge and skills* (scale value 1). At this item a more positive self-evaluation of the teacher research sample was expected. Recorded results, according to us, may be a consequence of the fact that creation and using tools of the software environment *Flow!Works* of the interactive white board QOMO do not belong currently to trends preferred by pedagogical employees, as development of this software has been suspended by its producer. Furthermore it can also be a consequence of the fact that scope of tools supported by the environment of *Flow!Works* does not reach not half such scopes as it is in case of the development environments of *ActivInspire* and *SMART Notebook*. Because of that schools probably prefer rather to buy and use tools of the development environments *ActivInspire* supporting interactive white boards *ActivBoard* and *SMART Notebook* supporting interactive white board *SMART Board*.

At the items D5 and D6 respondents assessed their digital literacy related to the use of computer/tablet applications *Mindomo* (D5) and *FreeMind* (D6). So, here their knowledge level and skills related to design of mind maps usable in teaching and learning activities with pupils and students, including pupils and students with special needs, were assessed. Statements of the particular groups of teachers recorded at these questionnaire items were almost the same. Reached median of the responses *I have rather sufficient knowledge and skills* (median of the scale value 3) in the group of *primary education teachers* (A4a) as well as in the group of *upper secondary education teachers* (A4c) proves that teachers have relatively sufficient digital literacy to create interactive mind map. A question remains whether they also really use in practice this by them declared level of literacy to work with *Mindomo* and *FreeMind*. According to Schubertová and Bednářová (Schubertová, Bednářová, 2018), mind maps help pupils to systemize acquired knowledge and facts and to increase amount of remembered knowledge. Moreover, use of mind maps in connection with integrated audio visual elements and great measure of interactivity can influence in a positive way pupils' attitudes towards those subjects which in general belong to less popular or unpopular (non-favourite) (Pushkarev, Pushkareva, 2019).

At the item D15 all three groups of teachers assessed their digital literacy to work with *Microsoft PowerPoint* as sufficient (Figure 4). It is generally known that creation of *Microsoft PowerPoint* educational presentations and their utilization as didactic means supporting teaching and learning processes is relatively broadly used by teachers at all levels of education (Ghavifekr,

Rosdy, 2015). According us, within the context of the development of teachers` (of all levels of education) presentation skills the teachers should pay a greater attention to acquisition and use of new tools of presentation software means, as are e.g. *Prezi* or *Microsoft Sway*, as internet online alternatives to the standard (offline) *Microsoft PowerPoint* application. Use of educational presentations designed in still more and more popular presentation platform of *Prezi* offers at the same time also a space to apply innovative methods in teaching (Kuna et al., 2018; Kozík et al., 2012). As well the online tool *Sway*, as an integral part of the Microsoft 365 package, enables similarly to *Prezi* to design in innovative ways interactive documents and presentations. According to Fuchsova and Korenova (Fuchsova, Korenova, 2019), it is almost sure that very soon to design graphical presentation of thoughts will be equally important as to write coherent texts.

5. Conclusion

Presented results of the carried out research survey point out to some pedagogical practice needs and requirements regarding curricula design to achieve an optimal model of pre-service teacher training to form and develop professional didactic technological competences necessary for a successful and efficient performance of future teachers in their consequent teaching practice. However, the whole research from which the findings were derived, was done before the corona pandemic situation. This means that it was carried out at time when we had no experience of teaching in corona pandemic conditions. In that time, the core of the teacher training related to the use of digital technologies was appropriate implementation of different software applications into teaching. Nowadays, in conditions of the pandemic, education is more and more moving into the virtual reality and we see that may be even more important is to train teachers to work with different on-line systems. For pupils, students and their teachers too, a new situation has arisen. To support distance form of education at all its levels, digital multiplatform tools are used. For many teachers this form of education is no novelty (Balogh, Kucharik, 2019). This form had been used in specific situations also before (for example in case of pupils/students` illness already for a longer time. But on the other hand a majority of teachers had not come into the contact with this form of education in their teaching practice before. From the position of the teacher, they are not familiar with methodology of online teaching. So beside the above mentioned research results also the new (corona) conditions should be taken into the consideration with respect to upgrading the teacher training in the area of their didactic technological competences. And taking into consideration the situation under the corona pandemic means that into the curricula of the teaching study programs also the issue of teaching through online systems (such as e.g. *Microsoft Teams*, *Zoom*, *Cisco Webex*, *GoToMeeting*, *BlueJeans*) should be included.

References

- Balogh, Kucharik, 2019 – Balogh, Z., Kucharik, M. (2019). Predicting Student Grades Based on Their Usage of LMS Moodle Using Petri Nets. *Applied Sciences-Basel*. 9(20): 1-16. DOI: <https://doi.org/10.3390/app9204211>
- Fuchsova, Korenova, 2019 – Fuchsova, M., Korenova, L. (2019). Visualisation in Basic Science and Engineering Education of Future Primary School Teachers in Human Biology Education Using Augmented Reality. *European Journal of Contemporary Education*. 8(1): 92-102. DOI: 10.13187/ejced.2019.1.92
- Ghavifekr, Rosdy, 2015 – Ghavifekr, S., Rosdy, W.A.W. (2015). Teaching and learning with technology: Effectiveness of ICT integration in schools. *International Journal of Research in Education and Science (IJRES)*. 1(2): 175-191.
- Klement et al., 2017 – Klement, M., Dostál, J., Kubrický, J., Bártek, K. (2017). ICT versus teachers: adoration or resistance? [ICT nástroje a učitelé: adorace, či rezistence?]. Olomouc: Palacký University Olomouc. DOI: 10.5507/pdf.17.24450926
- Kobylarek, 2018 – Kobylarek, A. (2018). Science as a bridge. Science in action preface. *Journal of Education Culture and Society*. 9(2): 5-8.
- Kosová et al., 2012 – Kosová, B. et al. (2012). Vysokoškolské vzdelávanie učiteľov. Vývoj, analýza, perspektívy [Higher education of teachers. Development, analysis, perspectives]. Banská Bystrica: Faculty of Education, Matej Bel University. [in Slovak]
- Kozík et al., 2012 – Kozík, T., Kuna, P., Šimon, M. (2012). Koncepcia využitia prvkov priemyselnej automatizácie v návrhu reálnych vzdialených experimentov [The concept of using

elements of industrial automation in the design of real remote experiments]. *Edukacja – Technika – Informatyka: wybrane problemy edukacji technicznej i zawodowej*. 4(3): 45-56. [in Slovak]

[Krumsvik et al., 2016](#) – Krumsvik, R.J., Jones, L.O., Øfstegaard, M., Eikeland O.J. (2016). Upper secondary school teachers' digital competence: analysed by demographic, personal and professional characteristics. *Nordic Journal of Digital Literacy*. 1(3): 143-164.

[Kuna et al., 2017](#) – Kuna, P., Kozík, T., Kunová, S., Šebo, M. (2017). Software tools for creating and presenting virtual 3D models. *Advances in Intelligent Systems and Computing: ICL 2017. 20th International Conference on Interactive Collaborative Learning*. 716: 17-26.

[Munk et al., 2017](#) – Munk, M., Drlík, M., Benko, L., Reichel, J. (2017). Quantitative and Qualitative Evaluation of Sequence Patterns Found by Application of Different Educational Data Preprocessing Techniques. *IEEE ACCESS*. 5: 8989-9004. DOI: 10.1109/ACCESS.2017.2706302

[O agentúre](#) – O agentúre. [Electronic resource]. URL: <https://saavs.sk/o-agenture/>

[Petrová, Duchovičová, 2013](#) – Petrová, G., Duchovičová, J. (2013). University Preparation of Teachers in the Context of Transformation Processes. *Lifelong Learning – celoživotní vzdělávání*. 3(1): 8-37. DOI: <http://dx.doi.org/10.11118/lifele201303018>

[Pushkarev, Pushkareva, 2019](#) – Pushkarev, Y.V., Pushkareva, E.A. (2019). Communication foundation for intellectual culture: Tendencies of contemporary development. *XLinguae*. 12(4): 212-218.

[Schubertová, Bednárová, 2018](#) – Schubertová, R., Bednárová, M. (2018). Využitie pojmového mapovania pri skúmaní predstáv žiakov a študentov o prepojení orgánových sústav [The use of conceptual mapping in the study of pupils 'and students' ideas about the interconnection of organ systems]. *Scientia in educatione*. 9(1): 104-121. DOI: <https://doi.org/10.14712/18047106.999> [in Slovak]

[Vezirov, Kostina, 2016](#) – Vezirov, T.G., Kostina, E.A. (2016). Educational web-technologies in training bachelors and masters of pedagogical education. *Science for Education Today*. 6(4): 39-49. DOI: <http://dx.doi.org/10.15293/2226-3365.1604.04>

[Záhorec et al., 2019](#) – Záhorec, J., Hašková, A., Munk, M. (2019). Teachers' Professional Digital Literacy Skills and Their Upgrade. *European Journal of Contemporary Education*. 8(2): 378-393. DOI: 10.13187/ejced.2019.2.378

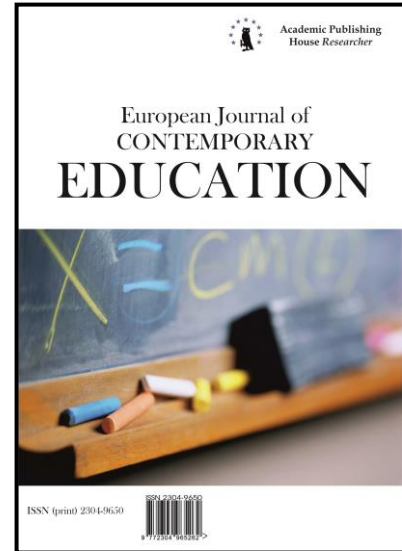
[Záhorec et al., 2020](#) – Záhorec, J., Hašková, A., Munk, M. (2020). Digitálna gramotnosť učiteľov v kontexte ich profesijnej prípravy [Digital literacy of teachers in the context of their professional training]. Bratislava: Comenius University in Bratislava, 1. ed. [in Slovak]

[Záhorec et al., 2019](#) – Záhorec, J., Nagyová, A., Hašková, A. (2019). Teachers' attitudes to incorporation digital means in teaching process in relation to the subjects they teach. *International Journal of Engineering Pedagogy*. 9(4): 101-120. DOI: <https://doi.org/10.3991/ijep.v9i4.11064>



Copyright © 2021 by Academic Publishing House Researcher s.r.o.
All rights reserved.
Published in the Slovak Republic
European Journal of Contemporary Education
E-ISSN 2305-6746
2021. 10(2): 509-516
DOI: 10.13187/ejced.2021.2.509
www.ejournal1.com

IMPORTANT NOTICE! Any copying, reproduction, distribution, republication (in whole or in part), or otherwise commercial use of this work in violation of the author(s) rights will be prosecuted in accordance with international law. The use of hyperlinks to the work will not be considered copyright infringement.



The History of Education

The System of Popular Education in Denmark in the 19th and Early 20th centuries: Some Specific Aspects

Aleksandr A. Cherkasov ^{a, b, c, *}, Sergei N. Bratanovskii ^{d, e}, Marina A. Ponomareva ^f, Ludmila G. Zimovets ^g

^a Cherkas Global University (International Network Center for Fundamental and Applied Research), Washington, USA

^b Volgograd State University, Volgograd, Russian Federation

^c American Historical Association, Washington, USA

^d Plekhanov Russian University of Economics, Moscow, Russian Federation

^e Institute of State and Law of RAS, Moscow, Russian Federation

^f Financial University under the Government of the Russian Federation, Moscow, Russian Federation

^g Sochi State University, Sochi, Russian Federation

Abstract

The paper reviews the system of popular education in Denmark in the 19th and early 20th centuries. Emphasis is made on the conservative and liberal trends in European education.

Scientific and specialized literature on the research topic was used as materials.

Methodological basis of the study consisted of the traditional historiography principles, historicism, scientific objectivity and consistency. Methods used in the course of work are as follows: comparative method. It enabled a comparison of the Danish popular education system with similar experiences in other countries. It also helped identify general European trends in education and highlight local features.

In conclusion, the authors note that Denmark's system of popular education experienced a dynamic transformational journey in the 19th and early 20th centuries. This period marked ups and downs, such as confrontation among followers of the liberal and conservative concepts in European pedagogy, which culminated in productive activity based on regional conditions.

* Corresponding author

E-mail addresses: a.cherkasov@incfar.net (A.A. Cherkasov)

An important note should be made that Denmark was very close to the Russian Empire in areas related to popular education, because both countries were dominated by the German pedagogical system and were about to introduce universal primary education.

Key words: system of popular education, Denmark, comparative pedagogy, Europe, Russia, 19th and early 20th centuries.

1. Introduction

Denmark's system of popular education in the 19th and early 20th centuries made a great journey, having assimilated many elements from Europe's general pedagogical practice and on the other hand retaining its own authentic features. The system was close to the system of popular education, adopted in the Russian Empire, in many respects – even a large number of similar measures were ratified almost at the same time. In other words, in matters concerning popular education, Denmark gave consideration to diverse experiences of developed countries and made significant efforts to keep high levels of education in the country.

2. Materials and methods

Scientific and specialized literature on the research topic was used as materials.

Methodological basis of the study consisted of the traditional historiography principles historicism, scientific objectivity and consistency. Methods used in the course of work are as follows: comparative method.

It enabled a comparison of the Danish popular education system with similar experiences in other countries. It also helped identify general European trends in education and highlight local features.

3. Discussion

Historiography on the subject can be divided into works on the history of Danish popular education proper and works on the history of general European mass education.

The first group, to our mind, should include works published in the "Journal of the Ministry of Public Education" (*Zhurnal ministerstva narodnogo prosveshcheniya*) in the period from 1856 to 1917. For example, the first short article on public education in Denmark was published there in 1856 ([O narodnom., 1856](#)). In the early 20th century, the area was explored by such researchers as N. Yegorov and S.S. Zakusev. For example, N. Yegorov examined Denmark's education both from inside ([Egorov, 1915](#)) and outside ([Egorov, 1917](#); [Egorov, 1917a](#)) school curriculum.

As for the second group of works, it is important to note studies on the history of German popular education, carried out by A.M. Mamadaliev et al. ([Mamadaliev et al., 2019](#); [Mamadaliev et al., 2019a](#); [Mamadaliev et al., 2019b](#)). Primary education in Serbia was addressed by G. Rajović et al. ([Rajović et al., 2018](#); [Rajović et al., 2018a](#)). Numerous attempts were made to review the Russian system of popular education ([Cherkasov, 2011](#); [Natolochnaya et al., 2021](#); [Magsumov, 2015](#); [Cherkasov et al., 2020](#)). The Swiss model of popular education was spotlighted by A.M. Mamadaliev et al. ([Mamadaliev et al., 2018](#)).

4. Results

In Denmark, the organization of public schooling was initiated by the School Act of 1814, which laid foundation for further development of the school, focused on teacher training, stipulated education as a compulsory obligation, determined a school's structure of expenditure and set forth teachers' salaries and pensions.

At the time, the school curriculum included the Law of God, native language, penmanship, arithmetic, singing and gymnastics (for boys only) and, if possible, subject-matter lessons and fundamentals of history and geography. To optimize costs, the old position of the Küster* was charged with a new duty of teaching. However, the enthusiasm for mass schooling quickly dwindled as the country moved into economic recession. Key reasons behind the situation were low pays received by teachers and poor school supplies. A note should be made that such leaps characterized not only Denmark, but Russia as well (particularly following the abolition of serfdom

* Küster is a steward clergyman. In Christianity, since ancient times, a Küster (sexton) was responsible for managing church housekeeping matters.

– Cherkasov et al., 2020: 660), and even Germany (Mamadaliyev et al., 2019). In addition, teaching methods featured little novelty because mutual instruction was widely used. Certain success was notched only in gymnastics teaching methods.

After the 1830s, the area of schooling showed significant buoyancy. Teachers began to form basic professional associations, journals on pedagogy were established (Russia's first pedagogical journal "Journal of the Ministry of Public Education"* also appeared at this time) and dedicated congresses brought together teachers to discuss educational reforms. All these enabled teachers to start putting forward their proposals at estate assemblies for consideration.

With the urge to set up higher levels of education, the opening of advanced type city schools, which delivered programs on natural science and new languages, was initiated in 1838. In 1844, radical transformation changed schools in the country's capital, Copenhagen (Zakusev, 1911: 10-11).

In the middle of the 19th century, European pedagogy was dominated by two pedagogical trends, liberal and conservative one. A prominent figure in Denmark's conservative pedagogy was a Danish priest, writer and philosopher Nikolaj Frederik Severin Grundtvig (1783–1872) (Figure 1).



Fig. 1. Nikolaj Frederik Severin Grundtvig

Grundtvig was committed to reforming schools and revitalizing popular life mainly through the knowledge of the Danish language and history, and he eventually gave birth to a separate movement in Danish schooling. Of course, Grundtvig paid much attention to schools for young people. His criticism of the school's callosity and sermon "Schools for Life" produced a direct impact on popular schooling.

In 1848, the entire school system was subordinated to the Ministry of Church and Popular Education. However, the school reform, which was enthusiastically debated in the press, faced with misunderstanding in the parliament as members plunged into disputes on to what extent the state and public self-administrations should interfere with school affairs.

It was not until 1856 that the School Act was ratified to enable a rise in the teacher's pay, empower community administrations to invite teachers to available vacancies, and ensure that a significant portion of the school system's funding was provided by the state (Zakusev, 1911: 11). At the same time, the system of teacher training seminaries was reformed, exams set up to qualify for the rank of female teacher and new pedagogical courses for teachers established. The increasing number of teachers, employed certified female teachers, launched preparatory schools for children

*The journal was founded in 1834 and existed until 1917. The journal resumed operation in 2014 and is currently published in Bratislava.

under 10, expanded curricula and the instituted title of head teacher – all added major improvements to schooling.

The period also introduced teachers' congresses that markedly kindled interest in school issues. The internal structure of the pedagogical process was also redefined – oral instruction gained momentum, biblical history was given priority over catechism, and school discipline became much less harsh. However, teachers were charged with clear goals of educating children in the ways that would foster the national spirit.

1870 marked the start of all-Scandinavian pedagogical congresses that considerably lessened Germany's previous pedagogical impact on Denmark. All the change was the result of extended civil rights and growing patriotic sentiments in society, and another driver was the influence of Grundtvigian ideas. Grundtvig's pedagogical ideas were put to practice thanks to a Danish teacher, Christen Mikkelsen Kold (Figure 2).

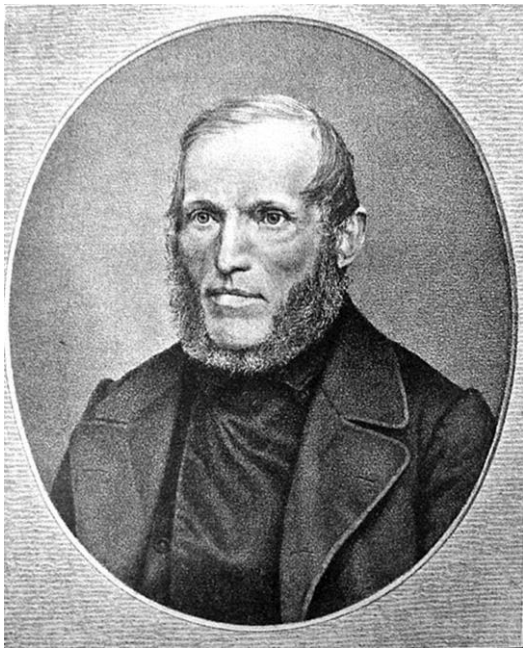


Fig. 2. Christen Mikkelsen Kold (1816–1870)

Ch. Kold advocated the right of parents to provide education for their children in line with their personal convictions, and his initiative facilitated the launch of several independent schools for children. The independent schools specifically sought to develop imagination and emotional intelligence in children, with a focus on singing, history, Danish poetry and biblical history (Zakusev, 1911: 12). According to Kold's design, such a school should predominantly use the 'living word' instead of official textbooks, and most lessons should include congregational singing.

Despite all its one-sidedness, the movement generated an extremely beneficial effect, as it aroused a sense of responsibility in parents and brought friendly methods of teaching, fresh outlook and renewal to Danish schools. Freedom of independent education was codified by the 1855 Act. The law made compulsory school attendance exempt only for the children of those parents who could guarantee proper education for their children outside community schools.

Kold's followers actively worked to modernize all community schools in line with their ideas, but the endeavor run into considerable resistance by various stakeholders. For this reason, disputes over the merits of state and free schools long were the most important item in all debates on the issues of the popular school. The confrontation, aggravated by political uncertainty, long remained an obstacle to implementing the required reforms. Repeated legislative initiatives in the period from 1872 to 1885 yielded no result. Only local parliaments of major cities, led by Copenhagen, chose to carry out thorough school reforms. Fundamental differences patched up over time. This allowed resuming a constructive dialog. In 1899, following a lengthy debate in the Rigsdag, a new act was approved, which, together with the amendments of 1904 and 1908 improved the teacher's

pay, reduced class sizes, extended curricula and increased government spending on school needs (Zakusev, 1911: 13).

In addition, the quality of teacher training, which was greatly reduced as a result of uncontrolled independent education, was significantly enhanced by the 1894 Act. Along with this, the 1903 Act on general secondary educational institutions connected the secondary school with the folk school, and the former obtained a new meaning – the basic school. Fresh legislative initiatives further increased the role of public administrations and private individuals in school affairs, which soon produced a positive impact on the school system.

From a pedagogical perspective, specialized literature and numerous congresses of teachers and educators were crucial. Their efforts helped expand school programs on history, contributed to a wider use of the principle of visual demonstration, conferred more rights on natural history, and created a new activity with the introduction of manual labor and home economics. At the same time, increasing emphasis was placed on improving the school's exterior experience and better school health teaching. Larger local governments began to provide free meals for students with economically disadvantaged backgrounds. Schools were now equipped with school bathing facilities (baths and showers). Some schools even began to invite school physicians. Finally, up to 20,000 Copenhagen schoolchildren were offered an opportunity to spend 2 or 3 weeks in the countryside.

A note should also be made that teacher training seminaries were set up in Denmark at the turn of the 19th century, and there were 7 such seminaries in Denmark as early as by the 1850s. These seminaries were supervised by the Ministry of Religious Affairs and Popular Education. Each seminary had its own director who was also the first professor, as well as 3 or 4 professors. The number of students varied from 30 to 80 people who studied for 2 or 3 years (O narodnom..., 1856: 6).

Beginning already in the 1870s, teachers started to form networks. In addition to several mutual societies, the Danish Union of Teachers was founded in 1874, which actively worked towards better conditions for folk teachers, promotion of teachers' congresses, dissemination of the best textbooks and maintenance of teachers' widows. In 1886, the Society of Danish Free Schools and the Danish School Society were created.

All the developments raised the teacher on the social ladder to a higher level – while retaining the traditional forms, schooling was given the new content that, in turn, brought about transformation in the teacher too.

In the early 20th century, the lower popular education had the following arrangement in Denmark. Compulsory schooling began at the age of 7 and ended when the child reached the age of 14. In the same way as before, home schooling was also allowed, provided that academic performance was necessarily assessed by a local school commission. At the beginning of the century, community schools were attended by: 91 % of children in rural areas, 80 % in cities and 76% in the capital (Zakusev, 1911: 14). Fines were imposed on parents whose child missed school without a legitimate reason. However, school absences decreased each year in the first decade of the 20th century. A key factor that contributed to irregular schooling was the engagement of children in family or factory work or sending children to the town, and agricultural labor in rural areas. However, it should be in fairness noted that, excluding absences due to illness, other reasons led to only 0.5 % of school days missed in the capital, from 1 to 2 % in cities and up to 5 % in villages (Zakusev, 1911: 15).

In each community, schools were divided into school districts according to the number of schools and were managed: by parish councils in villages and by city councils in cities. Schools were supervised by school commissions that consisted of a local pastor and several members. The activity of school commissions was under the control of school directorates. In the early 1910s, there were 73 school directorates in total in Denmark based on the number of rural dean's districts. All directorates of one district constituted a district directorate, and there were 18 such units in the country. All district directorates, in turn, reported to the Ministry of Church and Popular Education. The ministry approved all curricula, the size of the teacher's pay, handled dismissals of teachers and interpreted laws.

The Ministry received annual reports from school directorates that executed their reports using reports of school commissions. In addition, bishops, priests, gymnastics and singing inspectors reported annually to the ministry about their observations during their visits to schools.

Considering the reports, the Ministry, if applicable, initiated formal discussion with local authorities on matters related to schooling improvements.

As of 1908, in Denmark, there were 3,218 community schools in villages where education took place from 7 to 14 years old, 733 preparatory schools where education took place up to the age of 10, and, in addition, part of school-age children attended free and state educational institutions (lower and secondary schools) whose number in villages was 488. Overall, 253,000 children studied in villages, of which 233,000 attended community schools. At that time, 5,052 teachers worked in community schools (3,735 men and 1,317 women). In the period, the number of schoolchildren in cities reached 154,000, of which 112,000 attended community schools. City schools had 3,593 teachers (1,793 men and 1,800 women) (Zakusev, 1911: 17).

In the countryside, there were preparatory schools for children younger than 10 in addition to folk schools. In areas with sparse population, there were “mobile schools”, and therefore, one teacher could work in two schools (in the main one and additional one). There were 68 such schools in 1908 (Zakusev, 1911: 17).

Interestingly, in the countryside, everyone had the right to engage in private education, without taking a required examination for teacher qualification. In villages, schools had in most cases less than 100 students, on the average, in cities nearly 1,000, and in the capital – over 1,500. Hence, the number of classes varied from school to school: in villages, the average number of classes was around 2, in cities – 13, and in the capital – 43.

Classes in different regions were characterized by important variations in their size. For example, the number of students per class was limited to 30 children in Copenhagen (in the capital). Until 1900, laws permitted to accept 50 students per class. By 1910, however, the number was set to the maximum of 35 students in cities and 37 in villages. By the way, in the Russian Empire, the number of students per teacher was 50 since 1908.

A brief description should also be provided for compulsory subjects in folk schools. For example, the compulsory scope covered: Law of God, Danish language, penmanship, arithmetic, history, geography, singing, gymnastics for boys; in cities, the list additionally included drawing as well as gymnastics and handicrafts for girls. Optional subjects were natural science and manual labor, as well as gymnastics and home economics for girls.

Preparatory schools taught reading, writing, counting and singing. Their curriculum also included the fundamentals of the Law of God. A distinguishing feature of Danish folk schools was their religious nature. Teachers’ duty was to introduce children into the Law of God based on the Evangelical Lutheran teaching.

The period of schooling, which lasted from the age of 7 to 14, was divided into three levels: the junior level was three years, the middle and senior levels were 2 years each. Preparatory schools were covered at the junior level.

Table 1 shows lessons broken down by levels in city schools.

Table 1. Minimum number of lessons in city schools per level (Zakusev, 1911: 28)

Subjects	1st level	2nd level	3d level
Law of God	4/2	3	3
Danish language and penmanship	9	8	9
Arithmetic	6/2	3	4
History			
Subject-matter lessons, geography and natural science	4/2	4	4
Singing	2/2	1	1
Total	18	21	24

Table 2. Minimum number of lessons in rural schools per level (Zakusev, 1911: 28)

Subjects	1st level	2nd level	3d level
Law of God	4/2	3	8
Danish language and penmanship	9	8	3
Arithmetic	6/2	3	4
History, subject-matter lessons, geography and natural science	6/2	3	3
Singing	2/2	1	1
Total	18	18	18

As for textbooks and libraries, city schools had large libraries, while schools in rural communities received little funding for these needs. However, almost all communities provided children from low-income families with free textbooks and teaching aids. In Copenhagen and many other cities, schools also had teacher libraries in addition to student ones. A note should be made that gymnasiums in the Russian Empire also had student and teacher (fundamental) libraries (Molchanova et al., 2020: 92). Libraries, which enjoyed state funding, were required to compile their collections in compliance with the ministerial catalog of approved books.

As it was the case in the Russian Empire, there were evening supplementary schools operating in Denmark. Former graduates could continue their education in the facilities in the evening. References to the schools began to appear as early as 1814, but the practice never came into use on a significant scale. In 1910, 879 evening supplementary schools existed. The schools offered the following curriculum: the native language, penmanship, arithmetic, natural science and history. Two-hour classes took place at least two evenings per week and were arranged only in winter.

5. Conclusion

Summing up the results, an important note should be made that Denmark's system of popular education experienced a dynamic transformational journey in the 19th and early 20th centuries. This period marked ups and downs, such as confrontation among followers of the liberal and conservative concepts in European pedagogy, which culminated in productive activity based on regional conditions. An important note should be made that Denmark was very close to the Russian Empire in areas related to popular education, because both countries were dominated by the German pedagogical system and were about to introduce universal primary education.

References

- Cherkasov et al., 2020 – Cherkasov, A.A., Bratanovskii, S.N., Ponomareva, M.A., Zimovets, L.G. (2020). Educational Institutions under the Ecclesiastical Department in the Russian Empire (1860–1917): A Historical-Statistical Study. *European Journal of Contemporary Education*. 9(3): 657-665.
- Cherkasov, 2011 – Cherkasov, A.A. (2011). All-Russian primary education (1894-1917): Developmental Milestones. *Social Evolution and History*. 10(2): 138-149.
- Egorov, 1915 – Egorov, N. (1915). Shkola v Danii [School in Denmark]. *ZhMNP*. 3: 308-364. [in Russian]
- Egorov, 1917 – Egorov, N. (1917). Vneshkol'noe obrazovanie v Danii [Out-of-school education in Denmark]. *ZhMNP*. 9: 291-331. [in Russian]
- Egorov, 1917a – Egorov, N. (1917). Vneshkol'noe obrazovanie v Danii (prodolzhenie) [Out-of-school education in Denmark (continued)]. *ZhMNP*. 11-12: 229-251. [in Russian]
- Magsumov, 2015 – Magsumov, T.A. (2015). The additional professional training in the late Russian Empire. *Bylye Gody*. 36(2): 327-337.
- Mamadaliyev et al., 2018 – Mamadaliyev, A.M., Gordeev, I., Miku, N.V., Médico, A. (2018). Teacher training for the system of primary education in Switzerland in the mid-nineteenth century. *European Journal of Contemporary Education*. 8(1): 222-228.

[Mamadaliev et al., 2019](#) – Mamadaliev, A.M., Svechnikova, N.V., Miku, N.V., Médico, A. (2019). The German System of Public Education in the Period between the 15th and Early 20th Centuries. Part 1. *European Journal of Contemporary Education*. 8(2): 445-453.

[Mamadaliev et al., 2019a](#) – Mamadaliev, A.M., Svechnikova, N.V., Miku, N.V., Médico, A. (2019). The German System of Public Education in the Period between the 15th and Early 20th Centuries. Part 2. *European Journal of Contemporary Education*. 8(3): 646-654.

[Mamadaliev et al., 2019b](#) – Mamadaliev, A.M., Svechnikova, N.V., Ermachkov, I.A., Médico, A. (2019). The German System of Public Education in the Period between the 15th and Early 20th Centuries. Part 3. *European Journal of Contemporary Education*. 8(3): 646-654.

[Molchanova et al., 2020](#) – Molchanova, V.S., Balanyuk, L.L., Vidishcheva, E.V., Potapova, I.I. (2020). The Development of Primary Education on the Cossack Territories in 1803–1917 years (on the Example of the Kuban Region). Part 3. *Bylye Gody*. 55(1): 88-104.

[Natolochnaya et al., 2021](#) – Natolochnaya, O.V., Allalyev, R.M., Svechnikov, V.A., Petrova, S.V. (2021). Emergence of the Russian Public Education System in the Patriarchal Era (1593–1721). *European Journal of Contemporary Education*. 10(1): 246-251.

[O narodnom..., 1856](#) – O narodnom obrazovanii v Danii [About public education in Denmark]. *ZhMNP*. 1856. 4: 161-172. [in Russian]

[Rajović et al., 2018](#) – Rajović, G., Zuev, M., Vazerovala, A.G., Trailovic, M. (2018). Development of primary public education system in Serbia in 1832-1882. *European Journal of Contemporary Education*. 7(3): 623-629.

[Rajović et al., 2018a](#) – Rajović, G., Bratanovskii, S.N., Vazerovala, A.G., Trailovic, M. (2018). Development of the secondary-level education in Serbia from 1808 to the 1870s. *European Journal of Contemporary Education*. 7(4): 927-934.

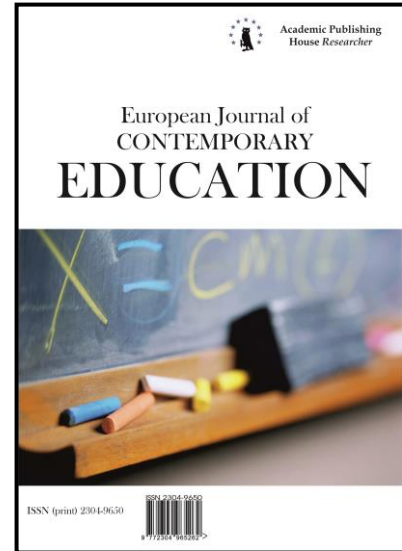
[Rajović, Bulatović, 2017](#) – Rajović, G., Bulatović, J. (2017). Geography education research in Serbia: A teacher's perspective. *European Journal of Contemporary Education*. 6(1): 100-125.

[Zakusev, 1911](#) – Zakusev, S.S. (1911). Ocherki srednego i nizshego obrazovaniya Danii [Essays on secondary and lower education in Denmark]. *ZhMNP*. 7: 1-49. [in Russian]



Copyright © 2021 by Academic Publishing
House Researcher s.r.o.
All rights reserved.
Published in the Slovak Republic
European Journal of Contemporary Education
E-ISSN 2305-6746
2021. 10(2): 517-528
DOI: 10.13187/ejced.2021.2.517
www.ejournal1.com

IMPORTANT NOTICE! Any copying, reproduction, distribution, republication (in whole or in part), or otherwise commercial use of this work in violation of the author(s) rights will be prosecuted in accordance with international law. The use of hyperlinks to the work will not be considered copyright infringement.



Schools for Training Future Clerical Employees in the Russian Empire: Professional Staff and Characteristics of the Learning Process

Sergey I. Degtyarev ^{a, b, *}, Mykola S. Nazarov ^a, Lybov G. Polyakova ^{b, c, d}

^a Sumy State University, Sumy, Ukraine

^b Cherkas Global University (International Network Center for Fundamental and Applied Research), Washington, USA

^c Volgograd State University, Volgograd, Russian Federation

^d East European Historical Society, Russian Federation

Abstract

As the bureaucratic apparatus burgeoned in the Russian Empire, an urgent need arose to provide it with professional personnel. The government made a series of attempts to address the issue since the early 19th century. One effort comprised the organization of clerical workforce schools. The institutions were expected to staff various levels of numerous government bodies with properly trained clerks.

In the paper, the authors adopted a comprehensive approach to highlight activities of schools for potential clerks. In particular, our study focused on the staff, financing policies in the educational institutions, functions performed by the management in the schools and supervisory bodies and learning process organization.

With a variety of research works and sources reviewed, the authors can conclude that, in the environment of the ever growing functional and structural complexity of the bureaucratic apparatus in the Russian Empire, schools for future clerks considerably drove the development of professional qualities required in employees of the state bureaucracy. It was these educational institutions that to a large extent helped set up a flow of junior professional clerks to government agencies and authorities.

Keywords: clerical employees, officials, Charter of schools for children of clerical employees, professional education, Russian Empire, 19th century.

* Corresponding author

E-mail addresses: starsergo2014@gmail.com (S.I. Degtyarev)

1. Introduction

The first half of the 19th century marked rapid progression of the bureaucratic apparatus in the Russian Empire. Its structure became more sophisticated as the bureaucratic machine evolved areas of subject matter expertise based on the functions performed. Government bodies rose dramatically in number and in variety, starting from the lowest departments up through to the highest authorities. Personnel for the bodies were in great demand at the time. It was often difficult to pick candidates for middle and top positions, but the government still managed to deal with the objective with relative success. Strengthening government bodies with “technical” personnel – junior officials that included clerical employees, scribes, copyists, archivists, filing clerks and others – was a far tougher challenge. Each authority needed a sufficiently large supply of such officials. However, the positions were not always easy to fill, even if there were those who wanted to occupy them, because applicants were expected to have good record keeping skills, be able to properly draw up various documents and have other competencies.

The relevance of the competencies was not that high almost over the entire 18th century. It was sufficient to be able to write, including in calligraphy. This also quenched the demand for some time after the administrative reforms in the last quarter of the 18th century. Technical aspects of matters controlled by specific government departments and increasingly elaborate bureaucratic functions sizably complicated the rules for drawing up and managing documents, and, as a result, proficiency requirements for officials holding clerical positions became tougher.

To provide numerous government bodies, authorities and agencies of various levels with properly trained clerical employees, the process of creating vocational educational institutions was initiated in the Russian Empire in the first half of the 19th century. The schools became a primary focus of this study.

2. Materials and methods

The paper's key source includes the legislative acts issued in the first half of the 19th century, which regulated the activity of the clerical schools under review. The documents were published in the second collection of the “Complete collection of laws of the Russian Empire” (PSZ-2). They were used to trace the evolution of the educational institutions and explore their operation, since the time they were established in 1828 to the middle of the 19th century.

The paper's methodological basis incorporates the principles of historicism and objectivity, which ensure an unbiased picture of events and phenomena of the past in their development and interrelation. We also used an anthropocentric perspective because our work had a close look at people that shared either a set of professional functions (teaching and management staff of the schools) or belonged to a specific socio-professional group (poor clerical employees and other officials, as well as their children). By employing the method of comparative analysis, we were able to identify common and distinguishing features in the way different educational institutions (clerical schools and *uezd* (district) schools) functioned in the period under review. The cliometric method enabled the work to leverage and analyze various quantitative data on the research topic.

The educational institutions under review were originally called Schools for Children of Clerical Employees. So, the name codified the category of individuals who were entitled to study at the schools. But over time, in addition to clerical employees, the government permitted other types of officials to send their children to the institutions. Nevertheless, the ultimate purpose of the schools was to train specialists who would have to take clerical positions in various government bodies and authorities. For this reason, our paper will use interchangeably terms “school for children of clerical employees”, “school for clerical employees” and “school for future clerical employees”.

3. Discussion

The history of education is a long established and one of the most popular areas of academic interest. A multitude of works examined the development of education in the Russian Empire in the 18th – early 20th century.

A number of scholars studied the education level of civil servants of the Russian Empire or educational institutions that provided training for future officials. The growth of the bureaucracy was closely intertwined with professionalization of bureaucratic personnel in the Russian Empire between the 18th and 19th centuries. The need for education was long linked with the opportunity to pursue a career in the public service. Hence, as researchers explored the operation of various

government or educational institutions of the period, they, one way or another, touched on the aspects related to the influence of the education system on the training of future or existing officials. In the range of these studies, we, above all, should point out the works by Russian and Ukrainian scholars, such as M. Vladimirskiy-Budanov ([Vladimirskiy-Budanov, 1874](#)), D. Tolstoy ([Tolstoy, 1883](#)), Ya. Barshev ([Barshev, 1876](#)), O. Pivovarov ([Pivovarov, 2001](#)), O. Yehorova ([Yehorova, 2004](#)), V. Masliichuk ([Masliichuk, 2009](#)), Yu. Disson ([Disson, 2008](#)), N. Zakaluzhna ([Zakaluzhna, 2009](#)) and V. Slotin ([Slotin, 2010](#)). A number of researchers put the problem in the center of their studies ([Bezrodnyiy, 1903](#); [Degtyarev, 2011](#); [Flynn, 1968](#)). In one of our works, we analyzed a package of measures that the government of the Russian Empire initiated to set up the process of professional training for officials by opening appropriate educational institutions and providing a legal framework for the process regulation ([Degtyarev, 2012](#)). Later, we also concentrated on such topics as the role of education in the professional capabilities of civil officers and employees of the department of public education as a constituent part of the bureaucratic apparatus ([Degtyarev, 2014: 102-190](#)).

The research area is generally reviewed in a wide range of studies. Proceeding from this, a number of scholars even sought to systematize them in individual historiographic works ([Lebid et al., 2020a](#); [Lebid et al., 2020b](#)).

Despite the attention to the subject, no dedicated studies have been aimed so far to supply an in-depth analysis of schools for future clerical employees, which were first launched in the Russian Empire in 1827-1828.

4. Results

On November 1 and 2, 1825, the cities of Yaroslavl and Poltava, respectively, arranged specialized departments to train clerical employees, namely scribes. Each of the departments received 50 students sent from the Poltava and Yaroslavl social welfare boards (*prikaz obshchestvennogo prizreniya*). The opening of these educational institutions was patronized by the military governor of Little Russian and civil governor of Yaroslavl. They later reported to the Minister of Internal Affairs (the title was held by V.S. Lanskoj at that time) that the institutions had already been properly equipped and were on and running. However, the Senate issued a corresponding edict based on the report only in May 1826, entitled “On opening Departments for students from Social Welfare Boards in the cities of Yaroslavl and Poltava to prepare scribes” ([PSZ-2. T.I. №346: 466](#)). In fact, these were the first attempts to institute professional training of civil servants at the government level.

October 14, 1827, almost two years later, saw His Imperial Majesty’s Edict “On the clerical employees of the civil affairs department” issued ([PSZ-2. T.II. №1469: 895-897](#)). It was an essential legislative act that regulated various matters related to the category of employees. It institutionally recognized the need for professional training of applicants for clerical positions. The government realized that the positions would not look very attractive for the most of the nobility. Hence, the edict instructed the Senate to develop a plan to establish schools that would “educate the children of impecunious clerical employees in line with their destiny”. When beginning their clerical service, applicants were required to “prove that not only can they read and write correctly, but know the fundamentals of grammar and arithmetic” ([PSZ-2. T.II. №1469: 895, 896](#)).

The edict, dated October 14, 1827, also demonstrates an aspiration by the government to make provisions to able to support schools in training clerical employees. All clerical officials on active duty were entitled to the so-called army ration. Moreover, officials working in provincial bodies and authorities, were also allocated cloth to have uniforms sewn. The same edict stipulated to convert surplus food and cloth, if any, into the support for the schools. The equivalent of the surplus stock price was transferred as sums of money to the social welfare boards in the governorates where the schools were to be launched ([PSZ-2. T.II. №1469: 897](#)).

Less than a year later (February 16, 1828), the emperor approved the “Charter of schools for children of clerical employees”. The document completed the legal implementation of schools for children of clerical employees as a new type of educational institution.

These institutions were accountable to the main department of the Ministry of Internal Affairs, but the primary oversight over the learning process was a responsibility of the Ministry of Public Education. The schools had three grades, but the academic program lasted six years (two years in each grade).

Mention has already been made above that the state was in critical need for properly trained officials, including clerical employees, at the time. But the Charter clearly shows the effort of the document compiler to shape, in the first place, a positive image of the government that demonstrates paternal care for its subjects and only then advances state interests. The Charter of February 16, 1828, even accordingly formulated the goals of creating schools for children of clerks:

1. "Grant aid to indigent (poor) board clerical employees or their families in raising children".
2. "Provide these children with decent upbringing".
3. "Educate (train) individuals capable of holding clerical and general civil service positions"

(PSZ-2. T.III. №1814: 158).

At the local level, clerical schools were supposed to be run by and receive financing from social welfare boards.

At the time when the Charter of schools for clerical employees was approved, an educational institution of the type already functioned in the Ryazan governorate. The plan aimed to start 10 more such schools in different cities across the empire, such as Arkhangelsk, Astrakhan, Voronezh, Kishinev, Nizhny Novgorod, Oryol, Perm, Pskov, Kherson and Yaroslavl. The schools were meant to train personnel for clerical positions in 20 governorates and 2 oblasts of the Russian Empire.

From this point forward, schools for future clerks started emerging in other cities of the empire. As early as on February 18, 1828, a decision was made to establish such schools in St. Petersburg, Moscow, in the summer of 1830, a school was opened in Smolensk, and more (PSZ-2. T.III. №1817: 174; Shperk, 1899: 54).

As soon as the foundation process for the clerical schools began, the issue of providing the educational institutions with premises was top of the agenda. The task of devising a solution was given to the Ministry of Internal Affairs. It was recommended to use buildings owned by social welfare boards or other unused public facilities (PSZ-2. T.III. №1814: 159). Construction of new buildings was coordinated if authorities could not find premises for a school.

The Charter of schools for children of clerical employees was supplemented with a special schedule (*rospis*) that detailed the number of students the schools could enroll, the teaching and administrative staff, calculations of the funds required to maintain schools, their employees and students, etc. (PSZ-2. T.III. №1814: Prilozheniya: 64-77). Even quotas were introduced for each governorate and oblast on the number of children they could send to the institutions to take up studies (see Table 1).

Table 1. Schools training clerical employees and number of students permitted in them as per the Charter of February 16, 1828

Clerical employee training schools	Permitted number of students	Governorates and oblasts which were authorized to send children to the schools (number of students)
Arkhangelsk school	25	Arkhangelsk G. (15) Olonets G. (10)
Astrakhan school	40	Astrakhan G. (20) Caucasus O. (20)
Voronezh school	60	Voronezh G. (10) Saratov G. (10) Sloboda Ukraine G. (10) Tambov G. (30)
Kishinev school	20	Bessarabia O. (20)
Nizhny Novgorod school	60	Nizhny Novgorod G. (15) Penza G. (20) Simbirsk G. (10) Kazan G. (15)
Oryol school	60	Oryol G. (20) Kaluga G. (10) Tula G. (10) Kursk G. (10)

		Mogilev G. (10)
Perm school	45	Perm G. (15) Vyatka G. (15) Orenburg G. (15)
Pskov school	60	Pskov G. (15) Novgorod G. (15) Smolensk G. (10) Tver G. (10) Vitebsk G. (10)
Kherson school	50	Kherson G. (18) Ekaterinoslav G. (18) Taurida G. (14)
Yaroslavl school	50	Yaroslavl G. (14) Vologda G. (12) Kostroma G. (12) Vladimir G. (12)

Overall, the 10 schools were allowed to have only 470 students, and the number was obviously insufficient and far from the desired figure to saturate the bureaucratic apparatus of the Russian Empire with clerical officials. But, we have already pointed out that similar educational institutions continued to open in other cities throughout the country in this and subsequent periods.

Note should also be taken of the fact that the entire spending for all educational and daily living needs of each student without exception was provided by the social welfare boards and through government subsidies (see [Table 2](#)).

Table 2. Number of students maintained through funding from Social Welfare Boards or government subsidies as per the Charter of February 16, 1828

Clerical employee training schools	Total number of students	Students paid for by social welfare boards	Students paid for through government subsidies
Arkhangelsk school	25	0	25
Astrakhan school	40	18	22
Voronezh school	60	40	20
Kishinev school	20	20	0
Nizhny Novgorod school	60	42	18
Oryol school	60	40	20
Perm school	45	22	23
Pskov school	60	24	36
Kherson school	50	30	20
Yaroslavl school	50	27	23

A school's funding was also determined depending on how many students the facility was designed to have. For example, schools with a capacity for 30 students were funded at the rate of 350 rubles per student. Larger schools were financed at the rate of 300 rubles per student. The money allocated not only covered student maintenance, but also the salaries of school employees and running costs, including firewood for heating, candles for lighting, books, dishes, clothing for students, food and others. So, average spending for one school, based on its size, could vary from 9 to 16.5 thousand rubles per year. In the first year of operation, each institution additionally received 150 rubles for each student from the government.

Similarly, the staff of the schools for future clerical officials was estimated. For example, a school, intended for 30 students, was supposed to employ one supervisor (smotritel) and an

assistant supervisor, paid 600 and 300 rubles per year, respectively. It should have four teachers on the staff in disciplines: 1) Law of God and Sacred History; 2) reading, spelling and grammar; 3) history and geography; 4) mathematics and drafting. Their salaries were subsidized in the amount of 2 thousand rubles per year (PSZ-2. T.III. №1814: Prilozheniya: 64). In addition, the schools separately hired a scribe to handle paperwork, as well as three servants – a cook and two laundresses. Staff schedules in schools, which fitted more than 30 students, differed insignificantly. The supervisor had two assistants. The number of teachers here was the same as in the schools for 30 students, and the same 2 thousand rubles were annually allocated for their salaries. The service personnel were slightly more extensive and included six servants, two cooks and three laundresses (PSZ-2. T.III. №1814: Prilozheniya: 70).

Instruction in clerical schools was supposed to be delivered by teachers from local gymnasiums and uezd schools. As for training in rules and procedures for handling documents or judicial practice, schools could invite retired or practicing officials.

School day-to-day operation was directly managed by supervisors. The general oversight of the institutions, however, was a responsibility of Boards of Trustees, formed specifically for the purpose. These boards were headed by civil governors and included provincial aristocracy leaders, governorate school directors and one member from the Social Welfare Boards. In some cases, other officials could be appointed to the Board of Trustees, if requested by the Ministry of Internal Affairs.

A Board of Trustees typically convened once a month. Meetings could be carried more often, as required. The Board watched over that the school ran its housekeeping processes in an orderly manner, monitored student performance, and made decisions to allocate funds as needed to maintain the school. A supervisor, his assistants, and teaching staff were hired or fired on the Board's discretion. The Board also decided on the admission or expulsion of students for academic failure or inappropriate behavior. In addition, the Boards of Trustees acted as an intermediary between clerical schools and the Ministry of Public Education in issues related to the educational process, which were not regulated by law.

A supervisor of a clerical school was obliged to comply with all the orders of the Board of Trustees. A supervisor's principal functions ranged from overseeing students' behavior and the school's housekeeping activities to ensuring that other school employees performed their duties as intended. He reported on all the matters directly to the chairman of the Board of Trustees (PSZ-2. T.III. №1814: 161).

As for student eligibility for enrollment, schools for children of clerical employees, unlike other schools, had their own peculiar process. Admission was only granted to children of poor clerical employees of state bodies at the governorate or uezd level, provided that their parents did not belong to a taxed estate. In addition, children should be vaccinated against smallpox or have immunity to it (had been exposed to the virus in the past) and have no chronic or contagious diseases, as well as suffer no physical and mental deviations that "could interfere with duties in the position" (PSZ-2. T.III. №1814: 162).

In October 1828, the Minister of Internal Affairs submitted a request to the Committee of Ministers to allow schools for children of clerical employees to "give custody to the children of estate representatives and secretaries in uezd courts and lower zemstvo courts in governorates where there was no nobility". The Committee rejected the request. The schools were specifically established for the children of indigent (poor) clerical employees and admitting children of other (often much more prosperous) officials there could brought about the need for major changes in the "Charter of schools for children of clerical employees" (PSZ-2. T.III. №2416: 986).

Nevertheless, one year had not passed when the problem was resolved. In September 1829, schools for clerical children were permitted to admit boarders (PSZ-2. T.IV. №3131: 634-635). The status of a boarder could receive a child of any official or noble. At the same time, the children were not regarded as students prescribed for such schools by the mandatory staff plan – they were, as it were, supernumerary students. The rule did not allow them to qualify for a portion of the state funding allocated to the educational institution. The tuition fee for boarders was equal to the sum of the state support for full-time students. Upon admission, parents of boarders made a one-time contribution of 150 rubles and paid 300–350 rubles annually. This was the sum that the

government spent to maintain one student, who came from a poor family of a clerical employee. Like regular students, boarders were required to submit medical documents to the school.

In 1834, the government added new categories of individuals eligible to go to schools for future clerical employees at public expense. By this time, the bureaucratic apparatus of the Russian Empire further yet more swelled. The number of grade rank officials (individuals that served their ranks according to the Table of Ranks) grew significantly, and was, among other things, swelled by poor members of non-aristocratic estates. Many of them had too small salaries and few other material resources to adequately keep their families. These officials, provided that their rank was not higher than grade IX (titular councilor) according to the Table of Ranks, had the opportunity to send their children to clerical schools as public charges. A note should be made, however, that the children of grade rank officials could only be admitted if there was “not enough children of prikaz clerks to complete school enrollment” (PSZ-2. T.IX. №7521: 121-122). It meant the children of low-income clerical employees still retained the formal right of the first priority when entering the institutions.

In 1845, the State Council approved a resolution that permitted establishing schools for children of clerical employees not only in central governorate cities, but wherever there was a need for the type of training facility and financial resources for the opening. The training departments for clerical employees, mentioned at the beginning of our work, that operated in social welfare boards in Yaroslavl and Poltava, were reorganized into schools for children of clerical employees in 1845 (PSZ-2. T.XX. №19558: 244-245). Moreover, all such schools could now increase enrollment up to 100 students. From that time on, the institutions were also opened for children of officials with ranks above grade VII according to the Table of Ranks (court councilor) (PSZ-2. T.XX. №19558: 244).

At the time of opening, the schools simultaneously enrolled students to two grades. The recommendation was to admit students aged from 10 to 12 (first grade) and from 12 to 14 (second grade) in equal shares. Subsequent enrollments admitted only children of 10-12 years old. The children, who were admitted to the second grade immediately, were required to have reading and writing skills. In 1836, the Committee of Ministers passed a resolution that allowed schools for future clerks to admit students beginning from the age of 9. In this case, preference was to be given to children who were orphans or whose parents were in extreme financial distress (PSZ-2. T. XI. №9522: 27).

The admission to the school followed a specific procedure. An applicant, which aspired to master the clerical profession, submitted a respective written request (application) to the school through the uezd marshal of the nobility or a uezd judge. A certificate of employment of the child's father, as well as a certificate of the difficult financial situation of their family were attached to the application. When considering candidates, priority was given to the children whose fathers had a longer and more impeccable record of service, to orphans, children from large families and children from other schools who had positive references from there.

The curriculum in schools for future clerical officials was similar to that of uezd schools in many respects. For example, the educational institutions taught the following disciplines:

- reading and penmanship;
- Law of God and Sacred History;
- Russian grammar;
- world and Russian history, geography of the world and the Russian state with the fundamentals of mathematical geography;
- arithmetic, basics of algebra, accounting and fundamentals of geometry with elements of trigonometry and geodesy;
- forms of proceedings and judicial procedures with practical exercises.

All the above disciplines were delivered in schools for clerks in the same volume and using the same tutorials as was the case in uezd schools (PSZ-2. T.III. №1814: 164).

Instructional times were strictly regimented. First-grade students had 4.5 classroom hours and 3 hours to prepare their lessons per day. In the second and third grades, lessons lasted 6 hours, and 3.5 hours were specified daily to do home assignment (PSZ-2. T.III. №1814: Prilozheniya: 76). The entire list of subjects delivered in schools for children of clerical employees and their weekly volumes in hours are shown in Tables 3, 4 and 5.

Table 3. Subjects and hours allocated for them per week for first-grade students in schools for children of clerical employees

Grade	Year of study	Subjects	Hours per week
I	1	Reading	9
		Writing	9
		Arithmetic	6
	2	Reading	9
		Writing	6
		Catechism	3
		Arithmetic	6

Table 4. Subjects and hours allocated for them per week for second-grade students in schools for children of clerical employees

Grade	Year of study	Subjects	Hours per week
II	3	Reading training	4
		Penmanship	4
		Dictating and copying	4
		Sacred history	2
		World (ancient) history	4
		Ancient geography	2
		Arithmetic	4
		Grammar	4
		Essay writing	4
	4	Selected reading	4
		Penmanship	4
		Dictating and copying	4
		Sacred history	2
		World (medieval) history	4
		Ancient geography	2
		Algebra	4
		Grammar	4
		Essay writing	4

Table 5. Subjects and hours allocated for them per week for third-grade students in schools for children of clerical employees

Grade	Year of study	Subjects	Hours per week
III	5	Manuscript reading	2
		Making fair copies of documents	4
		Longer Catechism	2
		World (contemporary) history	4
		Russian history	4
		World geography	4
		Accounting	4
		Training on making extracts and other documents	4
		Demonstration of types of clerical work	4
	6	Manuscript reading	2
		Making fair copies of documents	4

	Explanation of church decrees	2
	World (contemporary) history	4
	Russian history	4
	Geography of Russia	4
	Geometry and drawing	4
	Training on making extracts and other documents	4
	Demonstration of types of clerical work	4

The tables above show that first graders were instructed in reading, writing and counting (see Table 3). And subjects that broadened their general knowledge and gave them practical skills required for their potential occupation was only taught starting from the third year of study. For future clerical officials, such practice-oriented subjects, of course, included penmanship, copying documents, reading manuscripts, training in making extracts, study of clerical work (see Tables 4 and 5).

The profession of a clerk in the first half of the 19th century directly involved work with handwritten documents. Many of them were difficult to read, which, in the first place, was brought about by such nuances as hand writing styles of their authors or scribes, time of document execution and their physical condition, i.e. how they were preserved. Therefore, schools for future clerks prepared students for such challenges. For example, the last year of study (third grade) introduced a subject “Manuscript reading”. The «Gradual academic program for children of clerical employees» formulated the following purpose of the subject: “Reading manuscripts made in various handwriting styles” (PSZ-2. T.III. №1814: Prilozheniya: 75). This shows that students received hands-on training and were specifically drilled to deal with various difficulties they might encounter when reading handwritten texts.

Learning process organization and teaching methods were also built using the so-called Lancasterian System, named after an English educator, Joseph Lancaster. It is also known as the Bell-Lancaster method because another English educator Andrew Bell developed the same teaching methodology independently of J. Lancaster (Brokgauz i Efron, 1992: 45). The system gained widespread popularity in the early 19th century in many countries, and the Russian Empire adopted it in 1819 (although the system never came into common use). According to the system, older and more trained students (monitors) became helpers to the teacher who provided guidance as monitors conducted classes with younger students. The methodology made education more inclusive covering larger classes at a time.

In 1822, the Lancasterian instruction method was introduced in parish schools in the Russian Empire, but was only applied to the subjects such as reading, writing and basics of arithmetic (Orlov, 2013: 12; Zacek, 1967). Schools for children of clerical employees, were likely to use the Lancasterian teaching system for the same set of disciplines delivered in the first grade.

The director of educational institutions for the governorate, where a school for children of clerical employees was located, tracked good quality of teaching in the facility and students’ diligence in their schoolwork. To this end, he could appear at any moment at the school without a word of prior notification and check the knowledge of students in any subject, as well as personally review teaching methods there. This audit was called an “individual test”. In addition, a “general test” was held every year. It was an annual examination for all students, which was attended by the Board of Trustees, parents and everyone interested (PSZ-2. T.III. №1814: 165).

The brightest examinees could expect to have a more promising future. If they showed particularly outstanding performance at the exam at the end of the second grade, they received a privilege to additionally study Latin and German at local gymnasiums, as were transferred to the third grade. The students again took an exam in two years, when they finished the third grade. If they demonstrated the highest possible results this time as well, they were granted the right to apply to specialized departments at the Moscow, St. Petersburg, Kazan or Kharkov gymnasiums. They were admitted straight to the third grade and took a training course specified for provincial gymnasiums. Over the last two years of study, they also attended lectures on Russian jurisprudence at one of the universities (in Moscow, St. Petersburg, Kazan or Kharkov). However, the honor was

bestowed only on the fortunate few. Schools for future clerks were allowed to select no more than one student out of 20 examinees for gymnasiums. Some of them could gain the right to apply to the university after completing the gymnasium curriculum. In the long term, this opened a door to the civil state service in higher and more prestigious positions than clerical ones (PSZ-2. T.III. №1814: 166-167).

Graduates of schools for children of clerical employees were offered regular or supernumerary clerical positions of the lowest rank in governorate or uezd public offices. Those who further succeeded in finishing the gymnasium program, but failed to enter the university, could apply for clerical positions of a higher category. If a governorate had not enough vacancies for clerical positions, applicants could then be sent to work in other regions of the empire.

Young people who graduated from schools for future clerks were required to work in a civil authority for at least 8 years. Those, who in addition completed the gymnasium program, had to serve for at least 6 years (PSZ-2. T.III. №1814: 168). Boarding students were in a more advantageous position in this regard. Those who completed the full academic program at a school for future clerks were required to do a civil service only for 4 years. And the term of service for those who graduated from a gymnasium was even smaller – just 3 years (PSZ-2. T.IV. №3131: 634).

Moreover, the government took some steps to keep updated the professional skills acquired by clerical employees during their training in the schools. Senior government officials held an opinion that young clerks “could easily lapse into indolence, giving up any attempts to continue their education or, worse, forgetting what they learned in schools” (PSZ-2. T.XI. №9529: 30). As a result, on September 18, 1836, an imperial edict was issued, which made it mandatory for graduates of schools for children of clerical employees to take exams in all subjects they studied at the school over the first three years of their work in clerical positions. Young officials had to take a test of knowledge directly in schools for future clerks, or in provincial gymnasiums, uezd schools, and even right at the place of their employment.

The very first examinations brought back poor results. Government officials came up with a potential reason for the situation. They believed the knowledge acquired quickly degraded because young clerical employees had no handbooks and tutorials they could leverage to preserve their knowledge. The government’s special edict, dated December 21, 1837, ordered that young graduates from schools for future clerks, who joined the civil service, should be provided, at the schools’ expense, with handbooks and tutorials on all subjects studied. In addition, they were allowed to attend school and public libraries (PSZ-2. T.XII. №10824: 1025-1026). Apparently, by taking the decision, the Committee of Ministers thought the measures were sufficient to maintain the required level of knowledge and ensure further professional development of young clerical employees.

If, even with such opportunities to enhance their knowledge, clerks failed to perform well enough at examinations, their management might impose penalties on them. They could be deprived of any incentives and be denied the right to promotion. The terms of such punishments were also determined at the discretion of the employee’s immediate superiors (PSZ-2. T.XII. №10824: 1026).

5. Conclusion

Generally speaking, we should note that emerging schools, which trained future clerical employees, produced a beneficial effect in the Russian Empire. This was one of the government’s few activities in the first half of the 19th century, which truly aimed to improve professional competencies of employees in the state bureaucratic apparatus. The period witnessed a rather extensive network of educational institutions – parish and uezd schools, gymnasiums, lycées and universities – being created in the country. However, the key goals of the education system were to bring up citizens committed to the monarchy and advance the general intellectual enrichment of students. As a rule, this was not sufficient to efficiently carry out narrowly specialized professional functions in various lines of the state civil service. On the other hand, the bureaucratic machine of the Russian Empire rapidly grew, and its structure and functions became increasingly elaborate. In these circumstances, the idea of establishing schools to train future clerical employees and its implementation became one of the most forward-looking and transformative steps by the government. These educational institutions to a large extent helped set up a flow of junior professional clerks to various public agencies and authorities.

References

Barshev, 1876 – Barshev, Ya. (1876). Istoricheskaya zapiska o sodeystvii Vtorogo otdeleniya sobstvennoy Ego Imperatorskogo Velichestva kantselyarii razvitiyu yuridicheskikh nauk v Rossii [Historical note on the assistance of the Second Branch of His Imperial Majesty's own Chancellery to the development of legal sciences in Russia]. SPb. 32+7 p. [in Russian]

Bashkova, 2016 – Bashkova, I.S. (2016). K voprosu o statuse kantselyarskih sluzhiteley v pervoy polovine XIX v. (po materialam kantselyarii tavrisheskogo gubernatora) [To the question of the status of office attendants in the first half of the 19th century (on materials of office of the Taurian governor)]. *Nauchnyiy vestnik Kryima*. 4(4): 1-4. [Electronic resource]. URL: <https://cyberleninka.ru/article/n/k-voprosu-o-statuse-kantselyarskih-sluzhiteley-v-pervoy-polovine-xix-v-po-materialam-kantselyarii-tavrisheskogo-gubernatora/viewer> [in Russian]

Bezrodnyiy, 1903 – Bezrodnyiy, A.V. (1903). O podgotovlenii opyitnykh i obrazovannykh deyateley dlya gosudarstvennoy sluzhby [On the preparation of experienced and educated figures for the civil service]. *Zhurnal Ministerstva yustitsii*. 9: 249-285. [in Russian]

Brokgauz i Efron, 1992 – Bell (Andryu Bell) [Andrew Bell]. Entsiklopedicheskiy slovar Brokgauz i Efron. Biografii. T.2. Beyer – Vaker. Moskva: Bolshaya Rossiyskaya entsiklopediya, 1992. P. 45. [in Russian]

Degtyarev, 2011 – Degtyarev, S.I. (2011). Mistse dukhovnykh navchalnykh zakladiv u pidhotovtsi kadrov dlia tsyvilnykh derzhavnykh ustanov Rosiiskoi imperii u XVIII st. [Place of religious educational institutions in training for civilian government agencies of the Russian Empire in the XVIII century]. *Naukovyi visnyk Mykolaivskoho natsionalnoho universytetu imeni V.O. Sukhomlynskoho: Zbirnyk naukovykh prats*. Vypusk 3.31: Istorychni nauky. Mykolaiv: MNU, 55-63. [in Ukrainian]

Degtyarev, 2012 – Degtyarev, S. (2012). Civil Officers' Educational Level in the First Half of XVIII Century. *Bylye Gody*. 23(1). Pp. 11-18. [in Russian]

Degtyarev, 2014 – Dehtiarov S.I. (2014). Tsyvilne chynovnytstvo Ukrainy u kintsi XVIII – pershii polovyni XIX st.: monohrafiia [Civil officialdom in Ukraine at the end of the 18th – the beginning of the 19th centuries: monograph]. Sumy: TOV «Drukarskyi dim «Papirus». 472 s. [in Ukrainian]

Disson, 2008 – Disson, Yu.A. (2008). Litsei i blagorodnyie pansioni v sisteme narodnogo prosvescheniya Rossii v pervoy treti XIX veka [Lyceums and noble boarding schools in the system of public education in Russia in the first third of the 19th century]: diss. ... kand. ist. nauk: 07.00.02. Moskva, 307 p. [in Russian]

Flynn, 1968 – Flynn, J.T. (1968). The Universities, the Gentry, and the Russian Imperial Service, 1815-1825. *Canadian Slavic Studies*. Pp. 486-503.

Lebid et al., 2020a – Lebid, A., Shevchenko, N., Chuikov, O., Svechnikov, V. (2020). The Officialdom of the Russian Empire: A Modern Historiography of the Issue. Part II. *Bylye Gody*. 55(1): 115-129.

Lebid et al., 2020b – Lebid, A., Shevchenko, N., Volkov, A., Ponomareva, M. (2020). The Officialdom of the Russian Empire: A Modern Ukrainian Historiography. *Bylye Gody*. 56(2). 495-507.

Masliichuk, 2009 – Masliichuk, V. (2009). Hramotnist ta riven osvity na Livoberezhnii Ukraini XVII-XVIII st.: tvorennia istoriohrafichnoho stereotypu [Literacy and level of education in the Left Bank of Ukraine of the XVII-XVIII centuries: creation of a historiographical stereotype]. *Kyivska akademiia*. Vyp. 7. Kyiv, pp. 73-86. [in Ukrainian]

Orlov, 2013 – Orlov, A.A. (2013). Lankasterskie shkoly v Rossii v nachale XIX veka [Lancaster schools in Russia at the beginning of the XIX century]. *Pedagogika i psihologiya obrazovaniya*. 2: 9-23. [in Russian]

Pivovarov, 2001 – Pivovarov, O.V. (2001). Stanovlennia i rozvytok svitskoi serednoi osvity na Livoberezhzhi ta Slobozhanshchyni (druha polovyna XVIII – persha tretyna XIX st.) [Formation and development of secular secondary education in the Left Bank and Slobozhanshchyna (second half of the 18th – first third of the 19th century)]: dys. ... kand. ist. nauk: 07.00.01. Kharkiv, 244 p. [in Ukrainian]

PSZ-2 – Polnoe sobranie zakonov Rossiyskoy imperii, sobranie 2 [Complete collection of laws of the Russian Empire, collection 2]. [in Russian]

[Shperk, 1899](#) – *Shperk, Fr.F.* (1899). Kratkiy istoricheskiy ocherk narodnogo obrazovaniya v Smolenskoj gubernii [A brief historical outline of public education in the Smolensk province]. Pamyatnaya knizhka Smolenskoj gubernii na 1900 god. Smolensk: Tipografiya P.A. Silina, 35-110. [in Russian]

[Slotin, 2010](#) – *Slotin, V.E.* (2010). Provintsialnoe uchilischnoe chinovnichestvo Rossii v XIX v.: na materialah Kazanskogo uchebnogo okruga [Provincial school bureaucracy in Russia in the 19th century: on the materials of the Kazan educational district]: diss. ... kand. ist. nauk: 07.00.02. Kirov, 2010. 243 s. [in Russian]

[Tolstoy, 1883](#) – *Tolstoy, D.A.* (1883). Vzglyad na uchebnuyu chast v Rossii v XVIII stoletii do 1782 goda [A look at the educational part in Russia in the 18th century until 1782]. SPb.: Tipografiya Imperatorskoj Akademii Nauk, 100 p. [in Russian]

[Vladimirskiy-Budanov, 1874](#) – *Vladimirskiy-Budanov, M.* (1874). Gosudarstvo i narodnoe obrazovanie v Rossii XVIII veka. Chast I. Sistemyi professionalnogo obrazovaniya (ot Petra I do Ekaterinyi II) [State and public education in Russia in the 18th century. Part I. Professional education systems (from Peter I to Catherine II)]. Yaroslavl: Tipografiya G.V. Falk, 330 p. [in Russian]

[Yehorova, 2004](#) – *Yehorova, O.V.* (2004). Yurydychna osvita v universytetakh Ukrainy XIX – pochatku XX st. (etapy ta osoblyvosti rozvytku) [Legal education in Ukrainian universities of the XIX – early XX centuries (stages and features of development)]: dys. ... kand. ist. nauk: 07.00.01. Dnipropetrovsk, 199 p. [in Ukrainian]

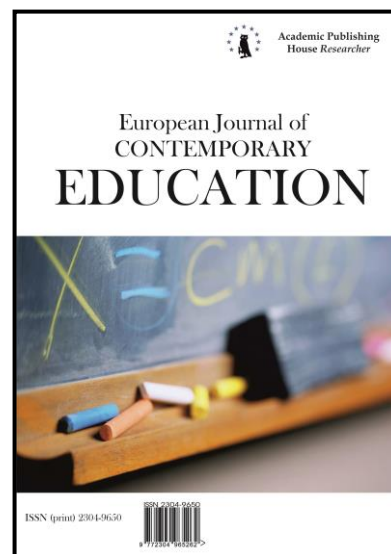
[Zacek, 1967](#) – *Zacek, J.C.* (1967). The Lancastrian school movement in Russia. *The Slavonic and East European Review*. 45(105): 343-367.

[Zakaluzhna, 2009](#) – *Zakaluzhna, N.* (2009). Profesionalizatsiia yustytsii v Rosiiskii imperii yak chynnyk sudovoi reformy 1864 roku [Professionalization of justice in the Russian Empire as a factor in judicial reform in 1864]. *Mizhkulturnyi dialoh*. Tom 1: Identychnist. Kyiv: Dukh i Litera. Pp. 151-165. [in Ukrainian]



Copyright © 2021 by Academic Publishing
House Researcher s.r.o.
All rights reserved.
Published in the Slovak Republic
European Journal of Contemporary Education
E-ISSN 2305-6746
2021. 10(2): 529-545
DOI: 10.13187/ejced.2021.2.529
www.ejournal1.com

IMPORTANT NOTICE! Any copying, reproduction, distribution, republication (in whole or in part), or otherwise commercial use of this work in violation of the author(s) rights will be prosecuted in accordance with international law. The use of hyperlinks to the work will not be considered copyright infringement.



The System of Public Education in Baku Governorate in the Period between the second half of the 19th century and the early 20th century. Part 1

Timur A. Magsumov ^{a, b, c, *}, Teymur E. Zulfugarzade ^d, Mikhail B. Kolotkov ^e, Sergei B. Zinkovskii ^f

^a Cherkas Global University (International Network Center for Fundamental and Applied Research), Washington, USA

^b Volgograd State University, Volgograd, Russian Federation

^c Naberezhnye Chelny State Pedagogical University, Naberezhnye Chelny, Russian Federation

^d Russian Economic University named after G.V. Plekhanov, Moscow, Russian Federation

^e Peter the Great St. Petersburg Polytechnic University, St. Petersburg, Russian Federation

^f Peoples' Friendship University of Russia (RUDN University), Moscow, Russian Federation

Abstract

This work analyzes the system of public education in Baku Governorate in the period between the second half of the 19th century and the early 20th century. This part of the work examines the timeframe 1849–1900, i.e. the period from the creation of the governorate to the beginning of the 20th century.

The key source used in putting this work together is the annual Reports on Educational Institutions in the Caucasus Educational District, which provide data on the region's schools under the purview of the Ministry of Public Education. Wide use was made of the statistical method. The authors researched the reports for statistical data on the following: the types of the region's educational institutions, the number of schools in the region, the region's library holdings, and the region's student body (information related to student demographics, including ethnicity, religion, social estate, and gender). The use of the statistical method helped identify some of the key distinctive characteristics of the development of the system of public education in Baku Governorate in the period 1849–1900.

The authors' conclusion is that the system of public education in Baku Governorate had markedly distinct characteristics. Above all, this was the case with its private educational institutions, which played an important role in the development of its public education system. By the year 1900, Baku Governorate had in place an entire network of public and private educational institutions, which included six gymnasia, seven lower educational institutions, and

* Corresponding author

E-mail addresses: nabonid1@yandex.ru (T.A. Magsumov)

113 primary schools. Gender-wise, girls comprised just 31% of the region's total student body, which at the time was quite characteristic of areas with a large Muslim population.

Keywords: Baku Governorate, system of public education, period between the second half of the 19th century and the early 20th century, Ministry of Public Education

1. Introduction

In 1846, the Caucasus Viceroyalty was divided into the Shamakhi, Tiflis, Kutais, and Derbent governorates (Mil'man, 1966: 133). However, in 1859 the capital of Shamakhi Governorate, Shamakhi, was destroyed by a devastating earthquake. The capital was moved to Baku, and the governorate was renamed Baku Governorate. As other regions of the Caucasus, Baku Governorate had a motley population. As of 1886, the region had a population of 712,000, of which 377,000 were Azerbaijanis (approx. 53 %), 134,000 – Tats (19 %), 57,000 – Dagestanis (8 %), and 50,000 – Talyshes (7 %), with ethnic Russians placed fifth – 42,000 (6 %), followed by Armenians – 39,000 (5.5 %). In large part, the region's demographic circumstances are what determined the complexity of organizing its system of public education.

This part of the work examines the making and development of the system of public education in Baku Governorate in the period 1849–1900, i.e. the period from the creation of the governorate to the beginning of the 20th century.

2. Materials and methods

The key source used in putting this work together is the annual Reports on Educational Institutions in the Caucasus Educational District, which provide data on the region's schools under the purview of the Ministry of Public Education.

Wide use was made of the statistical method. The authors researched the reports for statistical data on the following: the types of the region's educational institutions, the number of schools in the region, the region's library holdings, and the region's student body (information related to student demographics, including ethnicity, religion, social estate, and gender). The use of the statistical method helped identify some of the key distinctive characteristics of the development of the system of public education in Baku Governorate in the period 1849–1900.

3. Discussion

In his work on the system of public education in Kars Oblast, scholar T.A. Magsumov notes the following: “Up to now, the system of public education in Kars Oblast in the period 1878–1917 has not been the subject of independent research. What is more, the topic has not been touched upon in research publications even incidentally” (Magsumov et al., 2020: 222). This statement holds true for Baku Governorate too. Nevertheless, there are several summarizing works on the system of public education in other regions of the Caucasus, including Tiflis Governorate (Mamadaliyev et al., 2020; Mamadaliyev et al., 2020a; Mamadaliyev et al., 2020b; Mamadaliyev et al., 2020c), Kuban Oblast (Molchanova et al., 2019; Molchanova et al., 2019a; Molchanova et al., 2020), Stavropol Governorate (Natolochnaya et al., 2020; Natolochnaya et al., 2020a; Natolochnaya et al., 2020b), Black Sea Governorate (Cherkasov et al., 2020; Cherkasov et al., 2020a), and Kutais Governorate (Mamadaliyev et al., 2021).

In addition, in recent years researchers have expressed keen interest in the study of the system of public education in various governorates within the Russian Empire. Specifically, a team of researchers led by A.A. Cherkasov has explored the system of public education in Vologda Governorate (Cherkasov et al., 2019; Cherkasov et al., 2019a; Cherkasov et al., 2019b; Cherkasov et al., 2019c); A.Yu. Peretyat'ko has researched a similar subject in the context of the Don region (Peretyatko, Zulfugarzade, 2017; Peretyatko, Zulfugarzade, 2017a; Peretyatko, Zulfugarzade, 2019; Peretyatko, Zulfugarzade, 2019a); O.V. Natolochnaya has investigated the system of public education in Vilna Governorate (Natolochnaya et al., 2019; Natolochnaya et al., 2019a); T.A. Magsumov has studied the characteristics of the system of public education in Vyatka Governorate (Magsumov et al., 2018).

4. Results

The network of educational institutions in the Caucasus was divided into the systems of secondary education, lower education, and primary education. The system of secondary education

included male gymnasia and progymnasia, real schools, female gymnasia and progymnasia, and teacher's institutes and seminaries. The system of lower education was represented by urban schools, mountain schools, Mariinsky schools, and industrial schools. The system of primary education was comprised of parochial and primary schools (Magsumov et al., 2020: 223).

Naturally, given the region's complex demographic conditions, it was difficult to open new schools in the governorate. One of the first educational institutions in Baku was St. Nina's School for Girls, opened on April 15, 1848. Note that around the same time similar institutions were established in Tiflis (1846) and Kutais (1847) (Otchet, 1899: 166).

Secondary education

Despite all the problems in the development of the systems of primary and lower education in the region, on January 1, 1874, it became home to its first secondary educational institution for boys – Baku Real School (Otchet, 1885: tables). In September the same year, the governorate became home to its first secondary educational institution for girls as well – Baku Female Gymnasium (Otchet, 1885: 130). Thus, the governorate's residents were now able to have their children attend school without having to travel outside of the region.

Twenty-two years later, on September 1, 1896, the region became home to Baku Male Gymnasium (Otchet, 1899: 6), and on June 9, 1897, St. Nina's School for Girls was reorganized into another female gymnasium (Otchet, 1899: 166).

Table 1 displays the numbers of secondary educational institutions and students in them in Baku Governorate in the period 1884–1900.

Table 1. Numbers of Secondary Educational Institutions and Students in Them in Baku Governorate in the Period 1884–1900 (Otchet, 1885: tables; Otchet, 1886: 68, tables, 162; Otchet, 1887: tables, 106-107, 138, 168; Otchet, 1890: № 51, № 80, № 106, № 130; Otchet, 1891: № 51, № 80, № 108, 130; Otchet, 1892: № 80, № 130; Otchet, 1893: № 80, № 130; Otchet, 1894: № 80, № 130; Otchet, 1895: № 80, № 130; Otchet, 1896: № 80, № 130; Otchet, 1897: 60, 138, 214-215; Otchet, 1899: 60, 138, 214-215; Otchet, 1900: 60, 138, 214-215; Otchet, 1901: 60, 138, 214-215)

Year	Number of educational institutions					Number of students		
	Gymnasia		Progymnasia		Real schools	Boys	Girls	Total
	Male	Female	Male	Female				
1874	-	1	-	-	1	N/A	N/A	N/A
1884	-	1	-	-	1	465	250	715
1885	-	1	-	-	1	481	274	755
1886	-	1	-	-	1	491	280	771
1889	-	1	-	-	1	503	324	827
1890	-	1	-	-	1	515	321	836
1891	-	1	-	-	1	542	379	921
1892	-	1	-	-	1	585	402	987
1893	-	1	-	-	1	542	433	975
1894	-	1	-	-	1	596	477	1,073
1895	-	1	-	-	1	640	477	1,117
1896	1	1	-	-	1	1,255	568	1,823
1898	1	2	-	-	1	1,589	1,052	2,641
1899	1	2	-	-	1	1,657	1,103	2,760
1900	1	2	-	-	1	1,777	1,172	2,949

In analyzing Table 1, it is worth noting that, despite the low number of secondary educational institutions in Baku Governorate at the beginning of the period under examination, by 1900 the

region had managed to double their number, with the number of students in them growing 4 times. An interesting characteristic of the region's system of secondary education was that demand for secondary education in the governorate was very high. For instance, the male gymnasium in Baku was filled to capacity as soon as it opened. Interestingly, if in 1884 girls accounted for 35 % of the region's total student body, in 1900 the figure was now 40 %.

Table 2 displays the data on the region's student body in terms of ethnicity.

Table 2. Distribution of Students in Secondary Educational Institutions in Baku Governorate by Ethnicity in the Period 1884–1900 (Otchet, 1885: tables; Otchet, 1886: tables, 162-163; Otchet, 1887: 106-107, 168-169; Otchet, 1890: № 80, № 130; Otchet, 1891: № 80, № 130; Otchet, 1892: № 80, № 130; Otchet, 1893: № 80, № 130; Otchet, 1894: № 80, № 130; Otchet, 1895: № 80, № 130; Otchet, 1896: № 80, № 130; Otchet, 1897: 60-61, 138, 214-215; Otchet, 1899: 60-61, 138, 214-215; Otchet, 1900: 60, 138, 214-215; Otchet, 1901: 60, 138, 214-215)

Year	Ethnic Russians	Georgians	Armenians	Tatars	Mountaineers	Jews	Other ethnicities (Europeans)	Total
1884	377	16	204	43	11	16	18	715
1885	392	20	214	45	16	18	50	755
1886	402	14	230	37	15	21	52	771
1889	393	17	273	51	11	26	56	827
1890	416	24	252	56	11	33	44	836
1891	467	20	265	62	13	39	55	921
1892	472	14	263	56	17	48	66	987
1893	459	14	269	66	11	55	71	975
1894	545	18	276	73	7	73	81	1,073
1895	560	19	280	69	8	82	99	1,117
1896	766	32	647	89	12	149	128	1,823
1898	1,050	73	990	147	12	219	168	2,641
1899	1,077	74	1,045	142	14	246	180	2,760
1900	1,152	75	1,140	132	12	282	163	2,949

As evidenced in Table 2, at the time the ratio of boys to girls among ethnic Russian students in the region's secondary educational institutions was almost 1:1. Specifically, in 1900 ethnic Russian students in the region numbered 569 boys and 583 girls. Among the region's Georgian students, the sex ratio was two boys to one girl, with a similar figure recorded among its Armenian students. Compared with their Armenian counterparts, it was quite rare for the region's Muslim residents to enroll their children in secondary educational institutions. Specifically, of the region's approximately 3,000 students, Muslims accounted in 1900 for just 114 people, with just six of these being girls. Prior to 1896, virtually no Muslim girls in the region attended a secondary educational institution. As far as the region's mountaineers, the figure ranged in said period from seven to 17 people, and only once, in 1893, there were two mountaineer girls attending a secondary educational institution.

Prior to 1896, ethnic Russians accounted for the majority of students enrolled in the region's secondary educational institutions, However, starting in 1898, ethnic Russian students virtually evened up with Armenian ones in number.

Of significance is also the distribution of students in the region at the time by faith (Table 3).

Table 3. Distribution of Students in Secondary Educational Institutions in Baku Governorate by Faith in the Period 1884–1900 (Otchet, 1885: tables; Otchet, 1886: tables, 162-163; Otchet, 1887: 106-107, 168-169; Otchet, 1890: № 80, № 130; Otchet, 1891: № 80, № 130; Otchet, 1892: № 80, № 130; Otchet, 1893: № 80, № 130; Otchet, 1894: № 80, № 130; Otchet, 1895: № 80, № 130; Otchet, 1896: № 80, № 130; Otchet, 1897: 60-61, 138, 214-215; Otchet, 1899: 60-61, 138, 214-215; Otchet, 1900: 61, 138, 214-215; Otchet, 1901: 61, 138, 214-215)

Year	Orthodox Christians	Armenian Gregorian Christians	Catholics	Protestants	Jews	Muslims	Other faiths	Total
1884	389	192	19	41	16	54	4	715
1885	410	206	22	34	18	61	4	755
1886	414	214	18	47	21	52	5	771
1889	408	257	24	45	26	62	5	827
1890	433	242	13	42	33	66	7	836
1891	480	253	13	55	39	75	6	921
1892	482	247	20	61	49	73	6	987
1893	501	253	21	65	55	75	5	975
1894	560	259	22	75	73	80	4	1,073
1895	577	269	25	83	82	77	4	1,117
1896	787	620	37	115	144	101	19	1,823
1898	1,122	947	50	149	216	141	21	2,641
1899	1,152	1,140	55	160	241	138	14	2,760
1900	1,213	1,095	58	158	276	130	17	2,949

As evidenced in Table 3, Christians accounted in the region’s secondary educational institutions for nearly 87 %, followed by Jews (approx. 10 %), and then Muslims.

Table 4 displays the data on the student body in Baku Governorate’s secondary educational institutions in said period in terms of social estates.

Table 4. Distribution of Students in Secondary Educational Institutions in Baku Governorate by Estate in the Period 1884–1900 (Otchet, 1885: tables; Otchet, 1886: tables, 162-163; Otchet, 1887: 106-107, 168-169; Otchet, 1890: № 80, № 130; Otchet, 1891: № 80, № 130; Otchet, 1892: № 80, № 130; Otchet, 1893: № 80, № 130; Otchet, 1894: № 80, № 130; Otchet, 1895: № 80, № 130; Otchet, 1896: № 80, № 130; Otchet, 1897: 60-61, 138, 214-215; Otchet, 1899: 60-61, 138, 214-215; Otchet, 1900: 60, 138, 214-215; Otchet, 1901: 61, 138, 214-215)

Year	Nobles*	Persons of ecclesiastical status	Distinguished citizens and merchants of the first guild	Members of other urban estates	Peasants	Members of the lower ranks and Cossacks	Foreigners	Total
1884	394	23	252		18	1	27	715
1885	442	17	247		24	1	24	755
1886	436	12	265		31	11	16	771

* As used herein, the term ‘nobles’ means hereditary nobles, personal nobles, and functionaries.

1889	423	12	5	323	41	1	22	827
1890	424	9	7	340	27	10	19	836
1891	470	10	6	370	34	8	23	921
1892	458	10	9	381	39	5	35	987
1893	462	15	35	381	38	15	29	975
1894	494	17	44	438	38	17	25	1,073
1895	518	20	29	447	48	28	27	1,117
1896	653	38	65	861	142	30	34	1,823
1898	871	55	140	1,294	187	50	44	2,641
1899	891	56	135	1,385	212	45	36	2,760
1900	978	72	164	1,419	258	69	39	2,949

As evidenced in Table 4, in 1884 nobles (the children of nobles and functionaries) accounted for 55 % of the region's total student body. However, by 1900 this group had lost its prevalence in the region, coming to account for just 33 % of its total student body, with first place going to members of the urban estates – nearly 50 % of the total student body in the region's secondary educational institutions.

By tradition, major significance in the education system was attached at the time to the school library. As mentioned earlier, most secondary and lower educational institutions in the region had the following two separate library sections in place – fundamental (for teachers) and discipular (for students).

In 1884, Baku Real School had a library stock of 2,320 items in the fundamental library section and 1,003 items in the discipular one (Отчет, 1885: таблицы). As far as the library stock of Baku Female Gymnasium, it is to be noted that common practice in the Caucasus at the time was that where there was in place a male educational institution it would house a large fundamental library to be used by teachers from all educational institutions in town. The same was the case in Baku, where the fundamental library in the female gymnasium was secondary in significance and held just 204 items, with the discipular library holding 734 items (Отчет, 1885: 132). Thus, in 1884 the region's secondary educational institutions had a combined library stock of 4,261 items.

Fifteen years later (by 1900), secondary educational institutions in Baku Governorate had the following library stock: Baku Male Gymnasium – 4,566 items in the fundamental library section and 3,077 items in the discipular one (Отчет, 1901: 8); Baku Real School – 4,057 items in the fundamental library section and 1,820 items in the discipular one (Отчет, 1901: 111); Baku Female Gymnasium – 4,119 items in the fundamental library section and 3,568 items in the discipular one (Отчет, 1901: 170). St. Nina's Gymnasium for Girls had 702 items in the fundamental library section; it had no discipular section (Отчет, 1901: 170). Overall, in 1900 the region's secondary educational institutions had a combined library stock of 21,909 items, an increase of more than 5 times.

Lower education

Lower education in Russia was represented at the time by urban schools, mountain schools, female Mariinsky schools*, and industrial schools.

The region's first lower educational institution, Shamakhi Urban School, was opened in the same year as its first secondary one – 1874 (Отчет, 1885: tables).

In 1881, the governorate became home to Baku Nautical School (Отчет, 1885: tables).

On November 8, 1888, the region became home to Baku Tradesman's Specialized School (Отчет, 1890: № 241).

On September 1, 1889, the governorate became home to its second urban school – Baku Urban School (Отчет, 1890: № 185).

On September 1, 1896, Baku Tradesman's Specialized School was reorganized into Baku Tradesman's School. In addition, on the same day the region became home to a lower technical school (Отчет, 1897: 426). Two years later, in 1898, they opened in Baku another urban school,

* Mariinsky schools were female educational institutions under the purview of the widowed Empress Maria Fedorovna. There were no Mariinsky schools in Baku Governorate.

subsequent to which the two institutions were named ‘first urban school’ and ‘second urban school’, respectively (Otchet, 1899: 295).

Table 5 illustrates the dynamics of the numbers of lower educational institutions in Baku Governorate and students in them.

Table 5. Number of Lower Educational Institutions in Baku Governorate in the Period 1884–1900 (Otchet, 1885: 218, 238; Otchet, 1886: 192, 210-211, 244; Otchet, 1887: 198, 218-219, 232, 254-255; Otchet, 1890: № 185, № 203, № 241, № 259, № 271, № 282; Otchet, 1891: № 184, № 202, № 240, № 258, № 270, № 281; Otchet, 1892: № 202, № 258, № 281; Otchet, 1893: № 202, № 258, № 281; Otchet, 1894: № 202, № 258, № 281; Otchet, 1895: № 202, № 258, № 281; Otchet, 1896: № 200, № 258, № 281; Otchet, 1897: 327, 418, 462; Otchet, 1899: 329, 406, 442; Otchet, 1900: 296, 362, 456, 492; Otchet, 1901: 296, 362, 456, 492)

Year	Number of educational institutions				Number of students*
	Urban schools	Tradesman's specialized schools (lower technical schools)	Tradesman's schools	Nautical schools	
1884	1	-	-	1	205
1885	1	-	-	1	205
1886	1	-	-	1	193
1889	2	1	-	1	403
1890	2	1	-	1	470
1891	2	1	-	1	482
1892	2	1	-	1	499
1893	2	1	-	1	537
1894	2	1	-	1	579
1895	2	1	-	1	631
1896	2	1	1	1	700
1898	3	1	1	N/A [†]	937
1899	3	1	1	N/A	987
1900	3	1	1	N/A	1,058

As evidenced in Table 5, lower education in Baku Governorate was provided at the time only to boys. Both secondary and lower educational institutions in the region were divided by gender, meaning that boys and girls were taught separately. The governorate did not have separate lower educational institutions for girls. In the period 1884–1900, the number of lower educational institutions in the governorate rose 2.5-3 times, while the total student body in its lower educational institutions increased 5 times.

Another area of interest is the ethnic composition of the student body in the region's lower educational institutions at the time (Table 6).

* The student body was comprised of boys only.

† The Reports on Educational Institutions in the Caucasus Educational District stopped carrying data on the nautical school in 1898.

Table 6. Distribution of Students in Lower Educational Institutions in Baku Governorate by Ethnicity in the Period 1884–1900 (Otchet, 1885: tables, 239; Otchet, 1886: 210-211, 244-245; Otchet, 1887: 218-219, 254-255; Otchet, 1890: № 203, № 259, № 282; Otchet, 1891: № 202, № 258, № 281; Otchet, 1892: № 202, № 258, № 281; Otchet, 1893: № 202, № 258, № 281; Otchet, 1894: № 202, № 258, № 281; Otchet, 1895: № 202, № 258, № 281; Otchet, 1896: № 200, № 258, № 281; Otchet, 1897: 327, 418, 462-463; Otchet, 1899: 329, 442; Otchet, 1900: 362, 492; Otchet, 1901: 362, 492)

Year	Ethnic Russians	Georgians	Armenians	Tatars	Mountaineers	Jews	Other ethnicities	Total
1884	39	1	116	45	-	-	4	205
1885	42	7	107	46	-	-	3	205
1886	42	2	84	62	-	1	2	193
1889	156	6	119	100	1	10	11	403
1890	180	6	144	120	1	9	10	470
1891	194	10	138	111	-	17	12	482
1892	243	15	123	83	-	21	14	499
1893	256	16	150	74	2	23	16	537
1894	280	12	170	71	1	23	22	579
1895	312	9	186	77	1	34	12	631
1896	283	10	241	124	2	23	17	700
1898	293	16	320	250	4	32	23	937
1899	294	15	324	285	7	38	29	987
1900	308	11	332	319	15	51	27	1,058

As evidenced in Table 6, if in 1884 Armenians accounted for 56% of the total student body in the region's lower educational institutions, by as early as 1900 the way was now led by as many as three ethnic groups: ethnic Russians (29%), Armenians (31%), and Tatars (30%). With that said, in the period under examination the number of ethnic Russians rose nearly 8 times, Armenians – almost 3 times, and Tatars – 7 times. Growth was posted by other ethnic groups as well, including the region's mountaineers.

Let us now move on to the religious composition of the student body in the region's lower educational institutions at the time (Table 7).

Table 7. Distribution of Students in Lower Educational Institutions in Baku Governorate by Faith in the Period 1884–1900 (Otchet, 1885: tables, 239; Otchet, 1886: 210-211, 244-245; Otchet, 1887: 218-219, 254-255; Otchet, 1890: № 203, № 259, № 282; Otchet, 1891: № 202, № 258, № 281; Otchet, 1892: № 202, № 258, № 281; Otchet, 1893: № 202, № 258, № 281; Otchet, 1894: № 202, № 258, № 281; Otchet, 1895: № 202, № 258, № 281; Otchet, 1896: № 200, № 258, № 281; Otchet, 1897: 327, 418, 462-463; Otchet, 1899: 329, 443; Otchet, 1900: 363, 493; Otchet, 1901: 363, 493)

Year	Orthodox Christians	Armenian Gregorian Christians	Catholics	Protestants	Jews	Muslims	Other faiths (schismatics)	Total
1884	30	102	3	15	-	45	10	205
1885	37	91	2	17	-	46	12	205
1886	35	77	1	8	1	62	9	193
1889	121	109	1	19	10	101	42	403
1890	145	136	1	14	9	121	44	470
1891	164	127	1	20	17	111	36	482

1892	226	113	4	19	22	83	32	499
1893	245	137	6	23	23	75	28	537
1894	260	157	11	24	23	72	32	579
1895	294	158	4	28	35	78	24	631
1896	267	219	3	33	23	125	30	700
1898	323	303	4	28	32	304	43	937
1899	312	218	9	26	52	181	21	987
1900	281	304	9	37	51	334	43	1,058

As evidenced in [Table 7](#), in 1884 Christian students in the region's lower educational institutions accounted for 73 % (Orthodox Christians – 14.6 %; Armenian Gregorian Christians – 49.7 %). However, by 1900 the way was now led by Muslims (31.5 %), followed by Armenian Gregorian Christians (28.7 %), and then Orthodox Christians (26.5 %). With that said, it is to be noted that the number of Muslims in the region's lower educational institutions was not steady – it kept fluctuating significantly.

The description of the student body in Baku Governorate's lower educational institutions will be concluded with a look at its distribution by estate ([Table 8](#)).

Table 8. Distribution of Students in Lower Educational Institutions in Baku Governorate by Estate in the Period 1884–1900 ([Otchet, 1885: tables, 238; Otchet, 1886: 210-211, 244-245; Otchet, 1887: 218-219, 254-255; Otchet, 1890: № 203, № 259, № 282; Otchet, 1891: № 202, № 258, № 281; Otchet, 1892: № 202, № 258, № 281; Otchet, 1893: № 202, № 258, № 281; Otchet, 1894: № 202, № 258, № 281; Otchet, 1895: № 202, № 258, № 281; Otchet, 1896: № 200, № 258, № 281; Otchet, 1897: 327, 418, 462-463; Otchet, 1899: 329, 443; Otchet, 1900: 363, 493; Otchet, 1901: 363, 493](#))

Year	Nobles	Persons of ecclesiastical status	Distinguished citizens and merchants of the first guild	Members of other urban estates	Peasants	Members of the lower ranks and Cossacks	Foreigners	Total
1884	43	6	107		48	1	-	205
1885	42	9	122		28	2	2	205
1886	59	8	102		25	4	-	193
1889	80	14	11	211	68	14	5	403
1890	93	23	7	261	58	21	5	470
1891	86	22	9	271	64	23	7	482
1892	75	15	20	261	86	38	9	499
1893	62	11	25	266	118	45	10	537
1894	67	23	15	287	119	59	9	579
1895	71	15	15	307	154	61	8	631
1896	92	19	15	368	137	69	-	700
1898	70	33	9	505	158	38	19	937
1899	70	11	5	512	181	37	1	987
1900	93	39	17	563	241	95	10	1,058

As evidenced in [Table 8](#), in 1884 members of the urban estates accounted for more than 50 % of the total student body. By 1900, the trend of this group dominating the region's system of lower education persisted – 53 % of the total student body. This group was followed in 1900 by peasants, a group that in said period increased 5 times. Placed third was the Children of Nobles and

Functionaries group, which increased just 2 times. Another category that is worthy of mention is the Children of Members of the Lower Ranks and Cossacks group, but the figure kept fluctuating significantly.

A few words will now be said about the library holdings of the region's lower educational institutions at the time.

By 1884, Shamakhi Urban School had the following library stock: 1,058 items in the fundamental library section and 349 items in the discipular one (Otchet, 1885: tables). Baku Nautical School had only a fundamental library section, which held 182 items (Otchet, 1885: 220). Overall, in 1884 the region's lower educational institutions had a combined library stock of 1,589 items.

In 1900, the region's lower educational institutions had the following library stock: First Baku Urban School – 1,066 items in the fundamental library section and 2,006 items in the discipular one; Second Baku Urban School – 58 items in the fundamental library section and 487 items in the discipular one; Shamakhi Urban School – 2,434 items in the fundamental library section and 802 items in the discipular one (Otchet, 1901: 300); Baku Lower Technical School – 373 items in the fundamental library section and 587 items in the discipular one. The lower tradesman's school at the technical school did not have a library of its own (Otchet, 1901: 458). Overall, in 1900 the region's lower educational institutions had a combined library stock of 7,813 books, an increase of 5 times.

Primary education

The network of primary educational institutions in the region was represented by private, ministerial (schools under the purview of the Ministry of Public Education, including zemstvo and community schools), and parochial schools.

Private primary schools

Baku Governorate's network of private educational institutions is worthy of special consideration, as education was highly in demand in that region, which was quite uncharacteristic of the Caucasus, where private education was generally not very common. In 1900, Baku Governorate ranked second in the number of private educational institutions in the Caucasus, behind just Tiflis Governorate, and that is considering that the former had two private gymnasia versus the latter's one (Otchet, 1901: 518).

In 1884, the governorate had just four private primary schools (one male and three mixed), of which only one was housed in a building in satisfactory condition and had satisfactory furniture and textbooks (Otchet, 1885: 283). In 1885, out of the region's four private primary institutions (all mixed), two had satisfactory buildings, furniture, and textbooks (Otchet, 1886: 283). In 1886, the governorate now had eight private institutions (one lower and seven primary), all of which had satisfactory buildings and furniture, but only five had satisfactory textbooks (Otchet, 1887: 305). In 1889, the region had 10 private educational institutions (one lower and 9 primary) (Otchet, 1890: № 288). In 1890, the region no longer had in service the lower private educational institution; it had in operation nine primary institutions (Otchet, 1891: № 307). In 1891, the region became home to another three educational institutions, one of which being a male gymnasium (Otchet, 1892: № 309); two educational institutions ceased operation. In 1892, one new educational institution was opened in the region; three educational institutions were closed. Among the private educational institutions in operation were one male gymnasium and seven primary schools (Otchet, 1893: № 310). In 1893, the governorate became home to another five private institutions; one institution was closed. Among those in operation were one male and one female gymnasia, as well as 10 primary schools (Otchet, 1894: № 310). In 1894, no private institutions were opened in the region; one primary school was closed (Otchet, 1895: № 310). In 1895, the region became home to another five educational institutions. It now had in operation 16 private educational institutions – one female and one male gymnasia and 14 primary institutions (Otchet, 1896: № 310). In 1896, it became home to another six institutions; one institution was closed. The status of the male gymnasium was lowered to that of a lower educational institution. Overall, there were one female gymnasium, one male lower educational institution, four male primary schools, one female primary school, and 14 mixed primary schools (Otchet, 1897: 488).

In 1898, the region became home to another seven private educational institutions; no institutions were closed. Nevertheless, in 1898 the governorate did not have a single private

gymnasium in service, with the status of the female gymnasium lowered to that of a lower female institution; there were in operation 12 male primary, two female, and 16 mixed schools (Otchet, 1899: 468).

In 1899, Baku Governorate now had in operation 37 private educational institutions (six were opened and one was closed). Overall, there were in operation two lower (male and female) and 35 primary schools (10 male, seven female, and 18 mixed primary schools) (Otchet, 1900: 518).

In 1900, in a year's time the governorate closed two and opened two schools, with the overall figure, thus, remaining the same. However, there were substantial qualitative changes. Specifically, the region became home to two female gymnasia, two lower male schools, a female lower school, and 32 primary schools (nine male, six female, and 17 mixed) (Otchet, 1901: 518). Overall, the region's private educational institutions had a combined enrollment of 2,432 students (Otchet, 1901: 528). In this case, it is not possible to divide the student body across levels of education, as in the Reports on Educational Institutions in the Caucasus Educational District the data on the entire student body in the region's private educational institutions are provided in a single consolidated table.

In addition, in Baku Governorate there were Muslim and Jewish educational institutions, classified as ecclesiastical institutions. Specifically, in 1886 the governorate had in operation 249 Muslim educational institutions, in which students were taught the fundamentals of the Holy Quran, with a combined enrollment of 3,855 boys and 482 girls (Otchet, 1887: 312). In addition, that same year the region had in operation 17 Jewish educational institutions, with a combined enrollment of 201 boys and 14 girls (Otchet, 1887: 313).

Ministerial schools

The first school in the territory of the future Baku Governorate that would subsequently be under the purview of the Department of Public Education was opened back during the Caucasian War of 1817–1864 (Otchet, 1890: № 299).

Subsequently, the process of opening new primary schools continued, with the number of primary schools in the region reaching 11 by 1880 (Otchet, 1901: 543) and as many as 31 by the end of 1884 (Otchet, 1885: 256-257, 276). Table 9 illustrates the dynamics of the development of the network of primary educational institutions in Baku Governorate in the period through to 1900 (Table 9).

Table 9. Distribution of Primary Schools under the Ministry of Public Education in Baku Governorate in the Period 1884–1900 (Otchet, 1885: 256-257, 276; Otchet, 1885: 262-263, 284; Otchet, 1887: 272-273, 296; Otchet, 1890: № 296, 311; Otchet, 1891: № 315, № 330; Otchet, 1892: № 317, № 332; Otchet, 1893: № 318, № 333; Otchet, 1894: № 318, № 333; Otchet, 1895: № 318, № 333; Otchet, 1896: № 318, № 333; Otchet, 1897: 507, 536; Otchet, 1899: 486-487, 516; Otchet, 1900: 536-537, 566; Otchet, 1901: 536-537, 566)

Year	Two-grade schools			One-grade schools			Total schools	Number of students		
	Male	Female	Mixed	Male	Female	Mixed		Boys	Girls	Total students
1884		5			26		31	1,339	338	1,677
1885		5			26		31	1,362	361	1,723
1886		7			30		37	1,395	473	1,868
1889	3	-	-	17	1	19	40	1,404	302	1,707
1890	3	-	-	17	-	20	40	1,276	322	1,598
1891	3	-	-	19	-	19	41	1,482	338	1,820
1892	3	-	-	18	-	21	42	1,564	308	1,872
1893	4	-	-	20	-	11	35	1,495	181	1,676
1894	4	-	-	20	-	9	33	1,545	212	1,757

1895	4	-	-	20	-	9	33	1,596	277	1,873
1896	5	-	-	21	2	13	41	2,105	401	2,506
1898	4	1	3	29	5	24	66	2,976	1,015	3,991
1899	5	1	2	30	5	30	78	3,345	1,169	4,514
1900	4	1	3	36	5	32	81	3,786	1,321	5,107

As evidenced in [Table 9](#), in the period 1884–1900 the number of primary educational institutions in the region rose more than 2.5 times. With that said, the number of students in them rose 3 times. Gender-wise, the ratio was just one girl for every three boys, with the figure remaining virtually the same throughout said period.

It is now also worth taking a look at the ethnic composition of the student body in the region's primary schools at the time ([Table 10](#)).

Table 10. Distribution of Students in Primary Schools in Baku Governorate by Ethnicity in the Period 1884–1900 ([Otchet, 1885: 279; Otchet, 1886: 288-289; Otchet, 1887: 300-301; Otchet, 1890: № 314; Otchet, 1891: № 333; Otchet, 1892: № 335; Otchet, 1893: № 336; Otchet, 1894: № 336; Otchet, 1895: № 336; Otchet, 1896: № 336; Otchet, 1897: 542-543; Otchet, 1899: 522; Otchet, 1900: 572; Otchet, 1901: 572](#))

Year	Ethnic Russians	Georgians	Armenians	Tatars	Mountaineers	Jews	Other ethnicities	Total
1884	1,219	-	137	273	-	21	27	1,677
1885	1,265	5	204	212	1	15	21	1,723
1886	947	2	621	219	13	51	15	1,868
1889	1,045	5	272	266	40	40	38	1,707
1890	904	6	303	297	2	44	42	1,598
1891	1,066	4	280	333	36	52	49	1,820
1892	1,121	6	275	365	26	35	44	1,872
1893	1,020	4	159	413	32	23	25	1,676
1894	977	5	164	495	38	24	54	1,757
1895	1,017	5	161	588	41	39	22	1,873
1896	1,289	5	204	854	64	60	30	2,506
1898	1,824	12	921	964	77	64	129	3,991
1899	2,073	12	1,086	1,095	70	82	146	4,514
1900	2,163	19	1,331	1,239	61	137	157	5,107

Of interest are the data in [Table 10](#), in which it is evidenced that the system of primary education in Baku Governorate was in both 1884 and 1900 heavily dominated by ethnic Russians. Specifically, in 1884 ethnic Russians accounted for 72 % of the total student body, followed by Tatars (16 %), and then Armenians (8 %). By 1900, ethnic Russians accounted for 42% of the student body, followed by Armenians (26 %), and then Tatars (24 %). In the period 1894–1900, the region witnessed a significant increase in the number of Jewish students – from 21 people in 1884 to 137 people in 1900.

It is now worth taking a look at the religious composition of the student body in the region's primary schools at the time ([Table 11](#)).

As evidenced in [Table 11](#), in 1884 the way by a significant margin was led by the Other Faiths group. During the period under review, this group implied schismatics, who in 1884 accounted for 48 % of the total student body in the governorate's primary schools, i.e. one in two students. By 1900, the figure remained virtually the same, i.e. schismatics had initially enrolled a large number of children in the region's primary schools. In 1900, the situation changed radically. The way was now led by Muslims (25 %), followed by Armenian Gregorian Christians (24.8 %), and then Orthodox Christians (24.2 %), with schismatics ranking fourth (18.4 %).

Table 11. Distribution of Students in Primary Schools in Baku Governorate by Faith in the Period 1884–1900 (Otchet, 1885: 278-279; Otchet, 1886: 288-289; Otchet, 1887: 300-301; Otchet, 1890: № 314; Otchet, 1891: № 333; Otchet, 1892: № 335; Otchet, 1893: № 336; Otchet, 1894: № 336; Otchet, 1895: № 336; Otchet, 1896: № 336; Otchet, 1897: 542-543; Otchet, 1899: 523; Otchet, 1900: 573; Otchet, 1901: 573)

Year	Orthodox Christians	Armenian Gregorian Christians	Catholics	Protestants	Jews	Muslims	Other faiths	Total
1884	415	136	6	22	21	273	804	1,677
1885	500	165	5	55	15	213	770	1,723
1886	426	528	7	101	51	252	523	1,868
1889	346	220	7	84	100	306	643	1,707
1890	330	242	4	100	108	299	515	1,598
1891	352	221	1	105	135	369	637	1,820
1892	339	222	2	84	35	398	792	1,872
1893	460	158	2	9	23	455	569	1,676
1894	451	164	6	11	24	533	568	1,757
1895	443	161	5	11	39	632	582	1,873
1896	654	204	9	6	60	918	655	2,506
1898	985	739	7	277	64	1,041	878	3,991
1899	1,168	984	3	185	82	1,165	922	4,514
1900	1,241	1,270	6	212	137	1,300	941	5,107

Of interest is also the distribution of students in the region’s primary schools at the time by estate (Table 12).

Table 12. Distribution of Students in Primary Schools in Baku Governorate by Estate in the Period 1884–1900 (Otchet, 1885: 278; Otchet, 1886: 288-289; Otchet, 1887: 300-301; Otchet, 1890: № 314; Otchet, 1891: № 333; Otchet, 1892: № 335; Otchet, 1893: № 336; Otchet, 1894: № 336; Otchet, 1895: № 336; Otchet, 1896: № 336; Otchet, 1897: 542-543; Otchet, 1899: 523; Otchet, 1900: 573; Otchet, 1901: 573)

Year	Nobles and functionaries	Persons of ecclesiastical status	Members of the urban estates	Peasants, members of the lower ranks, and Cossacks	Foreigners	Total
1884	112	21	339	1,188	17	1,677
1885	120	17	484	1,087	15	1,723
1886	134	36	880	815	3	1,868
1889	109	16	489	1,039	3	1,707
1890	92	16	493	994	3	1,598
1891	87	21	533	1,176	3	1,820
1892	90	33	589	1,150	10	1,872
1893	92	27	519	1,020	18	1,676
1894	110	27	499	1,105	16	1,757
1895	129	31	558	1,151	4	1,873
1896	146	43	711	1,594	12	2,506
1898	171	54	1,544	2,204	18	3,991

1899	186	53	1,410	2,846	19	4,514
1900	221	64	1,910	2,902	10	5,107

As evidenced in [Table 12](#), in said period the number of students in the region’s primary schools rose 3 times. In 1884, the way was led by the Peasants, Members of the Lower Ranks, and Cossacks group (70.8 %), followed by members of the urban estates (20.2 %), and then nobles (6.6 %). By 1900, the rankings remained the same, with the percentages changing only: peasants – 56.8 %, members of the urban estates – 37.3 %, and nobles – 4.3 %. With that said, the number of peasants rose 2.4 times, members of the urban estates – 5.6 times, and nobles – just 2 times. While there was a threefold rise in the number of children of persons of ecclesiastical status, their number was still minimal.

A few words will now be said about the library holdings of the region’s primary schools at the time.

By 1884, the region’s 31 primary schools had a combined 30 libraries, with a combined library stock of 3,755 items, or 125 items per library ([Otchet, 1885: 267](#)). By 1900, the region’s 81 primary schools had a combined 81 libraries. Baku Governorate led the way in the Caucasus in the number of libraries in primary schools, followed by Black Sea governorate, and then Kuban Oblast ([Otchet, 1901: 554](#)). The combined library stock was 41,758 items, or 515 items per school. It is fair to note that the richest libraries in the Caucasus were in Kuban Oblast – an average of 1,056 items per library ([Otchet, 1901: 554](#)).

Parochial schools

In Baku Governorate, where the majority of the population was Muslim, Orthodox Christian parochial schools were not common. Specifically, in 1884 there were no parochial schools in the region, while in 1889 it had only one parochial school in operation ([Otchet, 1890: № 319](#)). This was another special characteristic for the education system in Baku Governorate.

[Table 13](#) illustrates the accomplishments of the system of public education in Baku Governorate in the period 1884–1900.

Table 13. The System of Public Education in Baku Governorate in the Period 1884–1900 ([Otchet, 1885: 285; Otchet, 1886: 295; Otchet, 1887: 307; Otchet, 1890: № 292; Otchet, 1891: № 311; Otchet, 1892: № 313; Otchet, 1893: № 314; Otchet, 1894: № 314; Otchet, 1895: № 314; Otchet, 1896: № 314; Otchet, 1897: 496; Otchet, 1899: 476; Otchet, 1900: 526; Otchet, 1901: 526](#))

Year	Schools under the Ministry of Public Education (MNE)							Students		
	Secondary		Lower		Primary		Total	Boys	Girls	Total
	MNE-run	Private	MNE-run	Private	MNE-run	Private				
1884	2	-	2	-	31	4	39	2,122	658	2,780
1885	2	-	2	-	31	4	39	2,166	738	2,904
1886	2	-	2	1	37	7	49	2,266	860	3,126
1889	2	-	4	1	40	9	56	2,564	740	3,304
1890	2	-	4	-	40	9	55	2,523	788	3,311
1891	2	1	4	-	41	9	57	2,861	859	3,720
1892	2	1	4	-	42	7	56	2,988	822	3,810
1893	2	2	4	-	35	10	53	3,067	965	4,032
1894	2	2	4	-	33	9	50	3,225	1,075	4,300
1895	2	2	4	-	33	14	55	3,783	1,191	4,974
1896	3	1	5	1	41	19	70	4,897	1,692	6,589
1898	4	-	4	2	66	30	102	6,515	2,801	9,316

1899	4	-	4	2	78	35	123	7,152	3,152	10,304
1900	4	2	4	3	81	32	126	7,891	3,655	11,546

As evidenced in [Table 13](#), by 1900 Baku Governorate had gone a substantial way in its journey toward the making of its system of secondary education (both male and female). In that period, the number of public and private gymnasia in the region rose 3 times, the number of lower educational institutions grew 3.5 times, and the number of primary educational institutions increased 3 times. The period 1884–1900 witnessed an increase of more than 4 times in the number of students in the region, with the figure growing 3.7 times with boys and as much as 5.5 times with girls. Of major significance to the development of female education were private educational institutions, where there was virtually a parity between boys and girls in enrollment (1,270 boys and 1,162 girls in 1900) ([Otchet, 1901: 526](#)).

5. Conclusion

The system of public education in Baku Governorate had markedly distinct characteristics. Above all, this was the case with its private educational institutions, which played an important role in the development of its public education system. By the year 1900, Baku Governorate had in place an entire network of public and private educational institutions, which included six gymnasia, seven lower educational institutions, and 113 primary schools. Gender-wise, girls comprised just 31% of the region's total student body, which at the time was quite characteristic of areas with a large Muslim population.

References

- [Cherkasov et al., 2019](#) – Cherkasov, A.A., Bratanovskii, S.N., Koroleva, L.A., Zimovets, L.G. (2019). Development of school education in the Vologda governorate (1725-1917). Part 1. *European Journal of Contemporary Education*. 8(1): 208-214.
- [Cherkasov et al., 2019a](#) – Cherkasov, A.A., Bratanovskii, S.N., Koroleva, L.A., Zimovets, L.G. (2019). Development of school education in the Vologda governorate (1725-1917). Part 2. *European Journal of Contemporary Education*. 8(2): 418-424.
- [Cherkasov et al., 2019b](#) – Cherkasov, A.A., Bratanovskii, S.N., Koroleva, L.A., Zimovets, L.G. (2019). Development of school education in the Vologda governorate (1725-1917). Part 3. *European Journal of Contemporary Education*. 8(3): 624-637.
- [Cherkasov et al., 2019c](#) – Cherkasov, A.A., Bratanovskii, S.N., Zimovets, L.G. (2019). Development of school education in the Vologda governorate (1725-1917). Part 4. *European Journal of Contemporary Education*. 8(4): 973-983.
- [Cherkasov et al., 2020](#) – Cherkasov, A.A., Koroleva, L.A., Bratanovskii, S.N. (2020). The System of Public Education on the Territory of the Black Sea Province in 1896–1917. Part 1. *Vestnik of Saint Petersburg University. History*. 65 (3): 750–770.
- [Cherkasov et al., 2020a](#) – Cherkasov, A.A., Koroleva, L.A., Bratanovskii, S.N. (2020). The System of Public Education on the Territory of the Black Sea Province in 1896–1917. Part 2. *Vestnik of Saint Petersburg University. History*. 65 (4): 1067–1084.
- [Il'in, 1904](#) – Il'in, A.A. (1904). Kavkazskii uchebnyi okrug v 1903 g. [Caucasian School District in 1903]. *Zhurnal ministerstva narodnogo prosveshcheniya*. № 11. Pp. 25-31. [in Russian]
- [Magsumov et al., 2018](#) – Magsumov, T.A., Artemova, S.F., Balanyuk, L.L. (2018). Regional problems of public schools in the Russian Empire in 1869-1878 (using an example of the Vyatka Province). *European Journal of Contemporary Education*. 7(2): 420-427.
- [Magsumov et al., 2018](#) – Magsumov, T.A., Artemova, S.F., Ustinova, O.V., Vidishcheva, E.V. (2018). Public education system in the Caucasus region in the 1850s: Unification and regulation of educational process. *European Journal of Contemporary Education*. 7(3): 598-607.
- [Magsumov et al., 2020](#) – Magsumov, T.A., Korolev, A.A., Ponomareva, M.A., Zulfugarzade, T.E. (2020). The System of Public Education in Kars Oblast in the Period 1878–1917. Part 1. *European Journal of Contemporary Education*. 9(1): 221-234.
- [Magsumov et al., 2020a](#) – Magsumov, T.A., Korolev, A.A., Ponomareva, M.A., Zulfugarzade, T.E. (2020). The System of Public Education in Kars Oblast in the Period 1878–1917. Part 2. *European Journal of Contemporary Education*. 9(2): 459-472.

Mamadaliyev et al., 2020 – Mamadaliyev, A.M., Karpukhin, D.V., Svechnikova, N.V., Médico, A. (2020). The System of Public Education in Tiflis Governorate in the Period 1802–1917. Part 1. *European Journal of Contemporary Education*. 9(1): 235-247.

Mamadaliyev et al., 2020a – Mamadaliyev, A.M., Karpukhin, D.V., Svechnikova, N.V., Médico, A. (2020). The System of Public Education in Tiflis Governorate in the Period 1802–1917. Part 2. *Bylye Gody*. 56(2): 530-540.

Mamadaliyev et al., 2020b – Mamadaliyev, A.M., Karpukhin, D.V., Svechnikova, N.V., Médico, A. (2020). The System of Public Education in Tiflis Governorate in the Period 1802–1917. Part 3. *Bylye Gody*. 57(3): 1065-1084.

Mamadaliyev et al., 2020c – Mamadaliyev, A.M., Karpukhin, D.V., Svechnikova, N.V., Médico, A. (2020). The System of Public Education in Tiflis Governorate in the Period 1802–1917. Part 4. *Bylye Gody*. 58(4): 2409-2426.

Mamadaliyev et al., 2021 – Mamadaliyev, A.M., Karpukhin, D.V., Svechnikova, N.V., Médico, A. (2021). The System of Public Education in the Kutaisi Province in 1846–1917. Part 1. *Bylye Gody*. 16(1): 169-181.

Mil'man, 1966 – Mil'man, A.Sh. (1966). Politicheskii stroi Azerbaidzhana v XIX – nachale XX vekov (administrativnyi apparat i sud, formy i metody kolonial'nogo upravleniya) [The political system of Azerbaijan in the XIX – early XX centuries (administrative apparatus and court, forms and methods of colonial administration)]. Baku. [in Russian]

Molchanova et al., 2019 – Molchanova, V.S., Balanyuk, L.L., Vidishcheva, E.V., Potapova, I.I. (2020). The Development of Primary Education on the Cossack Territories in 1803–1917 years (on the Example of the Kuban Region). Part 1. *Bylye Gody*. 53(3): 1049-1058.

Molchanova et al., 2019a – Molchanova, V.S., Balanyuk, L.L., Vidishcheva, E.V., Potapova, I.I. (2020). The Development of Primary Education on the Cossack Territories in 1803–1917 years (on the Example of the Kuban Region). Part 2. *Bylye Gody*. 54(4): 1524-1536.

Molchanova et al., 2020 – Molchanova, V.S., Balanyuk, L.L., Vidishcheva, E.V., Potapova, I.I. (2020). The Development of Primary Education on the Cossack Territories in 1803–1917 years (on the Example of the Kuban Region). Part 3. *Bylye Gody*. 55(1): 88-104.

Natolochnaya et al., 2018 – Natolochnaya, O.V., Miku, N.V., Zulfugarzade, T.E., Médico, A. (2018). Highland schools in the Caucasus: Historical background. *European Journal of Contemporary Education*. 7(3): 608-614.

Natolochnaya et al., 2019 – Natolochnaya, O.V., Bulgarova, B.A., Denisenko, V.N., Volkov, A.N. (2019). The History of the Public Education System in Vilna Governorate (the Second Half of the 19th and Early 20th Centuries). Part 1. *European Journal of Contemporary Education*. 8(3): 655-664.

Natolochnaya et al., 2019a – Natolochnaya, O.V., Bulgarova, B.A., Voropaeva, Yu.A., Volkov, A.N. (2019). The History of the Public Education System in Vilna Governorate (the Second Half of the 19th and Early 20th Centuries). Part 2. *European Journal of Contemporary Education*. 8(4): 964-972.

Natolochnaya et al., 2020 – Natolochnaya, O.V., Zimovets, L.G., Allalyev, R.M., Svechnikov, V.A. (2020). The System of Public Education in Stavropol Governorate in the Period 1804–1917. Part 1. *European Journal of Contemporary Education*. 9(2): 473-480.

Natolochnaya et al., 2020a – Natolochnaya, O.V., Makarov, Y.N., Allalyev, R.M., Svechnikov, V.A. (2020). The System of Public Education in Stavropol Governorate in the Period 1804–1917. Part 2. *European Journal of Contemporary Education*. 9(3): 679-688.

Natolochnaya et al., 2020b – Natolochnaya, O.V., Allalyev, R.M., Svechnikov, V.A., Ivantsov, V.G. (2020). The System of Public Education in Stavropol Governorate in the Period 1804–1917. Part 3. *European Journal of Contemporary Education*. 9(4): 984-992.

Otchet, 1885 – Otchet popechitelya Kavkazskogo uchebnogo okruga o sostoyanii uchebnykh zavedenii za 1884 g. [Report of the trustee of the Caucasian educational district on the state of educational institutions for 1884]. Tiflis, 1885. [in Russian]

Otchet, 1886 – Otchet popechitelya Kavkazskogo uchebnogo okruga o sostoyanii uchebnykh zavedenii za 1885 g. [Report of the trustee of the Caucasian educational district on the state of educational institutions for 1885]. Tiflis, 1886. [in Russian]

[Otchet, 1887](#) – Otchet popechitelya Kavkazskogo uchebnogo okruga o sostoyanii uchebnykh zavedenii za 1886 g. [Report of the trustee of the Caucasian educational district on the state of educational institutions for 1886]. Tiflis, 1887. [in Russian]

[Otchet, 1890](#) – Otchet popechitelya Kavkazskogo uchebnogo okruga o sostoyanii uchebnykh zavedenii za 1889 g. [Report of the trustee of the Caucasian educational district on the state of educational institutions for 1889]. Tiflis, 1890. [in Russian]

[Otchet, 1891](#) – Otchet popechitelya Kavkazskogo uchebnogo okruga o sostoyanii uchebnykh zavedenii za 1890 g. [Report of the trustee of the Caucasian educational district on the state of educational institutions for 1890]. Tiflis, 1891. [in Russian]

[Otchet, 1892](#) – Otchet popechitelya Kavkazskogo uchebnogo okruga o sostoyanii uchebnykh zavedenii za 1891 g. [Report of the trustee of the Caucasian educational district on the state of educational institutions for 1891]. Tiflis, 1892. [in Russian]

[Otchet, 1893](#) – Otchet popechitelya Kavkazskogo uchebnogo okruga o sostoyanii uchebnykh zavedenii za 1892 g. [Report of the trustee of the Caucasian educational district on the state of educational institutions for 1892]. Tiflis, 1893. [in Russian]

[Otchet, 1894](#) – Otchet popechitelya Kavkazskogo uchebnogo okruga o sostoyanii uchebnykh zavedenii za 1893 g. [Report of the trustee of the Caucasian educational district on the state of educational institutions for 1893]. Tiflis, 1894. [in Russian]

[Otchet, 1895](#) – Otchet popechitelya Kavkazskogo uchebnogo okruga o sostoyanii uchebnykh zavedenii za 1894 g. [Report of the trustee of the Caucasian educational district on the state of educational institutions for 1894]. Tiflis, 1895. [in Russian]

[Otchet, 1896](#) – Otchet popechitelya Kavkazskogo uchebnogo okruga o sostoyanii uchebnykh zavedenii za 1895 g. [Report of the trustee of the Caucasian educational district on the state of educational institutions for 1895]. Tiflis, 1896. [in Russian]

[Otchet, 1897](#) – Otchet popechitelya Kavkazskogo uchebnogo okruga o sostoyanii uchebnykh zavedenii za 1896 g. [Report of the trustee of the Caucasian educational district on the state of educational institutions for 1896]. Tiflis, 1897. [in Russian]

[Otchet, 1899](#) – Otchet popechitelya Kavkazskogo uchebnogo okruga o sostoyanii uchebnykh zavedenii za 1898 g. [Report of the trustee of the Caucasian educational district on the state of educational institutions for 1898]. Tiflis, 1899. [in Russian]

[Otchet, 1900](#) – Otchet popechitelya Kavkazskogo uchebnogo okruga o sostoyanii uchebnykh zavedenii za 1899 g. [Report on the status of educational institutions of the Caucasian educational district in 1899]. Tiflis, 1900. [in Russian]

[Otchet, 1901](#) – Otchet popechitelya Kavkazskogo uchebnogo okruga o sostoyanii uchebnykh zavedenii za 1900 g. [Report on the status of educational institutions of the Caucasian educational district in 1900]. Tiflis, 1901. [in Russian]

[Peretyatko, Zulfugarzade, 2017](#) – *Peretyatko, A.Y., Zulfugarzade, T.E.* (2017). Project of reforms proposed for the don public education in the first half of 1860: A.M. Dondukov-Korsakov, Kh.I. Popov, N.I. Krasnov. *European Journal of Contemporary Education*. 6(4): 817-829.

[Peretyatko, Zulfugarzade, 2017a](#) – *Peretyatko, A.Y., Zulfugarzade, T.E.* (2017). Higher and secondary education of the don cossacks in the context of the epoch: The time of the great reforms. *European Journal of Contemporary Education*. 6(2): 367-377.

[Peretyatko, Zulfugarzade, 2019](#) – *Peretyatko, A.Y., Zulfugarzade, T.E.* (2019). «66 % of Literacy among the Male Population of School Age Brings it Closer to Common Education» vs «in the Largest Villages, it was Difficult to Meet a Literate Person»: the Main Statistical indicators of Primary Education among Don Cossacks in the XIX c. Part 1. *European Journal of Contemporary Education*. 8(2): 454-465.

[Peretyatko, Zulfugarzade, 2019a](#) – *Peretyatko, A.Y., Zulfugarzade, T.E.* (2019). «66 % of Literacy among the Male Population of School Age Brings it Closer to Common Education» vs «in the Largest Villages, it was Difficult to Meet a Literate Person»: the Main Statistical indicators of Primary Education among Don Cossacks in the XIX c. Part 2. *European Journal of Contemporary Education*. 8(3): 664-676.

[Shevchenko et al., 2016](#) – *Shevchenko, N.A., Vidishcheva, E.V., Emelyanova, O.V.* (2016). The establishment of the system of public education in the Caucasus (1802-1917 years): The characteristic features. *Bylye Gody*. 40(2): 363-372.



Copyright © 2021 by Academic Publishing House Researcher s.r.o.

All rights reserved.

Published in the Slovak Republic

European Journal of Contemporary Education

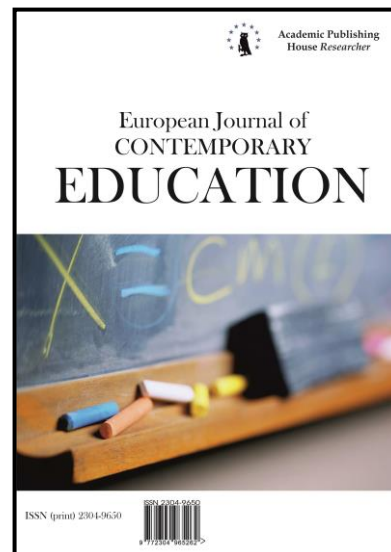
E-ISSN 2305-6746

2021. 10(2): 546-554

DOI: 10.13187/ejced.2021.2.546

www.ejournal1.com

IMPORTANT NOTICE! Any copying, reproduction, distribution, republication (in whole or in part), or otherwise commercial use of this work in violation of the author(s) rights will be prosecuted in accordance with international law. The use of hyperlinks to the work will not be considered copyright infringement.



The Organization of the Educational Process in Kharkov Imperial University (1835–1863)

Andrii E. Lebid ^{a, b, *}, Natal'ya A. Shevchenko ^{b, c}

^a Sumy State University, Sumy, Ukraine

^b Cherkas Global University (International Network Center for Fundamental and Applied Research), Washington, DC, USA

^c Volgograd State University, Volgograd, Russian Federation

Abstract

This paper analyzes ‘The Review of Instruction in Subjects at Kharkov Imperial University’, an official document that regulated the organization of the educational process in Kharkov Imperial University.

The work provides an insight into the evolution of modifications to the titles of this historical source for the entire period it was published. It examines the document’s substantive and formal characteristics such as structure, format, and data presentation.

A quantitative analysis of data from the document helped establish a list of disciplines and courses taught at the university and measure the weekly academic load of students in Kharkov Imperial University (in hours), which made it possible to also measure this load across terms and for instructors as well.

The study helped establish certain distinctive characteristics of the document – more specifically, the fact that it contained recommendations regarding scholarly and scholarly-instructional study guides that instructors were to use in their work. Such recommendations were eventually replaced with a list of recommended literature for each course taught at the university.

The present paper also provides dynamic data on the quantitative composition of the teaching workforce in each specific department. The authors established the scholarly-pedagogical potential of Kharkov Imperial University in the period between Nicholas’s University Statute of 1835 and Alexander’s University Statute of 1863.

It was established that, in addition to their primary duties at the university, professors also gave public lectures, which had them adapting their courses to the needs and interests of the public. As a rule, giving public lectures was not a burden on instructors, as it was voluntary in nature.

* Corresponding author

E-mail addresses: a.lebid@socio.sumdu.edu.ua (A. Lebid)

Among other matters, the authors researched the nonacademic component of university education – more specifically, the teaching of the “pleasing arts”. Based on this, a conclusion was drawn that the model of higher education in the Russian Empire in the 19th century was focused on the all-round development of a person.

Keywords: educational process, Russian Empire, higher education, Kharkov Imperial University

1. Introduction

What is essential to gaining a proper insight into the development of the system of higher education in the Russian Empire in the 19th century is the availability and accessibility of a source studies base that can enable comprehensive analysis and integrated assessment of particular historical events. From this standpoint, it may be worth drawing the attention of the scholarly community to ‘The Review of Instruction in Subjects’, a document that over the course of its existence was released under different titles. The present paper examines the characteristics of this valuable source on the history of higher education in the Russian Empire through the example of Kharkov Imperial University.

The document, which was published under the authority of a university’s Board, contained valuable information about the characteristics of the educational process in the country’s institutions of higher learning, including data on the academic disciplines taught and the teaching workforce employed across the university in different departments (e.g., academic degree and/or civil title, position held, state awards and other achievements, and courses taught). In addition, the document makes it possible to analyze the characteristics of the academic load of both students and instructors in the university.

Of particular importance is the fact that the document, which is an official source, contains objective information about various salient issues in the university’s history.

The authors undertook to analyze ‘The Review of Instruction in Subjects at Kharkov Imperial University’ to gain an insight into the organization of the educational process in Kharkov Imperial University in the period from the adoption of the University Statute of 1835 to the adoption of the University Statute of 1863. The document reflects the substantial changes in the social-political, social-cultural, and other spheres of life in the Russian Empire at the time.

2. Materials and methods

The authors analyzed ‘The Review of Instruction in Subjects at Kharkov Imperial University’, a historical source on the system of higher education in the Russian Empire in the 19th century that contains official factual material on the organization of the educational process in that institution of higher learning ([Obozrenie, 1835-1863](#)).

The document was an official bulletin of Kharkov Imperial University (similar documents were published by universities across the Russian Empire). Published yearly under the authority of the university’s Board, it served to address the various characteristics of its educational process (e.g., staffing, academic load, curricula, and instructional support).

The authors’ use of methods of data analysis helped establish the key areas and objectives in the process of implementation of the curriculum in Kharkov Imperial University subsequent to the adoption of the University Statute of 1835.

The authors employed comparative analysis to compare the university’s departments in terms of their scholarly-pedagogical potential (e.g., total scholarly-pedagogical personnel; total instructors in each department holding a doctoral or master's degree; academic load of students and instructors across the university in different departments, with breakdown into years, terms, and weeks; total courses taught across the university in different departments).

The analysis helped gain an integrated insight into the organization of the educational process in Kharkov Imperial University prior to the adoption of the University Statute of 1863.

3. Discussion

The history of Kharkov Imperial University is interwoven into the overall fabric of the history of higher education in the Russian Empire, which is no wonder, as it is known as not only one of the Empire’s oldest universities but a major research and educational center in Leftbank Ukraine.

In this regard, the history of Kharkov Imperial University must be viewed in the context of the development of higher education and science across the entire Russian Empire. This idea found its reflection in the fundamental research project ‘Ubi Universitas – Ibi Europa. The Transfer and Adaptation of the University Idea in the Russian Empire in the Period between the Second Half of the 18th Century and the First Half of the 19th Century’, focused on issues of the development of the university idea in the Russian Empire, the development of the university space, the social history of universities, etc.

Research of this kind can help determine key trends in the development of the system of higher education in the Russian Empire and the formation of the values of the university community as a corporation of students and instructors. In this context, the history of Kharkov Imperial University is of significant research interest, and it has been explored in a number of research works.

In this context, it is worth mentioning a systematic bibliographic index published in 2007 containing a bibliography on the history of Kharkov University for the period starting in 1804, i.e. the year the university was established (Istoriia, 2007). What makes the collection valuable is that it lists over 8,000 scholarly works on the university’s history, which are divided both chronologically and thematically. In the context of the present study, of particular interest are Sections 10 (‘Educational Activity’) and 13 (‘Staff’) of Issue 1, as well as Issue 2, which contains a bibliography on various issues relating to the operation of the university’s departments during the time of the Russian Empire.

In addition to general works on the history of Kharkov Imperial University (e.g., Andreev, 2009; Avrus, 2001; Bagalej, 1904; Denisenko, 2001; Kaluhin, 2019; Vishlenkova, 2013), it is also worth mentioning research works in which the topic was addressed to some degree (e.g., Astakhov, 1955; Kucher, 1980; Redin, 1908; Slyusarskij, 1955). As regards the actual analysis of the instruction review document, of particular interest is the research by E.Yu. Zharova (Zharova, 2013), which explores it as a historical source on higher education in the Russian Empire.

4. Results

The earliest example of this type of document dates back to the late 18th century, when it was adopted at the level of Moscow University, the oldest university in the Russian Empire. The practice was later implemented in the Kazan and Kharkov universities. The document for Kharkov Imperial University was released under different titles and appeared in the following editions:

- 1805 – The Notice about Public Instruction at Kharkov Imperial University;
- 1808 – The Review of Public Readings at Kharkov Imperial University;
- 1809–1826 – The Review of Public Readings Held at Kharkov Imperial University;
- 1831–1833 – The Announcement about Public Instruction in Sciences at Kharkov Imperial University Based on a Determination by the Board;
- 1833–1837 – The Review of Public Instruction in Sciences at Kharkov Imperial University Based on a Determination by the Board.
- 1838 – The Review of Instruction in Sciences at Kharkov Imperial University;
- 1839–1884 – The Review of Instruction in Subjects at Kharkov Imperial University;
- 1885–1903 – The Review of Instruction in Subjects and the Distribution of Lectures and Practicals at Kharkov Imperial University.

Subsequent to the adoption of the University Statute of 1835, the document was published in Russian, as opposed to Russian and Latin previously. Up until the adoption of the University Statute of 1884, it commonly had been published for the entire university. Subsequently, it covered each department individually.

A noteworthy characteristic of the document is the fact that it contained references to resources recommended for use in instruction. For instance, in teaching the Logic course to first-year students, ordinary professor in the Philosophy Department M.N. Protopopov was to rely on K.F. Bachmann’s ‘System der Logik’, while Dean for the First Division of the Philosophy Department A.O. Valitsky “would provide instruction in the history of Greek literature based on his own notes and with reliance upon a work by Groddeck” (G.E. Groddeck’s ‘Über die Vergleichung der alten besonders griechischen mit der deutschen und neueren schönen Literatur’) (Obozrenie, 1843).

As regards the document's format, information in it was structured for each department. In accordance with the University Statute of 1835, Kharkov Imperial University had three departments. The Philosophy Department was composed of two divisions – the History and Philology Division, which taught philosophy, history, and languages, and the Physics and Mathematics Division.

In 1850, the two divisions were turned into two separate departments – the History and Philology Department and the Physics and Mathematics Department.

In addition, the facility had two more departments – the Law Department and the Medicine Department. Thus, from 1835 to 1850 Kharkov Imperial University had three departments, while starting in 1850 it had four departments.

Along with changes in the distribution of divisions across the different departments of the university, the University Statute of 1835 also introduced changes in terms of staffing ([Brokgaуз, Efron, 1902: 754-755](#)).

Going back to the issue of the document's format, it is worth examining its structure. The document was comprised of four nominal parts. The introductory part contained information about the university's management team, which was composed of both civil and ecclesiastical persons, listing their academic degree, civil title, and awards and achievements. In addition, this part listed the name of an Orthodox priest (protopriest).

For instance, in the 1847–1848 school year Kharkov Imperial University's senior management team included the following staff:

1. Rector – Ordinary Professor P.P. Artemovskiy-Gulak, Actual State Councilor and Master of Fine Sciences, decorated with an Order of St. Anna (2nd class), an Order of St. Vladimir (4th class), an Order of St. Stanislaus (2nd class), and a 25 years' flawless service medal.

2. Prorector – Ordinary Professor A.V. Kunitsyn, State Councilor and Doctor of Laws.

3. Professor of Divinity and Ecclesiastical History – Protopriest I.A. Zimin, Master of Divinity ([Obozrenie, 1847](#)).

The first part listed professors, instructors, and officers concerned with the university's educational process. Information about the teaching workforce was systematized for each department. Listed first were ordinary professors in divisions within different departments in the university, with each professor's academic degree and/or civil title, and awards and other achievements listed next to their name. Ordinary professors were followed by extraordinary professors, and then adjunct professors (the Medicine Department also included prosectors and lab demonstrators), with the same information presentation scheme followed.

For instance, the Physics Division had on staff an ordinary professor named V.I. Lapshin, who was a Doctor of Mathematical Sciences, a State Councilor, and a holder of an Order of St. Anna (2nd class) and a 20 years' flawless service medal ([Obozrenie, 1857](#)). In fact, many of the professors mentioned in the document were holders of major state awards and medals.

The document's first part concludes with information about lecturers teaching English, French, Italian, and German, as well as art instructors (drawing, music, dancing, equestrianism, fencing, gymnastics, and chant) ([Table 3](#)). It was stated in a note to the list that “learners can attend lectures in the arts, as well as English and Italian, by choice”.

The second part of the document contained information about the courses taught at the university ([Table 1](#)). Information was presented in two major formats. The least common was the following format: the instructor's full name, their position, the year they would teach in, all subjects they would teach, and the amount of hours they would put in weekly. This information was provided for an entire department, without reference to divisions.

From a standpoint of differentiation by divisions and department disciplines, the second format was more informative (starting in 1853), with the same kind of information provided but with each division within the university's departments now covered ([Obozrenie, 1853](#)).

The third part contained a table illustrating the distribution of subjects and instruction time. The table listed subjects taught in each year in each department and the number of hours per week assigned to them in the first and second half-year terms ([Table 2](#)).

Table 1. Subjects Taught at Kharkov Imperial University

	Philosophy Department		Medicine Department	Law Department
	Division 1	Division 2		
Year 1	1. Ancient Geography 2. Statistics	Algebra and Geometry	1. Latin Grammar 2. Algebra and Geometry 3. Botany 4. General Physics 5. Chemistry 6. Anatomy	1. Latin Grammar 2. Encyclopedia of Jurisprudence 3. Civil Service Regulations
Year 2	1. Ancient History 2. History of the Russian State 3. Statistics	1. Algebra and Geometry 2. General Physics 3. Chemistry	1. Botany 2. Physiology 3. Mineralogy 4. Internal Medicine 5. Anatomy 6. Pharmaceutical Science	1. History of the Middle Ages 2. Political economy 3. History of Roman Law 4. Civil Service Regulations
Year 3	1. Moral Philosophy 2. History of Modern Russian Literature 3. Ancient History 4. Political economy 5. Statistics	1. Astronomy 2. Theory of Celestial Motion 3. Technology 4. Mechanics 5. Architecture (Technical Drawing) 6. Physics of the Earth 7. Chemistry	1. Pathology 2. Internal Medicine 3. Pharmacology 4. Semiotics (Symptomatology) 5. Pathological Anatomy 6. Surgery	1. Moral Philosophy 2. History of the Middle Ages 3. Civil Law 4. International Law 5. Criminal Law 6. Civil Service Regulations
Year 4	1. History of Philosophy 2. Greek Antiquities 3. History of Roman Literature 4. History of Modern Russian Literature 5. Ancient History	1. Geodesy 2. Technology 3. Architecture 4. Organic Chemistry	1. Greek Antiquities 2. History of Roman Literature 3. Obstetrics 4. Women's Diseases 5. Children's Diseases 6. Pathology 7. Internal Medicine 8. Surgery 9. Veterinary Medicine 10. Medical Jurisprudence 11. Surgery	1. Canon Law 2. Greek Antiquities 3. History of Roman Literature 4. Municipal Improvement Laws 5. Civil Service Regulations 6. State Duty Laws
Year 5	-	-	1. Obstetrics 2. Ophthalmology 3. Semiotics (Symptomatology) 4. Veterinary Medicine 5. History of Medicine	-

In addition, it was compulsory for students in all the departments to take a number of general subjects normally taught in the initial years of university, which included the following:

1. Divinity
2. Ecclesiastical History
3. Russian Language Arts
4. Logic
5. Main Laws of the Russian Empire
6. State and Gubernia Institutions
7. Theory of Prose Compositions
8. Psychology
9. Ethics
10. History of the Russian State

11. Latin, French, etc.

An analysis of the data provided in the document, including those displayed in [Table 1](#), indicates some unevenness in terms of the number of disciplines taught in different departments in the university (the Philosophy and Medicine departments had the largest number thereof) inclusive of core courses.

There also was unevenness in terms of the academic load through the lens of years of study in the university. It increased in senior years and in all the departments. The only exception was the Medicine Department, where the load was quite high throughout the program of study, which, above all, was due to the high share of medical practice in the educational process. The academic load varied between different departments weekly as well ([Table 2](#)).

Table 2. Study Load for Students in Kharkov Imperial University (hours per week)

	1842–1843			1853–1854				1862–1863			
	Phil. Dept.*	Law Dept.	Med. Dept.	Hist. and Phil. Dept.	Phys. and Math. Dept.	Law Dept.	Med. Dept.	Hist. and Phil. Dept.	Phys. and Math. Dept.	Law Dept.	Med. Dept.
Year 1	27/18	22	34	41	17	16	25	30	24	14	20
Year 2	20/15	19	28	32	17	17	19	33	14	14	24
Year 3	29/16	20	27	43	14	21	19	30	20	27	13
Year 4	16/9	15	44	37	18	16	32	24	19	15	35
Year 5	-	-	40	-	-	-	16	-	-	-	21

As can be seen, the largest academic load, in absolute terms, was carried by students attending the Philosophy Department, and later on those enrolled in the History and Philology Department, as well as the Medicine Department. For instance, in the 1842–1843 school year, a first-year student attending the Philosophy Department was taught 12 courses, a first-year student attending the Law Department – eight courses, and a first-year student attending the Medicine Department – 11 courses ([Obozrenie, 1843](#)). Over 50% of the disciplines were core courses (e.g., Divinity, Logic, Ecclesiastical History, etc.). The respective figures for the 1862–1863 school year were 12, nine, five, and 10 courses ([Obozrenie, 1862](#)).

A noteworthy aspect of the university's instruction to medical students is that it was mandatory for them to attend not only lecture (classroom) lessons but take part in practicals as well (e.g., “obstetrical exercises on the phantom”, hands-on training in a surgical clinic “under proper guidance”, «practical exercises on corpses”, etc.). The academic load increased for medical students particularly in fourth year, with more of their time having to be devoted to practical training.

The university's instructors held classes outside of it as well – they gave public lectures. For instance, the curriculum had ordinary professor E.S. Gordenkov teaching General Chemistry twice a week, and extraordinary professor I.D. Sokolov – teaching Mechanics, with both courses taught “as auxiliary to the arts and crafts” for the benefit of those pursuing a trade job.

As regards instruction in the “pleasing arts”, along with the academic courses, the university's student body was taught drawing (six hours per week), music (four hours per week), dancing (four hours per week), fencing (four hours per week), and equestrianism (six hours per week). As mentioned above, taking these “arts” was optional, with fencing and equestrianism being also available to students educated at the expense of the state.

* The provision of data on the Philosophy Department is based here on it being split into the History and Philology and Physics and Mathematics divisions.

Table 3. Kharkov Imperial University’s Scholarly-Pedagogical Potential

	1850–1851								1857–1858								1862–1863								
	Hist. and Phil. Dept		Phys. and Math. Dept		Law Dept		Med. Dept		Hist. and Phil. Dept		Phys. and Math. Dept		Law Dept		Med. Dept		Hist. and Phil. Dept		Phys. and Math. Dept		Law Dept		Med. Dept		
	d	m	d	m	d	m	d	m	d	m	d	m	d	m	d	m	d	m	d	m	d	m	d	m	d
Ordinary professor	4	-	4	1	1	2	7	1	6	-	3	2	3	1	8	-	3	-	4	2	4	-	6	-	
Extraordinary professor	-	-	2	2	-	1	-	-	2	-	1	2	3	-	1	-	-	3	1	4	-	-	2	1	
Adjunct professor	3		4		1		7		2		3		-		4		1		2		1		7		
Extra staff	4 lecturers 4 art teachers								4 lecturers 5 art teachers								3 lecturers 5 art teachers								
Department’s total	7	13	5	15	10	11	7	13	7	13	5	16													
University’s total	48								50								47								

An analysis of the document indicates that between 1835 and 1863 the size of the teaching workforce in Kharkov Imperial University remained more or less steady, ranging between 44 and 52 people. The facility’s largest teaching workforce was recorded in the 1847–1848 school year – 54 people ([Obozrenie, 1847](#)).

The largest number of scholarly-pedagogical staff were in the Philosophy Department and the Medicine Department. Subsequent to the splitting of the Philosophy Department (with its two divisions) into two separate departments, the History and Philology Department gradually, starting in 1858, ceased to lead the way in the number of staff, falling behind the Physics and Mathematics Department and the Medicine Department. By tradition, the Law Department had the smallest teaching workforce – an average of six instructors ([Obozrenie, 1835-1863](#)).

A calculation of the number of doctors among both ordinary and extraordinary professors employed in its departments subsequent to the splitting of the Philosophy Department (1850) indicates the following: the History and Philology Department employed an average of five doctors and one master; the Physics and Mathematics Department – five doctors and four masters; the Law Department – four doctors and one master; the Medicine Department – eight doctors and just three masters.

Thus, in absolute terms, the facility’s teaching workforce was distributed relatively evenly across departments, with the exception of the Medicine Department, which had more positions than other departments, which is no wonder, as it had a larger academic load, due to a large number of practicals being conducted in clinics and labs.

The same can be said for the History and Philology Department, which led the way in the number of hours assigned to classes weekly. In this case, an instructor’s load was determined by the large number of courses taught by them at a time, which included courses required for all students in all the departments (e.g., Logic, Divinity, Ecclesiastical History, etc.).

5. Conclusion

A valuable historical source on the system of higher education in the first half of the 19th century, ‘The Review of Instruction in Subjects at Kharkov Imperial University’ helps trace, through the example of Kharkov Imperial University, the dynamics of changes in academic (weekly and term) load in each department for both students and instructors. Of particular importance are

the document's data dealing with the teaching workforce (e.g., size, employment characteristics, and courses taught).

Of no less interest is the authors' comparison of the characteristics of the educational process across the university's departments. The data provided in the tables offer a dynamic insight into the key objective laws that governed the development of the educational component in each specific department.

An analysis of the source revealed minor fluctuations in the number of teaching staff over the nearly-30-year period (10–15% starting in 1835). Another fact worthy of mention is that in the period under review the largest number of doctors of science worked in two of the institution's four departments – the Philosophy Department (subsequently the History and Philology Department) and the Medicine Department.

The institution had a large number of instructors without an academic degree who held the position of ordinary or extraordinary professor, while simultaneously holding the civil title of state councilor, collegiate councilor, or collegiate assessor. The university had frequent cases of instructors having both an academic degree and a civil title.

As regards the university's study load across the departments, it was largest in the following two departments – the Philosophy (History and Philology) Department and the Medicine Department. The figure dropped gradually. Specifically, in the early 1840s it was higher than in the early 1860s. The biggest "load" was on senior students, who had the largest weekly academic load – and that is considering that members of this group were no longer taught general subjects, which were numerous and accounted for the lion's share of the academic load of the facility's junior students, especially first-year ones.

Another aspect worthy of mention is the load of the university's instructors, whose "burden" was comprised of not just giving academic lectures but holding public lecture classes as well. In this respect, the busiest were instructors in the Philosophy (History and Philology) Department, with each teaching several courses. While this was practiced in other departments as well, it is in the History and Philology Department that the practice was commonest.

References

[Andreev, 2009](#) – *Andreev, A.Yu.* (2009). *Rossijskie universitety` XVIII – pervoj poloviny` XIX veka v kontekste universitetskoj istorii Evropy*. [Russian Universities of the 18th - First Half of the 19th Centuries in the Context of European University History]. Moskva: Znak, 640 p. [in Russian]

[Astakhov, 1955](#) – *Astakhov, V.I.* (1955). *Uchebnaya deyatel`nost` universiteta, 1861-konecz XIX v.* [Educational activities of the university, 1861-end of the 19th century]. Khar`kovskij gocyniversitet im. A.M. Gor`kogo za 150 let. Xar`kov: Izd-vo universiteta., Pp. 63-81. [in Russian]

[Avrus, 2001](#) – *Avrus, A.I.* (2001). *Istoriya rossijskich universitetov* [History of Russian Universities]. Moskva. [in Russian]

[Bagalej, 1904](#) – *Bagalej, D.I.* (1904). *Prepodavatel`skaya i nauchnaya deyatel`nost` professorov 1835-1863 gg.* [Teaching and scientific activities of professors 1835-1863]. *Opy`t istorii Khar`kovskogo universiteta (po neizdannym materialam: T.2 (1815-1835))*. Khar`kov: Tipografiya M. Zil`berberga. Pp. 133-155. [in Russian]

[Biobibliografichniy slovnyk, 2020](#) – *Biobibliografichniy slovnyk-dovidnyk profesorsko-vykladatskoho skladu kafedry mizhnarodnoho i yevropeiskoho prava yurydychnoho fakultetu Khar'kovskoho universytetu (1805–2020 rr.)*. [Biobibliographic dictionary-reference book of the teaching staff of the Department of International and European Law, Faculty of Law, Kharkiv University (1805–2020)]. Kharkiv: TOV «Planeta-Print». 174 p. [in Ukrainian]

[Denisenko, 2001](#) – *Denisenko, I.N.* (2001). *Prepodavanie bogosloviya i czerkovnoj istorii v Khar`kovskom universitete (1805-1919 gg.)*. [Teaching Theology and Church History at Kharkov University (1805-1919)]. *Visnyk Khar'kovskoho universytetu*. 526: Istoriia. 33: 248-259. [in Russian]

[Brokgauz, Efron, 1902](#) – *Encyklopedicheskij slovar` Brokgauza i Efrona*. [Brockhaus and Efron Encyclopaedic Dictionary]. Tom XXXIVa. Sankt-Peterburg, 1902. Pp. 754-755. [in Russian]

[Istoriia, 2007](#) – *Istoriia Khar'kovskoho universytetu (1804-2006): Systematichniy bibliografichniy pokazhchyk*. [Istoriia Khar'kovskoho universytetu (1804-2006): Systematichniy bibliografichniy pokazhchyk]. Kharkiv: KhNU imeni V.N. Karazina, 2007. 770 p. [in Ukrainian]

[Kaluhin, 2019](#) – *Kaluhin, O.V.* (2019). Zarozhennia i stanovlennia vykladannia arkhelohii ta istorii pervisnoho suspilstva u Kharkivskomu imperatorskomu universyteti (1805–1920 gg.) [Origin and formation of teaching archeology and history of primitive society at Kharkiv Imperial University (1805-1920)]. *Naukovi pratsi istorychnoho fakultetu Zaporizkoho natsionalnoho universytetu*. 52(1): 45-51. [in Ukrainian]

[Kucher, 1980](#) – *Kucher, A.E.* (1980). Uchebnaya deyatel`nost` Khar`kovskogo universiteta, 1805-1917 gg. [Educational activity of Kharkov University, 1805-1917]. *Khar`kovskij gosuniversitet, 1805-1980: Istoricheskij ocherk*. Kharkiv: Vishha shkola. Pp. 15-19. [in Russian]

[Obozrenie, 1835-1863](#) – Obozrenie prepodavaniya predmetov v Khar`kovskom imperatorskom universitete [Review of subject teaching at Kharkov Imperial University]. Khar`kov: Universitetskaya tipografiya. 1835–1863. [in Russian]

[Redin, 1908](#) – *Redin, E.K.* (1908). Uchitelya «priyatny`kh iskusstv»: risovaniya, muzy`ki, tancza, fekhtovaniya, verkhovoj ezdy [Arts teachers: drawing, music, dance, fencing, horseback riding]. *Istoriko-filologicheskij fakul`tet Khar`kovskogo universiteta za pervy`e 100 let ego sushhestvovaniya (1805-1905)*. Xar`kov: Izd. un-ta. Pp. 381-388. [in Russian]

[Slyusarskij, 1955](#) – *Slyusarskij, A.G.* (1955). Professorsko-prepodavatel`skij sostav i prepodavanie v universitete, 1805-1860 gg. [Teaching staff and teaching at the university, 1805-1860]. *Khar`kovskij gocyniversitet imeni A.M. Gor`kogo za 150 let*. Khar`kov: Izd-vo universiteta. Pp. 25-34. [in Russian]

[Vishlenkova, 2013](#) – *Vishlenkova, E.A.* (2013). Soslovie russkikh professorov. Sozdateli statusov i smy`slov: kollektivnaya monografiya [The estate of Russian professors. Creators of statuses and meanings]. Pod red. E.A. Vishlenkovej, I.M. Savel`evoj. Moskva: Izd. dom Vy`sshej shkoly` e`konomiki, 386 p. [in Russian]

[Zharova, 2013](#) – *Zharova, E.Yu.* (2013). Izdavaemy`e universitetami «Obozreniya prepodavaniya nauk» kak istoricheskij istochnik po istorii vy`sshego obrazovaniya v dorevolycionnoj Rossii [Published by universities "Reviews of Teaching Sciences" as a historical source on the history of higher education in pre-revolutionary Russia]. *Istoricheskoe obozrenie*. 14: 68-73. [in Russian]