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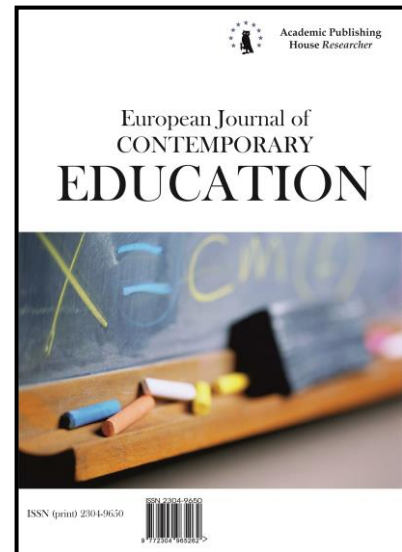
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## The Problems of Contemporary Education

### Students' Perceptions of Quality in Higher Education and Career Choices: A Case Study of the Russian Industrial Region

Ivan A. Aleshkovski <sup>a,\*</sup>, Alexander T. Gasparishvili <sup>a,b,c</sup>, Oksana V. Krukhmaleva <sup>a,b</sup>, Alexander A. Onosov <sup>a</sup>

<sup>a</sup> Lomonosov Moscow State University, Moscow, Russian Federation

<sup>b</sup> RUDN University, Moscow, Russian Federation

<sup>c</sup> Institute of Sociology of the Federal Center of Theoretical and Applied Sociology, Russian Academy of Sciences, Moscow, Russian Federation

#### Abstract

The transition to a new technological structure and mass digitalization of society involves revision of the existing forms and methods of educating students for the needs of the Industry 4.0. The problem arises from higher education non-compliance with the expectations of society, the modern requirements of the economy and the labor market. For regional higher education institutions, the situation is exacerbated by the high level of educational and labor migration of young people. This leads to negative trends in demographic indicators as well as to deficits in the regional labor market and to decrease in regional socioeconomic potential.

The study is based on the data from the sociological research conducted by the authors, as well as on the secondary data analysis. At the stage of data analysis in the SPSS 25 functional environment primary data were processed and the results were presented using descriptive statistics methods; an in-depth analysis of empirical information was carried out using multidimensional methods of analytical statistics, including the Pearson's  $\chi^2$  significance test and the procedures of factor analysis ( $p < 0.001$ ); non-formalized analysis of the qualitative research materials add statistical data were carried out.

The study revealed the opinions of university level students on the quality of the education they receive, on the problems of gaining professional skills and competencies in the education

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\* Corresponding author

E-mail addresses: [aleshkovski@fgp.msu.ru](mailto:aleshkovski@fgp.msu.ru) (I.A. Aleshkovski), [gasparishvili@yandex.ru](mailto:gasparishvili@yandex.ru) (A.T. Gasparishvili), [kruhoks@yandex.ru](mailto:kruhoks@yandex.ru) (O.V. Krukhmaleva), [o\\_shura@mail.ru](mailto:o_shura@mail.ru) (A.A. Onosov)

process, the possibility of implementing individual educational trajectories, migratory moods and future plans after graduation. A number of measures are proposed to modernize the regional system of higher education, including the use of opportunities of targeted training, the organization of interaction with business enterprises in the region, the network interaction of higher education institutions, the potential of WorldSkills contests, as well as the implementation of new approaches in the organization of education, student practicums and internships.

**Keywords:** higher education, students, quality of education, career choices, professional trajectories, competencies, skills, human capital, targeted education.

### **1. Introduction**

The relevance of the study is determined by contemporary challenges facing Russia's entire education system and higher education in particular. The transition to a new technological structure and mass digitalization of society involves revision of the existing forms and methods of education to meet the needs of the new economy. In this regard, it seems useful and significant to identify and analyze the opinions of Russia's tertiary level graduates on motivations for acquiring a profession, the quality of education, issues associated with professional training and ideas about possible professional trajectories.

The problem is that tertiary education does not meet the expectations of society, the modern requirements of the labor market, current and future demands of the economy. For regional tertiary education institutions, the situation is exacerbated by the high level of educational and labor out-migration of young people. This results in the formation of negative demographic trends, in the occurrence of deficits in the regional labor market and in a decrease in regional socioeconomic potential.

#### **The regional context**

Kemerovo Oblast (Kuzbass) is a constituent entity of the Russian Federation and is a part of the Siberian Federal District. It is an industrial region with coal production, metallurgy, mechanical engineering and chemical industry as its main economic resources. The population of the region is about 2.657 thousand people. Most of the citizens live in the cities, the largest of which are Kemerovo, the administrative center of the oblast, and Novokuznetsk. There are a lot of ecological, economic and social problems in the Kuzbass, which do not contribute to the region's attractiveness. According to main social and economic factors, the oblast is in the middle of other Russian regions. However, it is characterised by a significant drop in the population and there is a large percentage of youth out-migration, unemployment, death, and crime rates.

The higher education institutions are located mainly in two major cities and have a rather narrow range of specialities. When it comes to university rankings, none of the region's universities is listed as a university of federal importance (a federal university, a national research university, a strategically important regional university, a university that is a 5-100 project participant). These circumstances and the living standard of the population do not contribute to keeping young specialists and finding their niche in the region. In this relation, it is crucial to adapt the system of regional higher professional education to the development of new competences and the establishment of a strong relationship with regional enterprises and build educational programs in accordance with the interests of the regional labor market.

The aim of the study is to analyze the status and existing problems in the tertiary education system in one of Russia's industrial regions and develop recommendations that would improve tertiary education institutions in the region, increase the attractiveness of regional education and weaken youth out-migration to other regions and abroad.

### **2. Discussion**

Current research on higher education system examines various aspects of its functioning. Much attention is paid to ensuring equal and free access to post-secondary education. This topic is developed most actively in countries with certain barriers to education (Wu et al., 2020; Guan, James, 2019). Chinese researcher L. Wu et al. note that with the increasing number of universities in China, the availability of higher education has not changed significantly, as other factors of inequality have remained, in particular, high tuition fees at elite universities. The results of the study show that, with the exception of gender inequality, family economic status and parents' education level, all other factors of inequality remain persistent regardless of the increase in the

number of universities. S. Guan & F. James (2019) analyze this problem in terms of national isolation of some groups of students and suggest ways to overcome the isolation in the process of learning and interaction in the group.

A number of works in the field of accessibility of education are devoted to the territorial factor, i.e. location of the universities across the country (Ying et al., 2017; Dong et al., 2020). Thus, by using the example of Chinese universities, N. Dong et al. demonstrate the influence of regional characteristics, territorial situation and forms of management on the organization success and competitiveness. It is noted that raising the prestige and improving the quality of education are directly linked to those factors. This comment is particularly relevant for the context of this article.

A number of authors pay great attention to the starting positions of potential students and the factors that influence their choice of specialty and educational institution (Stensaker et al., 2019; Jin, Ball, 2019; Lehmann, 2019; Webb et al., 2017). J. Jin & S. Ball (2019) consider this issue from the point of view of the social status of individuals. They believe that people from working class families are more difficult to achieve educational success, as they experience not only academic difficulties, but also have to overcome barriers of inequality, lagging in basic training and some other problems. The same trend can be seen in an article written by W. Lehmann (2019) who, in addition to undergraduate education, considers the problems of transition to a Master's degree. S. Webb et al. (2017) use the example of universities in Britain and Australia to consider the extent to which higher education contributes to social mobility and what factors influence this process.

Researchers' interest in studying the factors that affect the quality of education is also high (Musso et al., 2020; Flores et al., 2020). Beyond traditional methodological approaches to the analysis of those factors, such as academic performance, personal creative achievements, internships, a number of research papers offer new, non-linear analysis capabilities, i.e., artificial intelligence, neural networks, which allow assessing the educational success and future trajectory of university graduates in a different way (Musso et al., 2020); or innovations in systems for evaluating students' knowledge and skills in the framework of the assessment model based on responsibility, engagement, success and performance (Flores et al., 2020).

Considerable attention of researchers is focused on an analysis of students' motivation to pursue their studies at a particular academic level, when they decide whether to opt for bachelor's or master's degrees. The study conducted by T.D. Le et al. (2020) suggests that future job prospects, quality of teaching, staff experience, and the current content of training courses are the determining factors of this choice. The authors place special emphasis on parental influence upon their children's career choice.

Some authors (Gallardo et al., 2020; Losada et al., 2019; Macfarlane, 2020; Espinosa et al., 2018) suggest that modern educational technologies, digitalization of education and digital learning opportunities have a direct impact on the quality of education, the competitiveness of graduates and their subsequent professional success.

M. Tomlinson & D. Jackson (2019) analyze employment strategies of university graduates. Some other authors consider the prospects of graduates in terms of forming their identity as a bridge between tertiary education and future employment, as well as other resources, in particular social and cultural capital that students acquire before entering the labor market (Macfarlane, 2020; Ryan, Lórin, 2018). A.-M. Bathmaker (2017) also analyzes various educational trajectories of graduates and feasibility of their transition to the next stage of education or entering the labor market. The author uses data from a comparative study of students' educational choice in the Netherlands and China. She makes a conclusion that among students in different parts of the world the motives of choice are very similar and the factors influencing them largely coincide.

Thus, the topic of this paper is relevant and intersects in many aspects with the scientific developments of colleagues from different countries (Cotronei-Baird, 2020; Harris-Reeves, Mahoney, 2017).

### **3. Materials and methods**

The work is based on the data of the sociological study "A Comprehensive Analysis of the Education System in the Kemerovo Region" (Aleshkovsky et al., 2019) conducted by the authors as part of the Vernadsky Consortium Program, and also on the analysis of secondary data from Russian and foreign research works (Wu et al., 2020; Lehmann, 2019; Flores et al., 2020; Gromov et al., 2016; Bondarenko et al., 2017; Monitoring..., 2018). Data collection at the level of the tertiary



education system in the Kemerovo Region included three categories of respondents, i.e. graduate students from all the region's tertiary educational institutions, heads of those institutions and their departments, and experts. The survey of the students and the heads was carried out by means of a questionnaire using Google Forms. The experts were surveyed using in-depth interviews. In all, 1,472 students, 40 faculty deans and 22 experts (the region's educational administrators, heads of tertiary education institutions and representatives of key employers) were surveyed (margin of sampling error is 3.5 percentage points).

The research tools were developed proceeding from the goals and objectives, state policy in the field of education in Russia, and taking into account some characteristics of the region. The latter included an increasing year by year outflow of school graduates to other regions to continue their education, the out-migration of recent graduates to continue their education or work, a high level of youth unemployment, an imbalanced nomenclature of professions available at the region's tertiary education institutions, etc.

At the stage of data analysis in the SPSS 25 functional environment, primary data were processed and the results were presented using descriptive statistics methods; an in-depth analysis of empirical information was carried out using multidimensional methods of analytical statistics, including the Pearson's  $\chi^2$  significance test and the procedures of factor analysis; non-formalized analysis of the qualitative research materials add statistical data were carried out.

#### **4. Results**

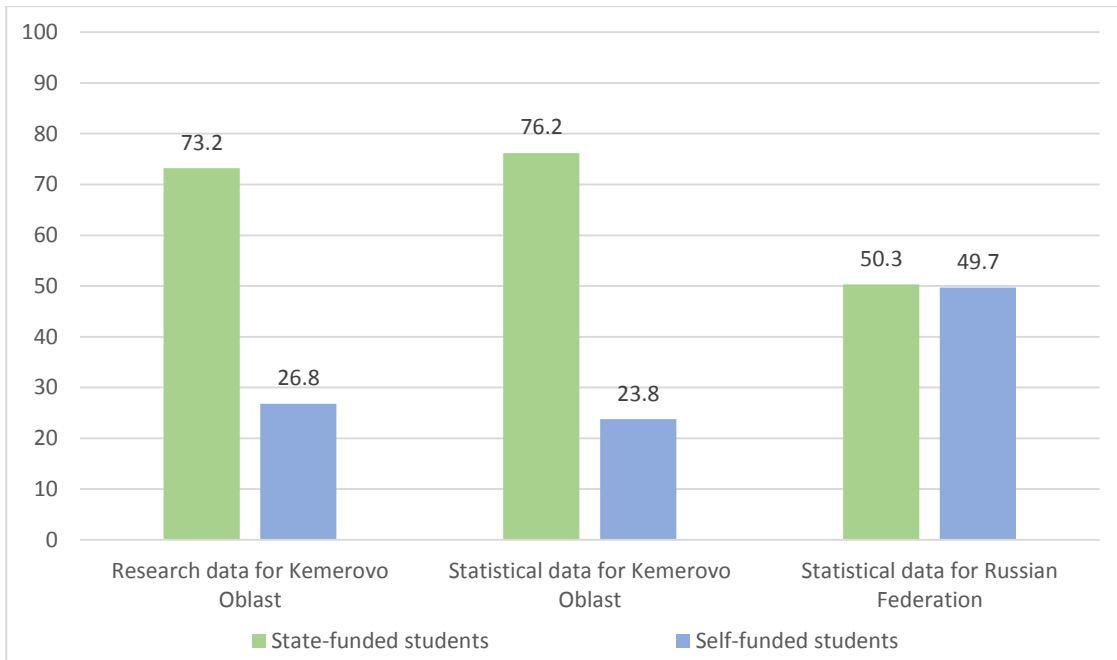
The objectives of the tertiary education system, which is part of the national project "Education", is the further development of tertiary education institutions, enhancing their competitiveness among the world's leading scientific and educational centers, getting talented youth and leading scientists attached to the region, and also the "formation of the university centers for innovative, technological and social development of regions whose activities are based on partnerships with business enterprises in terms of solving the problems of socioeconomic development of the Russian Federation's constituent entities through the saturation of regional labor markets with well-trained professionals." ([Report of the Government..., 2018](#)).

According to official sources, the Kemerovo region's education system included, as of the 2018/2019 academic year, 7 state tertiary education institutions and their 15 branches, among them, those of other regions' tertiary education institutions. The region's tertiary education institutions prepare specialists, mainly, for the industrial economy and the mining sector. Humanities, socioeconomic, pedagogical specializations look much smaller. Moreover, the region sees a serious manpower shortage in humanities and natural science. According to statistics, only state-owned tertiary education institutions were operating in the Kemerovo region in 2018.

Let us designate some indicators that characterize the region's education system in assessments comparative with the average indicators for the Russian Federation and show its position among other regions ([Bondarenko et al., 2017](#)). The Kemerovo region has an indicator of coverage by the population aged 17-25 years of places for studying at higher education institutions at the level of 24.7 %, which is significantly lower than the all-Russian indicator of 33 %. The region is one of the most problematic constituent entities of the Russian Federation, where the coverage level is below 28 %.

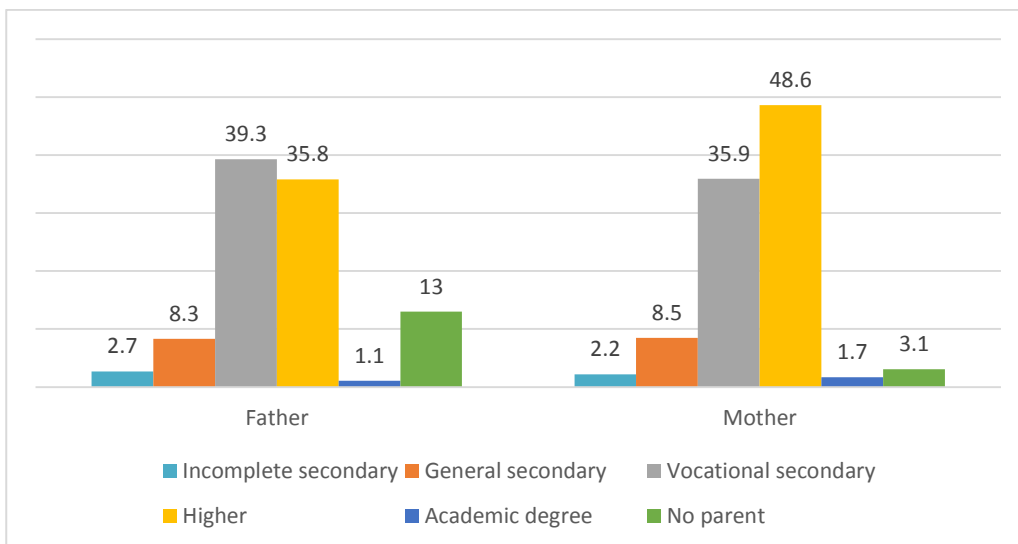
As an indicator characterizing the quality of education in the region, the proportion of students in higher education institutions of the region enrolled in the first year with an average exam score of at least 70 is used. The indicator of the quality of education in the region is 9.8 % compared to the national average of 24 % ([Monitoring the quality, 2018](#)). The region occupies the 48th place out of 79 regions by the quality of state-funded programs. That is, by the main characteristics of the accessibility of higher education, the region over the surveyed period displays very modest results among other constituent entities of the Russian Federation, taking 26th place ([Monitoring the quality, 2018](#)).

Most of the respondents at the region's tertiary education institutions are state-funded. The share of the "self-funded" student amounts to 26.8 % of respondents, which is almost twice as different as the average for Russia ([Figure 1](#)) ([Report of the Government, 2018](#)). This is confirmed by official figures for the Kemerovo Region ([Report on the analysis..., 2017](#)).



**Fig. 1.** Distribution of answers of the Kemerovo Region’s students about the ways of educational reimbursement (in % of the number of respondents) and the Russian Federation’s students (statistical data for the Russian Federation)

One of the most important indicator in the formation of student’s educational trajectories is the human (social) capital of their immediate social environment, that is, the family (Guan, James, 2019, Stensaker et al., 2019; Jin, Ball, 2019). The education and social status of parents are the most significant parameters in this analysis. Higher education institutions are entered by young people whose parents have a fairly high level of education (more than 75 % of fathers and about 85 % of mothers have higher or secondary vocational education). Moreover, the educational level of mothers is higher than that of fathers (Figure 2).



**Fig. 2.** Distribution of responses from students of higher vocational schools on the level of education of parents or persons replacing them (stepfather, stepmother, adoptive parent), in % of the number of respondents



$$(\chi^2 (5) = 117,653; p < 0,001).$$

The distribution of parents by social status in terms of employment shows that most often they are employees and specialists having higher education. About 15 % of parents occupy management positions. By gender, fathers are represented slightly more compared to mothers among those who have their own business (7.5 % vs. 4.1% for mothers), as well among those who are industrial workers (13.7 % vs. 10.6% for mothers) ( $\chi^2 (9) = 227,842; p < 0,001$ ).

During the study, students were asked about their living conditions. 34.4 % of respondents live with parents and relatives. 36.1 % of respondents live in a dormitory. 17 % of respondents rent their housing, and 12.6 % have their own. Since the survey involved the region's all major higher education institutions, which are located in the cities of Kemerovo and Novokuznetsk, students coming from villages and small towns of the region can be assumed to make up the main group of students there. Due to these cities' central status in the region, graduates of the secondary schools located there are, on average, better educated. It can be concluded that those who leave the region for educational reasons represent the most educated and, consequently, most ambitious part of prospective undergraduate students.

Migrants from other regions account for only 4.3 % of the students surveyed, which reflects poor demand for the Kemerovo Region's higher education institutions on the part of school graduates from the neighboring regions. It should be noted that the neighboring regions, i.e. Tomsk and Novosibirsk Regions, and also the Krasnoyarsk Territory, have well established higher education sectors seriously competing with the region under study. They significantly divert secondary school graduates not only from the Kemerovo Region, but also from other constituent entities within the Siberian Federal District and neighboring territories.

Higher education students were distributed by educational trajectories in accordance with the aiming of the region's education system to prepare specialists for the industrial sector of the economy. Most of them represent the engineering sector (25.5 %) and also finance and economics (20.6 %). The medical, social and humanitarian directions make up a significantly lower proportion. The share of teachers and those mastering natural sciences and information technologies is small.

Starting positions when entering the current level of education represent important indicators characterizing the purposefulness and awareness of choosing educational trajectory. Most of the respondents became higher education students after finishing secondary school (88 %). Some students continued their studies at a higher school after graduating from a vocational school, that is, they came from the secondary vocational education system (8.2 %). A small number of respondents indicated that they had entered this higher school after studying at another higher education institution (3.1 %).

When motivating their choice to continue their studies at a higher education institution, most students noted that they were oriented towards the profession (74 %). Following their dream to study in this particular educational institution, were 23.8 % of higher education students. 17.5 % noted that they had made their choice under the influence of their parents. Such a motivation as a continuation of family traditions was only noted by a small part of the students (6.7 %).

However, an analysis of the respondents' answers to the question of whether a person's success in life depends on the education level shows that practically equal proportions of respondents either do not link success to education (44.5 %) or consider higher education an important factor in achieving this success (44.8 %). All other answer options did not actually go beyond the statistical error.

The main motive for choosing a specialty by the students is an opportunity to have an "interesting and varied job" (40.8 %). Of high significance are also such motives as "career opportunities" (23.8 %) and "confidence in stability and guaranteed employment" which the students associate with their specialty (20.4 %). Job popularity and prestige is significant for every fifth respondent. An opportunity to set up their own business and apply the expertise gained through education attracts 14.3 % of students. Among the students surveyed, there is a rather high proportion of those who indicated the possibility to gain employment abroad after specialty training as a motive for their choice (19.4 %). 18.8 % of the respondents were guided by the easiness of getting subsequent employment.

Interestingly, a significant proportion of higher education students (23.4 %) frankly admitted the randomness of their choice of specialty. 19 % took the advice from their friends, relatives and acquaintances. One in ten respondents explained their choice by the easiness of studying at the chosen faculty. The total weight of responses that directly or indirectly indicate accidental, unconscious choice of future profession is about 40 %!

In fact, this is the share of “random” people at a higher education institution who are unlikely to work in their field and build their career in the chosen direction. Since students at the Kemerovo Region’s higher education institutions are mainly state-funded, such a high proportion of unmotivated students is indicative of problems in career guidance in the region and the selection system for post-secondary schools in general.

When choosing a course of study, students traditionally focus primarily on a particular profession, being unaware of the labor market currently undergoing a deep and dynamic transformation. In many ways, school leavers, parents, and higher school students turn out disoriented (Flores et al., 2020; Macfarlane, 2020; Tomlinson, Jackson, 2019). Therefore, it is very important to quickly change 20th century’s “career guidance” approaches and concentrate on personal and career counseling, attracting experts in recruiting and staff development. In this regard, modern group-work technologies, such as hackathons, start-up festivals, in-depth internships at business enterprises, solving specific production problems, can become extremely useful (Webb et al., 2017). A recent example of such new approaches is the holding of one of the stages of the “Open Innovation” startup tour in Kemerovo. This event is very important, but still not enough. Further analysis of the respondents’ answers confirms these findings.

Among motivation factors when choosing a particular college or university, students noted that they were guided by the following: university reputation (38.4 %), availability to explore majors that reflect their personal interests (28.6 %) and good partnerships a university has with employers (15.8 %). However, a rather significant share confirmed the randomness of their choice, that is, they were guided by the advice from their social environment (29 %), close proximity to their homes (30 %) and easy admission (20.4 %). An intermediate position is occupied by those who were able to enter only this particular higher education institution, because they failed to enter the others (17.3 %). One out of ten respondents indicated that in fact “there was no choice”, since it was the only way to get an education without moving away from their hometown (11.7 %). This once again proves underdevelopment of the network of higher education institutions in the region.

Assessment of the quality of education and satisfaction with the education process on the part of students is a very subjective indicator, the analysis of which depends on the students’ motivation to study, on their personal attitudes and desire to improve themselves in the chosen field (Le et al., 2020; Ryan, Lórin, 2018; Research “Value orientations...”, 2017).

Students evaluate very highly the educational programs in their course syllabus and curriculum. Satisfaction with their topicality and relevance was expressed by 80 % of respondents. The students displayed most satisfaction (over 50 %) by the following indicators: qualification of the teachers lecturing the theoretical part of the program; conditions for the preparation of publications, participation in conferences, scientific work, the use of information technologies, and the study of foreign languages. Below others (28.2 %) are evaluated the orientation of the educational process toward preparing one for real working conditions and entering the labor market. It is understandable, since not all students can fully assess this form of work, because they have not yet thought about their employment or continuing their careers in their chosen specialty.

Technologies that students master at their educational institutions were estimated as “fairly modern” by more than half of the respondents (51.8 %) and as “modern technologies used by industry-leading companies”, by another 8.8 %. At the same time, every fifth higher education student thinks that they study outdated technologies. 17.5 % of respondents failed to give an answer to this question and to substantively evaluate the learning technologies.

In general, it can be noted that the students’ assessments of the technological effectiveness of studying at the Kemerovo Region’s higher education institutions are in many ways in accord with the opinions of the heads of those institutions’ structural divisions. The higher education system is slowly mastering new technologies incorporating them into students’ education. That is to say, the region’s educational institutions do not appear as locomotives in terms of new technologies, but are rather “catching up”. This conclusion is also confirmed by experts who argue that “in the region’s education system there is a lot of sluggishness, and those graduated from today’s higher

education institutions may not be needed tomorrow.” This is a serious problem urging one to improve education in the region and bring it into compliance with the employers’ demands and those of the labor market as a whole.

The students evaluated diversely the knowledge gained through the education process from the viewpoint of student employability. A quarter of the students consider it to be sufficient (25.9 %), a third of them are not sure in one way or another of their education (35.3 %). The share of the respondents answered that the knowledge was insufficient is 16.3 %.

The majority of students expect their specialty knowledge (71.5 %) and practical skills (53.3 %) obtained in educational institutions to be useful in their future work. They value the acquired communication skills relating to the “flexible” skills (51.9 %). Their usefulness was only noted by every third respondent (31.2 %). Significant is their assessment of the importance of knowing foreign languages (27 %), and using a computer (28.7 %).

When asked whether they confirmed the choice of the educational trajectory, more than one-third of the students surveyed indicated their readiness to repeat the choice they had made (32.4 %). 11.8 % of the students would change their specialty or department. That is, about 44.2 % of higher education students believe that they have correctly chosen the educational institution in which they receive higher education. At the same time, the proportion of those who had confirmed the choice of a specialty but would like to get it in another educational institution is quite significant. This answer was given by 14.5 % of respondents. Of those willing to change something in their choice, 44.2 % said they would change their specialty within their educational institution.

Success in the education process can be considered in the context of the current employment of students. One third of the students (36.8 %) are currently employed, most of them working in an unrelated field. Most often, students work for extra money, 68 % of the number of those working, respectively. However, there are those working with the purpose of gaining experience for subsequent employment, every fifth. Working for the sake of mastering the chosen specialty is every tenth employed student.

An important component of a contemporary education process is the students’ desire and ability to independently acquire new knowledge and master skills that are not included in their curricula. More than half of them said they were engaged in self-education and read professional magazines, books, etc. (54.2 %). They are also active in attending additional courses and seminars (32.7 %). Online education is in demand among 40.9 % of respondents.

As to the practicums, they, on the whole, occur regularly and systematically. Students replied that they had repeatedly attended practical training in their specialty (69.4 %), while 16.2 % had attended only one practicum during their studies. 14.4 % had never attended practicums.

Using Pearson's  $\chi^2$  test, a statistically significant difference in the practical training by profession was revealed ( $\chi^2(20) = 278,648; p < 0,001$ ) (Table 1).

**Table 1.** Question: In what field of study does your major go into?

Fields of study	Practical training			Total
	Every year	Only once	Never	
Medicine	92.6	5.6	1.9	100
Culture, Arts, Sport	83.0	8.0	9.0	100
Agriculture	81.8	12.1	6.1	100
Engineering	77.3	17.6	5.1	100
Natural Sciences	65.4	22.2	12.3	100
Economics, Finance, Management	64.0	18.2	17.8	100
Pedagogics	61.9	15.9	22.1	100
Information Technology	50.0	35.7	14.3	100
Humanities & Social Sciences	34.9	17.8	47.4	100
Defense and Law	33.3	0.0	66.7	100
Other	69,2	7,7	23,1	100

Thus, regular practicum attendance was reported by students majoring in medicine, agriculture and engineering, and also in culture, art, and sport. While on the contrary, two thirds of

the defense and law students and a half of the students majoring in humanities and social sciences had not attended practicums for the whole period of their studies (66.7 и 47.4 %, accordingly). A significant proportion of those who are not involved in practicums can be noticed among students majoring in economics, finance, and natural sciences. It is telling to note that every fifth student majoring in pedagogics did not attend practicums. The lack of practicums while studying, especially in pedagogics, displays limitations in the teaching process and inevitably affects the quality of higher education.

The percentages of those who know about the possibility of doing internships provided by their educational institution, and those who found it difficult to answer this question are almost equal. 17.9 % of students claimed that in their higher education institutions there was no possibility for internships. About half of those students who were familiar with the internship program in their educational organization did an internship. Students majoring in medicine, information technology and engineering are actively invited to do internships. Students majoring in social sciences, humanities and pedagogics are least involved in the internship system. The indicated differentiation was revealed by using Pearson's  $\chi^2$  test and is statistically significant ( $p = 0,001$ ).

When answering the question about their personal achievements in the education process, more than 60 % of students mentioned, first of all, getting excellent and good marks. More than a quarter (27.7 %) of students participated in the scientific conferences and prepared publications in their field. 17.8 % consider individual creative projects to be their personal achievements.

The distribution of students' answers about personal achievements during the education process in their fields shows that agriculture students are most proud to be hired by a well-known company. Publication activity is most pronounced among students majoring in culture, sports, natural sciences, finance and economics. Individual creative projects are most actively developed by students majoring in culture, art, sport, and also agriculture and pedagogy.

An overall analysis of respondents' answers regarding personal educational achievements shows the latter to be very modest. During their studies, students actually did not succeed in learning foreign languages, did not try themselves in the profession at the workplace; they participated very poorly in project activities; they did no internships and failed to establish ties with employers. Thus, graduating students of higher education institutions have personal achievements similar to those of school graduates, that is, scoring "good and excellent marks".

All their achievements can be assumed to be lying in the field of theoretical training and, accordingly, they are sure to encounter problems when entering into a profession. In order to bridge such a gap between theory and practice, one can propose strengthening the students' stimulation and motivation to take more active steps in the applied component of their education, among other things, developing their own projects and solutions and participating in professional skills competitions.

The students' prospective professional and educational plans for completing the current educational stage seem to be a significant indicator in terms of their more informed and balanced choice. Those students can be conditionally divided into four groups: those going to continue their study to master's degree, those wishing to start working, those eager to get a second higher education, and those who "do not have clear plans yet". 38.7 % of the respondents are planning to continue their study at the stage of post-graduate education (the master's program). Every fourth graduating student (25.3 %) will go to work in their specialty. 7.1 % of the respondents will try to work in an unrelated field. 3.9 % of the respondents will receive a second higher education in another specialty. 14.9 % of the respondents did not have clear plans at the time of the survey.

Since the study sample includes undergraduate students earning a Bachelor's degree, a refusal to continue further studies on the part of 60 % of the respondents is a very alarming indicator. Today's trends in higher education show the trend towards receiving a complete education through two stages, Bachelor's and Master's programs to be increasingly in demand and is implemented by a significant number of students. According to statistics for the period from 2006 to 2017, the demand for a master's degree increased from 6 % to 50 % ([Research "Value orientations..."](#), 2017).

The share of those who are focused on continuing their studies and obtain a master's degree is higher among students studying on a government-funded basis (42.2 % vs. 29.2 % of those who pay tuition fees). Naturally, they intend to start labor activity less often (36.6 % vs. 39.8 %, respectively, for the indicated categories of respondents) ( $\chi^2(5) = 25.150$ ;  $p = 0.001$ ) ([Table 2](#)).

**Table 2.** Question: What do You plan to do after graduation?

Answer options	Forms of education	
	Government-funded basis	Paying tuition
Continue studies and obtain master's degree	42.2	29.2
Start working	36.6	39.8
Get a second higher education	3.4	5.1
Join the army	3.2	5.1
Dedicate oneself to family	1.2	1.8
Don't know	13.5	19.0
<b>Total</b>	<b>100.0</b>	<b>100.0</b>

Students who have decided to continue their studies are currently majoring in engineering, medicine, economics, finance and management, social sciences and humanities. Among students majoring in other fields, the percentage of respondents who intend to continue studying does not go beyond 10 %. This is especially telling, in particular, for pedagogics or natural sciences. Today's labor market urges a higher level of education than undergraduate studies, exactly for the above fields. Accordingly, a refusal to continue education automatically entails leaving the profession and getting a job in an unrelated field.

A choice of a field of study at the next stage of education, a Master's degree, is more informed and balanced than when getting into a bachelor's degree program. Answers of higher education students about possible options for continuing studies show half of them effectively focusing on their region of residence (56 %). It can be noted that the higher education system in the region is self-replicating, which is confirmed by the answers of the heads of higher education institutions' divisions, 73.2 % of them having indicated that they work at the higher education institution they have graduated from.

Almost one in ten respondents intends to leave hometown to study at higher education institutions in neighboring regions within the Siberian Federal District. 11.8 % of respondents will be trying to enter higher education institutions in Moscow and St. Petersburg. There is a high proportion of those who found it difficult or would not give an answer (13 %). Most likely, they include those who have migration plans, but are not sure of their capabilities. Thus, 31-44 % of the students who are determined to continue their studies after graduating do not consider continuing education at the Kemerovo Region's higher education institutions. These data have a high correlation with those of studies conducted across Russia and its individual constituent entities (Roshchin, 2018).

As part of analytical statistics procedures, a multidimensional regression analysis was performed with a step-by-step input of a set of independent variables that can have a significant impact on students' plans after graduation. The calculation of the regression equation revealed a statistically significant effect of such factors as the assessment of the modern technologies studied in a higher school, financial support for training of the students, their previous educational trajectory and evaluation of the adequacy of acquired knowledge (significance of the model at  $p < 0.001$ , coefficient of determination  $R^2 = 0,600$ ).

Thus, the share of those oriented toward continuing studies in the Master's program is growing significantly among those who believe that the technologies mastered in their university are modern, used by leading enterprises in the industry (49.6 %), and are declining among those who believe that they are being taught outdated technology (35.0 %).

A similar differentiation of plans is presented in the assessment of the sufficiency of the gained knowledge opening up the prospect of sought-after professionals for the graduates, 45.1 % of those students who believe that the knowledge gained will be enough for a contemporary specialist, and 32.1 % of those who are sure of the opposite will intend to continue their education.



The effect of the influence of the source of financing of training in this regard is reflected in the fact that those who study on a government-funded basis more often make plans to continue their education, while students studying on a self-funded basis are more likely to start working.

The influence of the educational trajectory on the future plans of graduates expresses a natural pattern: the longer the student's previous educational history, the clearer their plans to begin independent work, and therefore those who entered the university immediately after school are more focused on continuing education.

Higher education students who consider moving to other regions of the Russian Federation to continue their studies (28.1 %) substantiate their position, first of all, by a desire to have better living conditions (57.3 %) and get a higher quality education (55.4 %). Of significant importance to them is also the place of the chosen higher education institution in the ranking (43.3 %) and its prestige (38.2 %). Without fear or favor, the Kemerovo Region's higher education institutions are still losing by these parameters to those of neighboring regions (Tomsk Regions, Novosibirsk Region and Krasnoyarsk Territory). Also important for the respondents is a possibility of foreign internships (29.3 %), building a scientific career (26.1 %), established contacts with employers (25.5 %) and a pronounced practical component in the education process (20.4 %). A quarter of the respondents indicated a lack of their chosen specialty in the higher education institutions in Kuzbass as the main motive. Thus, all other things being equal, some of these students could be attracted to higher education institutions in their home region. On the whole, the students' answers to this question show their informed choice and the understanding of the prospects for their further educational trajectory.

Few people (3 %) were revealed during the survey who wish to continue their studies in another country. Therefore, it seems incorrect to fully analyze their motivation, but it is possible to consider their main arguments. These students noted that they were guided by the desire to change their place of residence, improve their foreign language skills, and also get a better education and implement their career ambitions. Similar answers were revealed in other studies. According to the Higher School of Economics survey, the main motivations for students to study abroad include the desire to strengthen their foreign language skills, improve their qualifications, education, etc. (Research "Value orientations...", 2017).

According to expert interviews and mass polls, the problem of retaining the best graduates worries both the region's government and its residents. However, despite the efforts being made, the situation is not radically changing. The very formulation of the problem, and, accordingly, the task of "retaining" youth seem to be unconstructive and essentially false. If this problem is reformulated as "attracting the most promising students to the Kemerovo Region's higher education institutions", its solution will become possible and feasible.

Students who have decided to go to work immediately after graduation are confident that they will be able to find a job in their field in their region (79.8 %) and in neighboring areas (67.7 %). 56.2 % are sure that they will be in demand in other regions of the country, and 43.3 % are ready to compete in the labor market in Moscow and St. Petersburg. One-third of the respondents (32.5 %) believe they will be able to find a job abroad.

As little as 7 % of the respondents answered that they were going to work in an unrelated field. It is significant that they evaluate similarly the prospects of their employment in various regions of the Russian Federation, and all the answers have a frequency of over 60 %. The respondents are slightly less optimistic about working abroad. Obviously, there is a certain difference between the plans and the way things actually unfold. Official figures show that at present every sixth graduate student cannot find a job during the first 7 months after graduation.

The respondents' answers regarding their plans after completing their bachelor's degree show that the region's educational potential is materialized rather poorly. Surely, the students' migratory feelings are largely conditioned by the general socio-economic situation in the region. However, modernizing the region's education system, improving the prestige of its higher education and research institutions, and implementing promising educational projects can significantly restrain youth migration from the region both for continuing education and for employment.

Since all graduates, in any case, will have to find a job, they were asked about possible options of searching for a job. The most popular options here turned out to be "going to job search websites, and also to individual companies' websites and social networks to send out their resumes there" (62.8 %). A rather significant proportion of the students rely on their higher education



institution's well-established contacts, including organizations where they have done practical training or internships (43.6 %). About one-third of the respondents (33.6 %) are ready to take initiative and interact directly with employers. 30.9 % of those polled are hoping for help from their social environment (family, relatives, friends or acquaintances).

The proportion of those who would like to start their own business among the students surveyed is insignificant (5.1 %). They doubt their ability to organize their own business, but in doing so they mention not so much their own inability as external obstacles (bureaucracy, corruption and crime).

The introduction into professional education of such relatively new tools as professional skills contests in the WorldSkills format, demonstration exams, specialized academic competitions and other initiatives can also be regarded as an additional incentive for personal growth in the chosen specialty.

Students participating in the survey noted that they were rather poorly informed about the WorldSkills program. As little as 17.4 % indicated that they were aware of it. Although this program is primarily focused on secondary vocational education, such low awareness indicates an almost complete lack of interest in this topic. Those familiar with WorldSkills evaluate the program, on the whole, positively. They mention, first of all, its usefulness from the viewpoint of both one's future professional career and improving professional skills.

To obtain an integral indicator of the quality of life, the respondents were asked to assess the situation in the region by a number of key indicators. Factor analysis was used for qualitative convolution and generalization of the obtained estimates. Within the framework of this procedure by the Principal Component Analysis method according to the Kaiser criterion, 3 factors were extracted from the set of considered indicators, followed by orthogonal rotation according to the Varimax method (Table 3 and 4).

**Table 3.** Total Variance Explained

Component	Initial Eigen values			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5,166	36,897	36,897	3,092	22,085	22,085
2	2,308	16,483	53,381	2,997	21,409	43,494
3	1,112	7,945	<b>61,326</b>	2,496	17,832	61,326
4	,803	5,734	67,060			
5	,743	5,309	72,369			
6	,605	4,319	76,688			
7	,589	4,207	80,895			
8	,496	3,546	84,441			
9	,481	3,438	87,879			
10	,438	3,129	91,009			
11	,407	2,904	93,913			
12	,340	2,432	96,344			
13	,279	1,996	98,340			
14	,232	1,660	100,000			

Extraction Method: Principal Component Analysis.

**Table 4.** Rotated Component Matrix<sup>a</sup>

	Component		
	1	2	3
6 Health care quality	,815	,177	
5 Quality of housing and communal services	,768	,148	
7 Personal security level	,704	,210	-,206
8 The level of social aid to young people from local authorities	,630	,407	
9 Opportunities for running business	,608	,376	
14 General standard of living	,534	,491	-,154
12 Cultural events	,167	,839	
13 Opportunities for leisure activities of the youth	,244	,812	
11 Quality of higher education	,268	,731	-,108
10 Quality of general education	,346	,658	
3 Spread of drug addiction			,872
4 Spread of alcoholism		-,110	,822
2 Youth crime rate			,812
1 Youth unemployment rate			,554

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 4 iterations.

Hence, the resulting model explains in total 61.326 % of the total variance. A comprehensive analysis allowed us to offer the following informal interpretation of the identified factors of the quality of life in the region:

Factor 1: Social and economic situation in the region (health care system + quality of housing and communal services + security + social aid to young people from local authorities + opportunities for running business + general living standard);

Factor 2: The degree of development of the leisure and educational infrastructure for young people;

Factor 3: Negative phenomena in the region's society (drug addiction + alcoholism + crime + youth unemployment).

The results of factor analysis may allow studying at a higher level of generalization the value attitudes and motivations of the youth to participate in the economic, social and cultural life of the region.

## 5. Conclusion

The study revealed the opinions of higher education students in Kemerovo Region about the quality of education they receive, about the problems in the formation of professional skills and competencies faced during the study, the possibility of implementing individual educational trajectories, their migratory feelings and career plans. The motives and arguments determining their choices of higher education institutions and academic fields were studied, and factors influencing such choices were defined.

The results of the study enable one to conclude that today the most trained and, consequently, more ambitious potential college and university students are leaving the Kemerovo Region. At the same time, the share of migrants from other regions accounts for only 4.3 % of the surveyed students. On the whole, this situation is indicative of the region's higher education institutions being in low demand among secondary school graduates. It is telling, however, that a significant proportion of higher education students (23.4 %) openly admit the randomness of their choice of specialty. The total weight of the answers, pointing (directly or indirectly) at the random or unconscious character of the choice of the future specialty (profession), is about 40 %! In fact, this is the proportion of "random" people at a college or university who are unlikely to work in their specialty or build their career in the chosen field. Since students studying at the Kemerovo Region's higher education institutions are mainly government-funded, such a high proportion of

unmotivated students indicate some problems in career guidance in the region and higher education student recruitment in general.

Respondent judgments about their plans after completing their bachelor's degree show that the region's educational potential is unlocked rather poorly. Certainly, students' migration plans are largely conditioned by the general socio-economic situation in the region. However, modernization of the region's education system, raising the prestige of its higher education institutions and scientific research centers, and the implementation of up-and-coming education areas can have a significant "braking" effect on young people's out-migration both for continuing education and for work.

Nearly every tenth student is planning to travel to the neighboring regions within the Siberian Federal District to continue their education at higher education institutions. 11.8 % of the respondents will try to enter such in Moscow and St. Petersburg. 7.2 % are planning to leave for the regions in Russia's other federal districts, while 3 % for another country. Higher education students who admit the possibility of travelling to other regions of the Russian Federation to continue their studies (28.1 %) substantiate their position primarily by the desire to have better living conditions (57.3 %) and get a higher quality education (55.4 %). As part of the factor analysis, the main factors of the quality of life in the region were identified, which allowed, at a higher level of generalization, to study educational strategies dominating in the youth social environment, their value attitudes and motivations to participate in the socio-cultural dynamics of the region.

Higher education students assessed in different ways the knowledge gained during their study in terms of a demand for them in the labor market. Only a quarter (25.9 %) of them consider it sufficient, while a third (35.3 %) are in one way or another not sure of their educational standards.

The distribution of students' answers to the question about doing their practicum revealed, in general, its regular and systemic nature. Thus, 69.4 % of students noted that they had repeatedly had practicums in their specialty area, and 16.2 % had only had it once during their studies. 14.4 % have never had an internship. At the same time, a statistically significant difference was revealed in doing practicums in specialties. It is telling that every fifth student (22.1 %) majoring in pedagogics never participated in practicums. The lack of practicums in higher education, especially in pedagogical specialties, is clearly indicative of the insufficient preparation of higher education students and inevitably affects the quality of education.

On the whole, the results of the study enable one to propose a set of measures aimed at modernizing the regional higher education system, including the use of targeted education opportunities, the organization of interaction with the region's businesses enterprises, the network interaction of higher education institutions, the potential of WorldSkills contests, as well as implementing new educational approaches, forms and methods, doing practicums and internships. All this should contribute to increasing attractiveness of regional higher education institutions, the formation of a balanced labor market and rising socioeconomic indicators in the country as a whole.

The results of the study will be of use to everyone who takes an interest in the country's education modernization issues, sociologists, and migration and job market experts, as well as the Russian Federation's regional education officers. The research tools can be used as a basic model when analyzing the education system in Russia's regions to identify the most problematic points in the organization of work at all levels of the education system.

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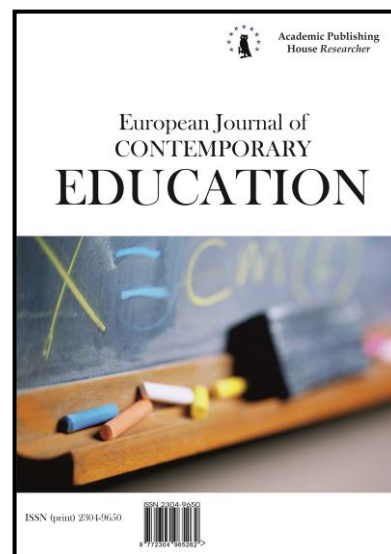
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## Extensive Reading and the Writing Ability of EFL Learners: the Effect of Group Work

Mahmood Azizi <sup>a</sup>, Hedviga Tkáčová <sup>b,\*</sup>, Martina Pavlíková <sup>c</sup>, Zita Jenisová <sup>c</sup>

<sup>a</sup> University of Mazandaran, Mazandaran, Iran

<sup>b</sup> University in Zilina, Zilina, Slovakia

<sup>c</sup> Constantine the Philosopher University in Nitra, Nitra, Slovakia

### Abstract

This study attempted to investigate the impact of extensive reading (ER) on the writing ability of Iranian EFL students. The study also took a further step to explore the effect of adding group work activity to the extensive reading program to find its possible positive effect on improving writing ability. The present study had two experimental groups with no control group. Participants were 35 students majoring in English Literature as ER plus GW (group work) group and 30 students majoring in English Language Teaching as ER group both taking the course of reading comprehension(II) in the University of Mazandaran. Participants were first given a reading comprehension test taken from TOEFL from which 24 students were chosen as the participants of this study according to their marks. The ER plus GW group read one graded reader each week at home, discussed the summary or related topic in the groups of five or six. The group members took notes on each other's talk including new vocabulary and language structure. At home, they wrote a summary of the book. ER group, on the other hand, read one book each week and wrote its summary at home without any discussion. Both groups were asked to write about a common topic one before and one at the end of the program as their pre/post test. Their summary examined in terms of four writing aspects including: run-on sentences, vocabulary errors (word choice and word form), and overall accuracy. The results of t-test revealed that adding group work to ER was almost effective in improving overall accuracy, run-on sentences, word choice but not in word form errors.

**Keywords:** extensive reading, writing ability, group work, English literature, research.

### 1. Introduction

In language learning, reading is a very important and active skill. The ability to read in a second language is considered to be an essential skill for students. Learning to read requires

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\* Corresponding author

E-mail addresses: [hedwiga.tkacova@mail.com](mailto:hedwiga.tkacova@mail.com) (H. Tkáčová), [mazizijam@umz.ac.ir](mailto:mazizijam@umz.ac.ir) (M. Azizi), [mpavlikova@ukf.sk](mailto:mpavlikova@ukf.sk) (M. Pavlíková), [zjenisova@ukf.sk](mailto:zjenisova@ukf.sk) (Z. Jenisová)



cognitive effort and a long process in first and second language (Grabe, 2006). Reading is a complex process involving the interaction of various cognitive, metacognitive, linguistic, and sociolinguistic elements. Benettayeb believes that reading is not an individual act, but it involves the interaction of the reader's general information, linguistic competence, visual and mental means, and socio-cultural reference (Benettayeb, 2010). Generally, it is a key to language acquisition and learning. There are generally four styles considered for reading including: skimming, scanning, intensive reading (IR), and extensive reading (ER). However, nowadays, extensive reading is not considered as a reading style but rather as an approach to second and foreign language reading instruction (Day, Bamford, 1998; Day, Bamford, 2004; Ficzer et al., 2020; Lalinská et al., 2020).

Harold Palmer was the first person who applied the term ER and IR in 1968. Intensive reading is reading complex material under the teacher's control by the aim of detailed understanding (Gardner, 2004; Imrie, 2004; Nishino, 2007 and etc.). On the other hand, ER is a kind of rapid, silent reading of large and easy to understand material without teachers' help in a stress-free environment, usually done outside the classroom (Asraf, Ahmad, 2003; Gardner, 2004; Imrie, 2004; Nishino, 2007). Generally speaking, ER is an approach to language teaching in which learners read a lot of easy material in the new language. They choose their own reading material and read it independently of the teacher. They read for general, overall meaning and for information and enjoyment. The only necessity is that the students already have a basic knowledge of the foreign or second language.

Over the past decade, an increasing number of studies have been conducted within English as a second or foreign language context on extensive reading. The purpose of those studies was to investigate the impact of ER on the improvement of language skills. ER program has been found to be very helpful and effective in increasing learners' language proficiency. Research has shown improvement of the vocabulary through ER (see e.g. Benettayeb, 2010; Nuttall, 2005; Nation, 1997; Matsuka, Harish, 2010), speed reading (Mason, Krashen, 1997; Bell, 2001; Mason, Krashen, 2004; Tanaka, Stapleton, 2007), reading comprehension (Lalinská et al., 2020; Kirmizi, 2009; Tanaka, Stapleton, 2007; Yamashita, 2008; Wan Rom, 2010), attitude and motivation toward reading (Asraf, Ahmad, 2003; Nishino, 2007; Prowse, 2002), listening (Day, Bamford, 1982; Schieppegnell, 1984), affect (Powell, 2005; Han, 2010; Grabe, 2001; Hartshorn, 2008), and writing (Lee, Hsu, 2009; Tsang, 1996; Nordquist, 2009; Lundstrom, Baker, 2009).

Learning including extensive reading can move forward with the use of educational applications in addition to teaching literature and language (Blakqori, 2020), use extensive reading combined with form-focused or meaning-focused activities (Khonamri, Roostae, 2014), by increasing the competencies of teachers (Gadušová et al., 2020; Weda, 2018; Prochazka et al., 2018), through the assignments in IELTS format (Vasbieva, Vlasova, Novikova, 2020), with the use of media supports (Babushkina, Kalugina, 2020), different tools of modern communication (Pushkarev, Pushkareva, 2018; Pushkarev, Pushkareva, 2019; Martin et al., 2020; Kobylarek, 2018; Kobylarek, 2019), metacognitive strategy training (Khonamri, Ahmadi, 2015; Delaney, 2008), students' collaboration and reflection (Storch, 2005) or with the use and develop of literature-based reading materials (Irwansyah et al., 2020). The training of the practitioners in schools also proves to be suitable. Research has shown they need to be trained to develop precise themes and topics in the lesson plan (Muhammad et al., 2007; Syarifudin, Patak, 2019; Najmonova et al., 2020). As mentioned above, for many decades, people have been increasingly interested in ER programs. Extensive reading is being employed in reading classes for both native and non-native English students. The purpose of ER is improving reading skills by reading a large quantity of materials that are comprehensive and pleasurable enough. It can help improve reading skills in native and foreign languages and have a positive effect on the enhancement of other language skills (Stranovská et al., 2020a; Stranovská et al., 2019; Králik, Máhrik, 2019a,b).

Research studies (Asraf, Ahmad, 2003; Bell, 1998) show that students become better and more confident readers through employing ER program. Furthermore, they write better, their listening and speaking abilities improve, and their vocabularies get richer. In addition, ER makes students motivated to learn the target language and develop positive attitudes toward the new language. ER considers a special sense in the context of language teaching: real world reading but for a pedagogical purpose. Nuttall suggested that the best way to improve the knowledge of a

foreign language is to go and live among its speakers; the next best way is to read extensively (Nuttal, 2005).

The studies that have supported the effectiveness of ER (Jacobs, Gallo, 2002; Imrie, 2007; Han, 2010; Benson, 1991) have been carried out both in L1 and L2 settings in EFL and ESL contexts. Extensive reading program in the mentioned researches, have been employed on various age groups ranging from children to adults. All of these studies have shown that there is a high correlation between ER and different areas of a language except in the writing skill. Of course, that is to say that success has not been attained in all aspects of writing through employing an ER program. Furthermore, just a small number of writing criteria have been examined through employing ER program. Some writing criteria examined in research studies so far include: fluency, accuracy, word count, range of language structure, expression, complex structure, general improvement, content, language use, etc. (Tsang, 1996; Abu Saleem, 2010; Han, 2010). Thus, writing improvement via extensive reading program, among the other language skills, needs more examination. In other words, the reason why ER has not been successful in improving some aspects of writing remains unanswered in foreign and native language learning setting. Accordingly, the following research questions were raised and guided this study.

## **2. Methodology**

Accordingly, the following research questions were raised and guided this study:

1. Can the effects of ER on writing ability be enhanced by the use of group work?

1.1. Is there a significant difference in EFL learners' writing ability regarding selected items (run-on sentences, vocabulary errors including word form and word choice, and overall accuracy) after ER program?

2.1. Is there a significant difference in EFL learners' writing ability regarding selected items (run-on sentences, vocabulary errors including word form and word choice, and overall accuracy) after ER program plus group work?

### **Participants**

Sixty five first year students, both male and female students majoring in English Literature and English Language Teaching studying at the department of foreign languages of Mazandaran University participated in this study. Their ages ranged from 19 to 23. The participants were divided into two experimental groups: the one in which group work was employed along with ER (ER plus GW) in English Literature class and the other one which only used ER (ER group) in English Language Teaching class. All of the participants took a reading comprehension test at the beginning of the course. This was done to control the effect of reading proficiency on the final analysis of the results.

### **Design**

The study employed a quasi-experimental design which used a pre-test-treatment–posttest procedure to collect data. The present study had two experimental groups with no control group: ER plus GW group and ER group. The idea of having no control group is not something new in this domain. Some other studies (Lai, 1993; Mason, 2004; Han, 2010), also, designed their studies without a control group. In this study, if it were possible, the inclusion of a group work was preferred but in practice, it was difficult to impossible to find three reading classes with the same instructor. Both groups wrote two essays one before and one at the end of the program around the topic of "what is your idea about your previous-present reading course?"

### **Procedures**

Thirty five English Literature students as ER plus GW group made six groups, five in each. The teacher divided these students according to the grade of their previous course in reading. The present course was reading 2. Each individual student read one book of his/her interest each week. The students themselves selected the books for the purpose of encouraging more involvement; furthermore, learners' motivation to read increases when they are interested in what they are reading. The reading occurred at home and a short discussion on the topic of the book or any related issues regarding the books they have read was held for 25 minutes in the class as a group work activity. Thus, each student could talk for about 5 minutes; it could play an absolutely crucial role in keeping them focused on what they have read. The rationale behind group element is that discussing a book with others boosts learners' curiosity, gives them opportunity to exchange

points of view, and introduces them to other books in the library. While working in groups, the members took notes on each other's talk including new vocabularies and language structures.

The teacher monitored the whole process by listening to the presentation actively, helping the students with choosing the books, etc. ER and group work are parts of their reading class activities. The teacher would consider separate mark for students' group works and discussions. ER program was employed in the reading class for 90 minutes, once a week. The analysis was done on 12 students whose scores were among 12-16.

To be more specific, the following activities were performed in the ER plus GW group:

**Extensive Reading and Thinking Logs:** students were required to read a book every week outside of class and keep logs of what they read. In the log, they were to write a summary of the book and express their opinion about it. At the same time, it was obligatory to write how much they thought the book helped them develop their general command of English (grammar and vocabulary). They were also required to complete an ER form asking for more detailed information about their reading.

**ER Group Discussion:** Each week, upon completing their graded readers, the students sat with their group members and talked about the books they had finished. They were required to take note of the expressions, vocabulary or the collocations they encountered in the book and share it with their group members.

Thirty English Language Teaching students comprised the ER group. The course they were studying was reading (II). They chose one book per week according to their interest. After reading the book at home, they filled out the checklist sheet, wrote the summary of the book at home, and handed them in to the teacher the next session. Like ER plus GW group, ten books should be read till the end of the program. This group did not have group work activity and discussion part. Extensive reading was one activity of their reading course with a separate mark considered for it. The writings of 16 students whose scores were among 12-16 were examined at the end.

The researcher studied the first three summary writing of the learners of both groups and observed that the most problematic areas of their writings were the three aspects mentioned before which were run-on sentences, vocabulary errors including word choice and word form. Overall accuracy was chosen by the researcher as the most important criteria to compare the two groups. Therefore, after an analysis of students writing, these four criteria were selected to be examined in this study. Every week, the researcher studied the data collected from the students carefully. Those summaries, which were seemed to be a copy from some sources like internet, were omitted.

The findings collected from the ER worksheet were as follows:

- Most of the learners found the graded readers comprehensive enough with not very difficult texts.

- The students' writings improved gradually and the length of the summaries they delivered increased a little as well.

- The problematic areas of their writing, regarding the first three summary writings, included: run-on sentences, incomplete sentences, articles, vocabulary errors (word form and word choice), and punctuation. These four (run-on sentences, vocabulary errors, and overall accuracy) were selected to be examined in the present study since they were more obvious in students writing.

### **3. Results**

#### **Part 1 of question 1**

Is there a significant difference in EFL learners' writing ability after ER program plus group work?

To answer this research question, first the mean score of the first variable WC (word choice error) in control group was calculated and then the participants' marks were run to paired sample t-test formula to investigate the difference between the results in pre-test and post-test (Table 1).

**Table 1.** Paired Samples Statistics for Variable WC

Variable	N	Mean	Variance	Std. Deviation	Minimum	Maximum
WC <sub>pre</sub>	12	86.7	76.37	27.6	45	100
WC <sub>post</sub>	12	88.3	77.8	8.8	70	100

Source: own research

**Table 2.** Paired Samples t-Test Variable WC

Variable	T	Df	Sig
WC <sub>pre</sub> & WC <sub>post</sub>	-0.34	15	0.73

Source: own research

Based on [Table 2](#) it is shown that sig = 0.73 and since it is more than 0.05, the null hypothesis that there is not a significant difference in EFL learners' writing ability after ER program is accepted. Although it can be seen that there is three numbers rise in the post-test, the change is not meaningful according to t-test.

The second variable that was analyzed in the ERG was the run-on sentences (RO). The same steps as mentioned above were taken for this variable too and the results were as follows ([Table 3](#)):

**Table 3.** Paired Samples Statistics for Variable RO

Variable	N	Mean	Variance	Std. Deviation	Minimum	Maximum
RO <sub>pre</sub>	12	91.75	130.47	11.4	72	100
RO <sub>post</sub>	12	96.25	52.2	7.2	80	100

Source: own research

**Table 4.** Paired Samples t-Test Variable

Variable	T	Df	Sig
RO <sub>pre</sub> & RO <sub>post</sub>	-1.175	15	0.26

Source: own research

Regarding [Table 4](#), sig = 0.26 and since it is more than 0.05, this investigated item (i.e. run-on sentences) confirms the null hypothesis which was: "there is not a significant difference in EFL learners' writing ability after ER program is accepted".

WF (word form error) was the third variable examined in ERG that resulted in following analysis ([Table 5](#)):

**Table 5.** Paired Samples t-Test Variable

Variable	N	Mean	Variance	Std. Deviation	Minimum	Maximum
WF <sub>pre</sub>	12	86.9	133.85	11.57	55	100
WF <sub>post</sub>	12	96.94	62.73	7.92	71	100

Source: own research

**Table 6.** Paired Samples t-Test for Variable WF

Variable	T	Df	Sig
WF <sub>pre</sub> & WF <sub>post</sub>	-2.81	15	0.013

Source: own research

[Table 6](#) shows that sig = 0.013 and it is less than 0.05. So the above hypothesis which was: "there is not a significant difference in EFL learners' writing ability after ER program", is rejected regarding this variable.

The last variable OA (overall accuracy) was investigated in the writing of ERG and the same steps were followed for analyzing it (Table 7):

**Table 7.** Paired Samples Statistics for Variable OA

Variable	N	Mean	Variance	Std. Deviation	Minimum	Maximum
OA <sub>pre</sub>	12	68.31	99.83	14.13	40	91
OA <sub>post</sub>	12	81.19	240.16	15.5	50	100

Source: own research

**Table 8.** Paired Samples t-Test for Variable OA

Variable	T	Df	Sig
OA <sub>pre</sub> & OA <sub>post</sub>	-2.48	15	0.025

Source: own research

According to the Table 8 sig = 0.025 and it is less than 0.05 and the above hypothesis which was: "there is not a significant difference in EFL learners' writing ability after ER program ", is rejected.

**Part 2 of question 1**

Is there a significant difference in EFL learners' writing ability after ER program plus group work?

To answer this research question, the above steps were followed to calculate the mean score of the three variables mentioned above (WC, ro, WF, OA). Then the data were run to SPSS software to calculate the paired sample t-test score between the pre- and post test marks.

The first variable is WC (word choice error). The results of the analysis are as follow (Table 9):

**Table 9.** Paired Samples Statistics for Variable WC

Variable	N	Mean	Variance	Std. Deviation	Minimum	Maximum
WC <sub>pre</sub>	12	81.67	77.5	8.8	66	92
WC <sub>post</sub>	12	94.3	83.6	9.14	70	100

Source: own research

**Table 10.** Paired Samples t-Test for Variable WC

Vriable	T	Df	Sig
WC <sub>pre</sub> & WC <sub>post</sub>	-0.34	15	0.004

Source: own research

Table 10 shows that sig = 0.004 that is less than 0.05. Thus, it rejects the null hypothesis which was: "there is not a significant difference in EFL learners' writing ability after ER program plus group work".

The next variable analyzed is RO (run-on sentence) with the results showed below (Table 11):

**Table 11.** Paired Samples Statistics for Variable RO

Variable	N	Mean	Variance	Std. Deviation	Minimum	Maximum
RO <sub>pre</sub>	12	99.25	6.75	./6	91	100
RO <sub>post</sub>	12	98.3	3.3	5.7	80	100

Source: own research



**Table 12.** Paired Samples t-Test for Variable RO

Variable	T	Df	Sig
RO <sub>pre</sub> & RO <sub>post</sub>	0.485	11	0.63

Source: own research

According to [Table 12](#), sig = 0.63 that is more than 0.05 and the above null hypothesis which was: "there is not a significant difference in EFL learners' writing ability after ER program plus group work", is accepted. It shows that run-on sentences were manifested more in post-tests of the participants. Group work did not make the learners able to overcome this problem. More than that, as the mean score shows, participants showed weaker performance compared with pre-test.

WF (word form) is the third variable examined in the writings of ER plus GWG and the analysis is shown below ([Table 13](#)):

**Table 13.** Paired Samples Statistics Variable WF

Variable	N	Mean	Variance	Std. Deviation	Minimum	Maximum
WF <sub>pre</sub>	12	85.08	1388	11.7	61	100
WF <sub>post</sub>	12	94.5	60.6	7.7	78	100

Source: own research

**Table 14.** Paired Samples t-Test Variable WF

Vriable	T	Df	Sig
WF <sub>pre</sub> & WF <sub>post</sub>	-2.68	11	0.021

Source: own research

[Table 14](#) shows that sig = 0.021 and it is less than 0.05. As a result, the above null hypothesis which was: "there is not a significant difference in EFL learners' writing ability after ER program plus group work", is rejected.

The last variable analyzed is OA (overall accuracy). The result is as follows ([Table 15](#)):

**Table 15.** Paired Samples Statistics for Variable OA

Maximum	Minimum	Std. Deviation	Variance	Mean	N	Variable
83	50	12.7	162.2	65.7	12	OA <sub>pre</sub>
100	70	10.06	101.2	87.1	12	OA <sub>post</sub>

Source: own research

**Table 16.** Paired Samples t-Test for Variable OA

Sig	Df	T	Variable
0.001	11	-4.8	OA <sub>pre</sub> & OA <sub>post</sub>

Source: own research

According to [Table 16](#), sig = 0.001 that is less than 0.05. Then, the null hypothesis which was: "there is not a significant difference in EFL learners' writing ability after ER program plus group work", is rejected. Through an overall overview of the above analysis, one can infer that extensive reading program has been influential in improving some aspects of writing in this study such as OA and WF; it has been less effective in enhancing two other aspects which are ro and WC. Adding group element to ERP brings about improvement in three aspects of writing which are WF, WC, and OA but not in RO. It is noteworthy that learners gained a lower mean of RO in post-test than in their pre-test.

Also, an independent samples t-test at the 0.05 level of significance as the standard was performed to determine whether group work activity was effective through comparing the overall



means of ER plus GW and ER group from the pre-test to post-test. Table 17 illustrates the results of this analysis:

**Table 17.** Independent Samples T-test for ER plus EREG and ERG

		t-test for Equality of Means			
		t	df	Sig. (2-tailed)	Mean Difference
OA	Equal variances assumed	-.429	46	.66	-1.75
	Equal variances not assumed	-.429	43.642	.66	-1.75
RO	Equal variances assumed	-.076	46	.93	-.25
	Equal variances not assumed	-.076	45.618	.93	-.25
WF	Equal variances assumed	1.569	46	.12	2.79
	Equal variances not assumed	1.569	37.101	.12	2.79
WC	Equal variances assumed	-1.361	46	.18	-3.79
	Equal variances not assumed	-1.361	42.715	.18	-3.79

Source: own research

According to the above table, the results show that sig in all of the variables are the same in both groups and all are more than 0.05. Therefore, the null hypothesis that "there is not a significant difference in EFL learners' writing ability after ER program plus group work", is confirmed (Table 18).

**Table 18.** ER plus GW and ER Groups' Statistics

	Groups	N	Mean	Std. Deviation	Std. Error Mean
OA	ER plus GWG	24	76.3750	15.67277	3.19919
	ERG	24	78.1250	12.36866	2.52474
RO	ER plus GWG	24	89.7917	10.88669	2.22224

	Groups	N	Mean	Std. Deviation	Std. Error Mean
OA	ER plus GWG	24	76.3750	15.67277	3.19919
	ERG	24	78.1250	12.36866	2.52474
RO	ER plus GWG	24	89.7917	10.88669	2.22224
	ERG	24	90.0417	11.93271	2.43575
WF	ER plus GWG	24	98.7917	4.40335	.89883
	ERG	24	96.0000	7.52388	1.53580
WC	ER plus GWG	24	88.0000	10.90672	2.22632
	ERG	24	91.7917	8.20381	1.67460

Source: own research

#### 4. Discussion

Regarding the first part of the first research question which was "Is there a significant difference in EFL learners' writing ability regarding selected items (run-on sentences, vocabulary errors including word form and word choice, and overall accuracy) after ER program?", findings of the study showed that ERG's writing improved from the pre-test to post-test which was in line with the studies of Tsang, Lee and Hsu, Abu Saleem or Han (Tsang, 1996; Lee, Hsu, 2009; Abu Saleem, 2010; Han, 2010). They investigated the relationship between extensive reading and writing improvement of high school and college students. Their programs, especially the program in the study of Tsang and Abu Saleem, were very close to the one which was used in the present study (Tsang, 1996; Abu Saleem, 2010). Tsang believed that extensive reading was a very effective approach in improving different aspects of writing. He recommended ER in English teaching syllabus as an effective material. In their studies, these three researchers worked on some writing criteria such as general improvement, organization, mechanics, vocabulary, content, and language use (Tsang, 1996). However, the present study examined some other criteria which were more problematic in the participants' writing namely word choice, word form, and run-on sentences.

The second part of the first research question was "Is there a significant difference in EFL learners' writing ability regarding selected items (run-on sentences, vocabulary errors including word form and word choice, and overall accuracy) after ER program plus group work?". A survey in the literature revealed that group work element has been found to be effective on improving reading comprehension as Manning and Manning proposed in their study (Manning, Manning, 1984). They intended to test the value of combining ER with peer interaction. Heal, also, carried out a research on the effect of group work on the attitude of learners toward reading. He suggested that group work was a very effective factor in changing learners' attitude and increasing quantity of reading (Heal, 1998). However, the present study is not consistent with these researches. Although the findings of paired t-test performed for each group showed that group work was effective in improving writing to a great extent, findings of the independent t-test revealed that the performance of both groups was almost the same; thus, group work cannot be considered as the

reason of ER plus GW groups' improvement. The following sections will explain the analysis of the four variables in details:

According to the findings of the study, related to the first variable that is WF (word form), ER group outperformed ER plus GW group after ERP. First, it might imply that group work element did not influence that much on improving the vocabulary errors i.e. word form error (wrong form of an appropriate word or spelled incorrectly) in learners' writings. And second, that this aspect of writing may require a longer time to develop and in the short term, as was the case of this study, one should not expect a huge difference. It is worth mentioning that ER plus GWG has improved in terms of WF errors. RO is the third variable ending in ERG's outperformance.

Why run-on sentence problems and word form errors did not show a considerable improvement in ER plus GWG might be answered by the claim that these are two aspects of writing which require a big deal of reading and concentration to be improved. Perhaps, in ER plus GWG, the learners pay their close attention to group work. They were to read, discuss in groups, and finally write their summaries. Group work might play an intruding role ending in lack of concentration on writing and full concentration on doing the group work activity. However, ERG, on the other hand, without any group work activity, tried to just concentrate on their reading only and immediately writing their summaries. Building on the studies on the effect of ER on improving some writing criteria which ended in positive results (Tsang, 1996; Mason, 2004; Mason, 2005), it might be implied that mere ER is influential and GW was an intruding factor. Since, to the best of the researcher's knowledge, there were almost no studies on this area, this reason should be viewed with caution. There is a need for more studies to examine the reason precisely.

The next variable analyzed was WC (word choice) in which ER plus GWG outperformed ERG leading to the conclusion that group work was somehow helpful in enhancing word choice error (spelled correctly but wrong word) related to vocabulary errors. So group work activity and interaction between learners, according to Long, was a factor helping the learners to concentrate on each other's talk; perhaps they were able to choose a better, and more appropriate word through repetition and taking notes on their group members' talk.

According to the findings of paired t-test, one can imply that group work can be an influential and effective element added to extensive reading program to improve writing ability of EFL learners. Relying on Long's interaction hypothesis both input and output are necessary for second language acquisition; interaction among learners in negotiation around meaning through clarification requests, confirmation checks, comprehension checks, and repetition makes input more comprehensible, meaningful, accessible, and more useful. The members of the groups listened to each other's speech and took notes on the new vocabularies and new structures. Therefore, it is expected that group work activities should have influenced their writings. However, because the comparison of the two groups indicated no significant differences between their performances, the above-mentioned claim cannot hold true unless it is investigated in depth in future.

According to the data, the last variable (OA) received higher mean score in ER plus GW group than in ER group. Overall accuracy (OA), as the most important writing aspect in the present study, was selected for the purpose of contrasting the two groups which improved in ER plus GEG. It supports the idea introduced by Mason and Krashen according to which besides massive reading, some output-oriented activities should be added to ER to result in better language acquisition (Mason, Krashen, 2004). According to Long's interaction hypothesis on which the present study is relied, while both input and output are necessary for second language acquisition, in order to gain a greater understanding of how this works, one should focus more attention on the interactions language learners engage in to end in more success.

Regarding learners' self-rating of adding group element to ERP, since finding an appropriate attitude questionnaire related to ER and group work was not accessible for the researcher, an unstructured interview to ER plus GWG was designed instead. According to the result, the majority of the participants (i.e. 18 out of 35) disagreed with adding group work activity to extensive reading during the program in their reading class. Most of the students (n = 15) reject adding such an element claiming that it was better if all of the group members read a common book. Since each member read a different book, while presenting the summary or the points related to the book, the members did not listen well and the process got a bit tiring for them. As far as the nature of ER has concerned, such a claim is not applicable in ERP. Building on Waring's (2007)

idea, each individual should choose a book of his/her interest and level of proficiency. There should not be any force in choosing the books.

### 5. Conclusion

This study showed how ER can be a supplementary approach in reading class for improving writing quality. Therefore, writing teachers, too, can add some input-based activity in the class in order to gain more positive outcomes. ER approach can also be employed in writing classes; integrating reading and writing in writing classes enhances the interrelationship between reading and writing.

For running a good ERP, teachers should notice the fact that some modifications (such as number of graded readers, duration of the program, etc) are needed in applying every stage of the approach to be more relevant to the situations and conditions of the students. It can be employed in high schools, universities, and language centers.

Although ER has been used in some language centers in Iran, most of the language teachers are not aware of the real quality of this approach and its useful impacts on improving different aspects of language. This study could be helpful for them to be aware of ERP and also make the learners familiar with it since it can build a long life reading habit.

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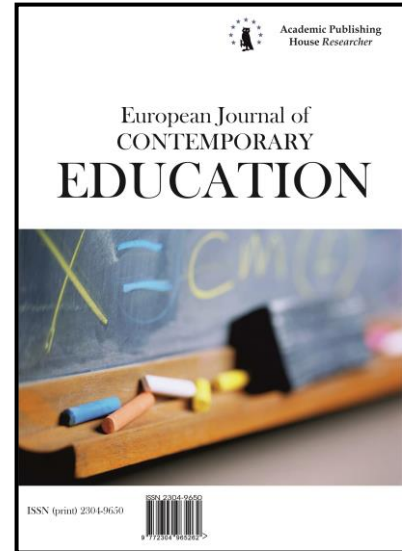
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## Effects of Socioeconomic Status and University Learning Experiences on Male and Female Students' Leadership Capacity in Vietnamese Higher Education

Minh-Quang Duong <sup>a,\*</sup>

<sup>a</sup>University of Social Sciences and Humanities – Vietnam National University  
Ho Chi Minh City, Vietnam

### Abstract

Little is known about students' leadership capacity in higher education in developing countries such as Vietnam. This research explored gender differences in family socioeconomic status (SES) and university learning experiences in Vietnamese higher education and investigated how family SES and university learning experiences influenced male and female students in terms of leadership capacity. The research was used methods of survey questionnaire and documentation. The data were drawn from a longitudinal sample of 513 fourth-year students across five member universities of Vietnam National University Ho Chi Minh City, Vietnam. They were then analyzed by data processing, displaying, and drawing a conclusion. The research has two findings. The empirical results indicated that first, overall gender differences exist regarding family SES and university experiences of students and female students came from more diverse SES families and university learning experiences compared with their male counterparts. Second, the findings of this research also revealed that both genders were affected by their family SES and university learning experiences as far as leadership capacity was concerned. The results may be attributed to Vietnamese traditions. Its primary contribution comes from the findings on the development of leadership programs, which was confirmed as the main responsibility of Vietnamese universities. The suggestions connoted for university administrators and policymakers are also discussed.

**Keywords:** Vietnam, leadership capacity students, family SES, university learning experiences, higher education.

### 1. Introduction

While Vietnamese university students constitute a considerably small proportion among the national population, Vietnamese higher education institutions undergo various reforms with a core mission to cultivate high-quality human resources to promote the industrialization and

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\* Corresponding author

E-mail addresses: [duongminhquang@hcmussh.edu.vn](mailto:duongminhquang@hcmussh.edu.vn) (M.Q. Duong)

modernization of Vietnam (Hayden, Lam, 2007; Ngo et al., 2006). However, one big challenge facing Vietnamese higher education is helping students develop competences needed by the employers and the labor market (e.g., problem-solving, teamwork, multimedia communication, leadership capacities). Indeed, university students do not appear to meet the manpower needs for development in Vietnam: businesses frequently complain of the shortage of skilled personnel, especially for management positions (Pham, Fry, 2004; Tran, 2013). In Vietnam, T.L.A. Tran (Tran, 2000) pointed out that capacities of decision making, leadership, problem-solving, timing, prioritizing and information management are highly ranked.

It is clear that very few studies have been conducted in the area of university students' leadership capacity (Dugan, Komives, 2007). Developing students' leadership capacity plays a critical role (Guthrie, Jones, 2012; Morse, 2004) and is one of the most important outcomes in higher education (Komives et al., 2011). Furthermore, J. Kouzes and B. Posner (Kouzes, Posner, 2013) emphasize the importance of equipping all university students with leadership capacity because the ever-changing world constantly requires leaders to face different problems in the future. However, the incompletion of leadership student study prevents the development of leadership capacity which is confirmed to be the main responsibility of universities (Smart et al., 2002).

Various previous studies demonstrate leadership as a social responsibility approach to emphasize the importance of the researches of leadership and the main findings of university. In this research, the social change model of leadership development is used to measure students' leadership capacity, which focuses on social responsibility and the benefits of its widespread use in university campuses (HERI, 1996). The model is designed specifically for students and affects the development of leadership programs in higher education institutions.

Researches of D. Bélanger and J. Liu (Bélanger, Liu, 2004), and P.L. Nguyen (Nguyen, 2006) demonstrate that gender and family SES are critical elements influencing the Vietnamese education. The Vietnamese education was traditionally exclusive to the male elites (Horton, 2013). However, this problem has changed with the development of Vietnamese society, especially since the economic renovation in 1986. In recent years, the proportion of female students has been increasing in the 237 higher education institutions up to 51.1 percent in the 2018–2019 academic year (General statistics office of Vietnam, 2018). Meanwhile, the gap between the rich and poor has extended, and family SES has enhanced in importance for describing educational chance and outcome (Bélanger, Liu, 2004). When the family SES is improved and the perceptions of the traditional Vietnamese society change in the positive direction, there may not be a gap between male and female students in terms of opportunities to access education, especially higher education, in Vietnamese universities.

Previous studies notice the relationship between leadership capacity and university environment (Pascarella, Terenzini, 2005; Smart et al., 2002). According to L. Beaman, E. Duflo, R. Pande, and P. Topalova (Beaman et al., 2012), and C.L. Wu (Wu, 2012) agree that classroom engagement, course hours, and class preparation factors are associated with university students' leadership development. In addition, participation in the students' associations, social service, and sports activities is found to enhance the development of students' leadership (Dugan, 2006; Hansen et al., 2003). However, the studies of relationships between factors of university learning experiences (such as curricular engagement and co-curricular involvement) and the leadership capacity are relatively sparse.

In view of aforesaid points, the purpose of this research is to explore gender differences in the family socioeconomic status (SES) and university learning experiences of Vietnamese university students and to investigate how family SES and university learning experiences impact on male and female students' leadership capacity. This research aims to answer the following research questions:

1. Are there any significant differences in the family SES and university learning experiences regarding gender?
2. How do family SES and university learning experiences affect male and female students' leadership capacity?

**2. Research method**

**2.1. Sample**

A multipart questionnaire was used to collect basic information about students (gender, family income, the parental education level, and the parental occupation) and obtain data regarding their university learning experiences as well as leadership capacity perceptions.

This research investigated 600 fourth-year students in the five member universities of Vietnam National University Ho Chi Minh City (VNU-HCM), which were 237 higher education institutes in Vietnam (General statistics office of Vietnam, 2018). Out of the 600 students, this research was conducted with 513 students whose were self-reported information in higher education research (Gonyea, 2005). It was 85.5 % return rate which exceeded the 30 % response rate for analysis purpose (Dillman, 2000). Considering that this research examined samples of female students (39.4 %) and male students (60.6 %).

**2.2. Variables**

The dependent variable of this research, leadership efficacy, was constructed based on seven questionnaire items measuring student capacities to develop a common direction in group, help to shape the mission of group, counting on to do students' part, contribute to the goals of the group, describe themselves as a cooperative group member, work with others toward common goals, and actively listen to what others have to say. This research measured the reliability of leadership capacity factors of the VNUHCM students through the valuable results of factor loading, total variance explained, and internal consistency analysis (Cronbach's  $\alpha$ ).

Values of factor loading for items of leadership capacity student factors ranged from 0.704 to 0.852, which were higher than the threshold level of 0.6 (Hair et al., 2009). Total variance explained was 63.88 percent, which was higher than the threshold level of 60 percent and meeting the requirement of a constructed variable for social science research (Hair et al., 2009). The findings of the internal consistency analysis revealed a Cronbach's  $\alpha$  coefficient of 0.901, which was higher than the threshold level of 0.6 (Hair et al., 2009) and 0.7 (Nunnally, Bernstein, 1994), indicating satisfactory reliability. Based on the above findings, hence, seven factors were acceptable for establishing leadership capacity students in this research (Table 1).

**Table 1.** Factor analysis and reliability of the seven factors constructing students' leadership capacity in the VNU-HCM

<b>Factors</b>	<b>range of score</b>	<b>factor loading</b>
developing a common direction in group		.852
helping to shape the mission of group		.844
counting on to do students' part		.822
contributing to the goals of the group	1 - 5	.807
describing individual as a cooperative group member		.793
working with others toward common goals		.763
actively listening to what others have to say		.704
<b>Total variance explained (%)</b>		63.88
<b>Cronbach's <math>\alpha</math></b>		.901

Note: Data were analyzed with principle component analysis.

The independent variables of this research encompassed 3 categories: gender, family SES, and university learning experiences. Family SES consisted of family income, parental education, and parental occupation (Clarke-Stewart et al., 1994). University learning experiences contained 5 factors, including teaching approach, assessment of learning outcomes, curriculum emphases, engagement in classroom activities and co-curricular involvement. Table 2 shows the details of operational definitions, means, and standard deviations of the research variables.

**Table 2.** Operational definitions, means, and standard deviations of the variables

<b>Dependent Variable</b>
<b>Student leadership capacity</b> Constructed according to 7 capacity factors of developing a common direction in group, helping to shape the mission of group, counting on to do students' part, contributing to the goals of the group, describing themselves as a cooperative group member, working with others toward common goals, and actively listening to what others have to say. Measured on a 5-point scale, where 1 = <i>strongly disagree</i> and 5 = <i>strongly agree</i> ( $M = 3.79, SD = .72$ ).
<b>Independent Variables</b>
<b>Gender</b> Female = 0, Male = 1
<b>Family SES</b>
Family income: measured annually on a 6-point scale, where 1 = <i>under USD 1,739</i> , 2 = <i>USD 1,739 to under 2,174</i> , 3 = <i>USD 2,174 to under 2,609</i> , 4 = <i>USD 2,609 to under 3,043</i> , 5 = <i>USD 3,043 to under 3,478</i> , and 6 = <i>over USD 3,478</i> ( $M = 2.91, SD = 2.12$ ).
Father education: measured on a 6-point scale, where 1 = <i>elementary school and lower</i> , 2 = <i>junior high school</i> , 3 = <i>senior high school</i> , 4 = <i>junior college</i> , 5 = <i>university</i> , and 6 = <i>graduate degree</i> ( $M = 3.76, SD = 1.41$ ).
Mother education: measured on the same scale as that for father's education ( $M = 3.43, SD = 1.44$ ).
Father occupation: measured on a 3-point scale, where 1 = <i>blue collar</i> , 2 = <i>management/sales</i> , 3 = <i>professional/executive</i> ( $M = 1.66, SD = .69$ ).
Mother occupation: measured on the same scale as that for father's occupation ( $M = 1.77, SD = .77$ ).
<b>University learning experiences</b>
Teaching approach: measured on a 5-point scale, where 1 = <i>never</i> and 5 = <i>always</i> ( $M = 3.59, SD = .58$ ).
Assessment of learning outcomes: measured on the same scale as that for teaching approach ( $M = 3.47, SD = .56$ ).
Curriculum emphasizes: measured on the same scale as that for teaching approach ( $M = 3.71, SD = .53$ ).
Engagement in classroom activities: measured on the same scale as that for teaching approach ( $M = 3.20, SD = .54$ ).
Co-curricular involvement: measured on the same scale as that for teaching approach ( $M = 2.42, SD = 1.00$ ).

Note. Every variable is measured with one question item

### 2.3. Procedure

This research employed the following data analysis procedure: independent *t*-test, and multiple regression analyses. Independent *t*-test was performed to see whether significant differences existed between male and female students with regard to their own the family SES and university learning experiences. Multiple regression analyses were conducted to investigate the influences of family SES and university learning experiences on male and female student leadership capacity in the VNUHCM.

## 3. Results

### 3.1. Family SES and university learning experiences of the VNUHCM students regarding gender differences

Table 3 shows that, overall, gender differences exist regarding family SES and university experiences of VNUHCM students. Regarding family SES, the female students' family SES was substantially more diverse than that of the male students. The *t*-test results revealed that the average levels of mother education ( $t = 2.490, p < 0.05$ ) and parental occupation ( $t = 2.236,$



$p < 0.05$  for father occupation;  $t = 2.905$ ,  $p < 0.01$  for mother occupation) of the female students were significantly higher than those of the male students. The average levels of family income of the female students and the father education of the male students were also lower than those of the male and female students, respectively; however, the difference did not attain statistically significant levels.

**Table 3.** Gender difference analyses of family SES and university learning experiences of the VNUHCM students

Factor	Gender	N	<i>M(SD)</i>	<i>t</i> -test
<b>Family SES</b>				
Family income	Male	311	3.04(2.25)	-1.814
	Female	202	2.70(1.89)	
Father education	Male	307	3.74(1.40)	.349
	Female	202	3.79(1.42)	
Mother education	Male	311	3.30(1.36)	<b>2.490*</b>
	<b>Female</b>	<b>202</b>	<b>3.62(1.52)</b>	
Father occupation	Male	307	1.60(.77)	<b>2.236*</b>
	<b>Female</b>	<b>202</b>	<b>1.74(.54)</b>	
Mother occupation	Male	311	1.69(.79)	<b>2.905**</b>
	<b>Female</b>	<b>202</b>	<b>1.89(.72)</b>	
<b>University learning Experiences</b>				
Teaching approach	Male	311	3.58(.63)	-.088
	Female	202	3.58(.49)	
Assessment of learning outcomes	Male	311	3.36(.58)	<b>5.446***</b>
	<b>Female</b>	<b>202</b>	<b>3.63(.47)</b>	
Curriculum emphasizes	Male	311	3.62(.50)	<b>4.722***</b>
	<b>Female</b>	<b>202</b>	<b>3.85(.55)</b>	
Engagement in classroom activities	Male	311	3.10(.59)	<b>4.729***</b>
	<b>Female</b>	<b>202</b>	<b>3.33(.41)</b>	
Co-curricular involvement	Male	311	2.27(.98)	<b>4.368***</b>
	<b>Female</b>	<b>202</b>	<b>2.66(.99)</b>	

Notes: N = 307 instead of 311 for male students' father educational level and occupation because their parent divorced, passed away, or did not live together, etc.

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

Regarding university learning experiences, the female VNUHCM students were more engaged in the university learning experiences than their male counterparts. The university learning experiences for assessment of learning outcomes of  $t = 5.446$  and  $p < 0.001$  (namely oral examination, essay or report, amount of work done, and duration attend classroom), curriculum emphasizes of  $t = 4.722$  and  $p < 0.001$  (as emphasis on memory, analysis, system synthesis, and skill formation), engagement in classroom activities of  $t = 4.729$  and  $p < 0.001$  (including go to the library, prepare lesson before class, actively participate in class, and guide friends to complete assignments) and co-curricular involvement of  $t = 4.368$  and  $p < 0.001$  (such as self-regulatory organization, volunteer activities, international exchange, and management operations) of the female students were significantly higher than those of the male peers.

### 3.2. Effects of family SES and university learning experience on the male and female VNUHCM students' leadership capacity

In Table 4, Models 1 to 3 were stepwise regression analyses to clearly present the effects of independent variables on the students' leadership capacity in the VNUHCM. Model 4 involved gender-specific regression analyses to further examine gender differences. The results exhibit coefficients of  $\beta$  values, with  $\beta > 0$  indicating a positive impact on the leadership capacity and by contrary. These models explained 28.7 %, 65.8 %, 77.2 %, and 98.4 % of the variance of leadership

efficacy of family SES (Adj. R<sup>2</sup> = .287), university learning experiences (Adj. R<sup>2</sup> = .658), the female students (Adj. R<sup>2</sup> = .772), and the male students (Adj. R<sup>2</sup> = .984), respectively.

**Table 4.** Stepwise and regression analyses of variable effects on male and female student leadership capacity of VNUHCM

Factor	Model 1	Model 2	Model 3	Model 4	
				Male	Female
Beta ( $\beta$ )					
<b>Gender</b>	<b>-.152**</b>				
<b>Family SES</b>					
Family income		<b>.151***</b>		<b>-.107*</b>	<b>.432***</b>
Father education		.078		<b>.111*</b>	<b>.490***</b>
Mother education		<b>.616***</b>		<b>.431***</b>	<b>-.275***</b>
Father occupation		<b>-.270***</b>		<b>-.135**</b>	<b>-.740***</b>
Mother occupation		<b>-.460***</b>		<b>-.325***</b>	<b>.108***</b>
<b>University learning experiences</b>					
<i>Teaching approach</i>					
explaining the knowledge in books			<b>.159***</b>	<b>.307***</b>	.006
interaction between lecturer and student			<b>-.107*</b>	-.050	<b>-.106*</b>
selecting topics and do report			<b>.212***</b>	<b>.260***</b>	.059
field trips			<b>.094*</b>	-.089	<b>.429***</b>
<i>Assessment of learning outcomes</i>					
oral examination			.085	<b>.204**</b>	<b>1.061***</b>
essay or report			<b>.103*</b>	<b>.352***</b>	<b>-.423***</b>
amount of work done			<b>-.113*</b>	-.057	<b>-.109**</b>
duration attend classroom			.005	<b>-.106*</b>	<b>.278***</b>
<i>Curriculum emphasizes on</i>					
memory			<b>.129**</b>	<b>-.196**</b>	<b>.268***</b>
analysis			.015	<b>.162**</b>	<b>.133***</b>
system synthesis			.005	<b>-.181**</b>	-.012
skill formation			<b>.157**</b>	<b>.115*</b>	<b>-.104*</b>
<i>Engagement in classroom activities</i>					
going to the library			<b>.143***</b>	<b>.206***</b>	<b>.251***</b>
preparing lessons before class			<b>.121*</b>	-.002	<b>.425***</b>
actively participating in class			<b>.322***</b>	<b>.250***</b>	<b>.498***</b>
guiding friends to complete assignments			<b>-.503***</b>	<b>-.350***</b>	<b>-.267***</b>
<i>Co-curricular involvement</i>					
self-regulatory organization			<b>.202**</b>	<b>.224*</b>	<b>.540***</b>
volunteer activities			<b>-.394***</b>	<b>-.282**</b>	<b>-1.747***</b>
international exchange			<b>.281***</b>	-.003	<b>.253***</b>
management operations			-.032	.001	-.025
F	12.01***	41.98***	50.20***	42.50***	491.27***
Adj. R <sup>2</sup>	.021	.287	.658	.772	.984

\* p < .05, \*\* p < .01, \*\*\* p < .001

The findings of this research demonstrated that various family ESE and university learning experiences persisted to have significant relationships with student leadership capacity. Model 1 showed a significant effect of gender on student leadership capacity ( $\beta = -.152, p < 0.01$ ). The results of Model 1 indicated that the leadership capacity of the female students was significantly higher than those of the male students in the VNUHCM. Model 2 indicates that most items of family SES, except father education, exerted a substantial influence on the leadership

capacity of the Vietnamese university students. Thereby, students' family finance and mother education yielded positive effects on their leadership capacity ( $\beta = .151$  and  $.616$ ,  $p < 0.01$ , respectively); by contrast, students' parental occupations ( $\beta = -0.270$  for father and  $-.460$  for mother,  $p < 0.01$ ) were shown as negative predictors of their leadership capacity. However, all items of family SES significantly benefited the students' leadership capacity in Model 4.

As for Model 3, the findings indicated that university learning experiences were difference associated with leadership capacity of the Vietnamese university students. Most items of teaching approach, except the item of interaction between lecturers and students, yielded positive effects on students' leadership capacity. For assessment of learning outcomes, essay or report ( $\beta = .103$ ,  $p < 0.05$ ) and amount of work done ( $\beta = -.113$ ,  $p < 0.05$ ) had positive and negative impact on student leadership capacity, respectively. Two out of four items of curriculum emphases were positively associated with students' leadership capacity ( $\beta = .129$ ,  $p < 0.01$  for emphasis on memory, and  $\beta = .157$ ,  $p < 0.01$  for emphasis on skill formation). All items of engagement in classroom activities found a positive relationship, except guide friends to complete assignments item, which hindered students' leadership efficacy ( $\beta = -.503$ ,  $p < 0.001$ ). Finally, self-regulatory organization and international exchange activities showed positive effects on students' leadership efficacy ( $\beta = .202$  and  $.281$ ,  $p < 0.01$  and  $0.001$ , respectively), but, volunteer activities demonstrated no, ever negative relationship with leadership efficacy of VNUHCM students. However, all the items persistently indicated significant difference effects after university learning experiences (Model 3) was considered across gender subgroups (Model 4).

Model 4 further revealed an intriguing effect of family SES and university learning experiences between the genders. The findings showed that father education ( $\beta = .111$ ,  $p < 0.05$  for male and  $\beta = .490$ ,  $p < 0.001$  for female) and father occupation ( $\beta = -.135$ ,  $p < 0.01$  for male and  $\beta = -.740$ ,  $p < 0.001$  for female), respectively, yielded negative and positive effects on male and female students' leadership capacity; and the remaining factors of family SES had conflicting effects for both genders.

Regarding curricular learning experiences in Model 4, items of explaining the knowledge in book ( $\beta = .307$ ,  $p < 0.001$ ), selecting topics and doing report ( $\beta = .206$ ,  $p < 0.001$ ), and emphasis on system synthesis ( $\beta = -.181$ ,  $p < 0.01$ ) respectively, yielded positive and negative effects on male students' leadership capacity, but yielded no effect on female students' leadership capacity. By contrast, items of interaction between lecturers and students ( $\beta = -.106$ ,  $p < 0.05$ ), field trips ( $\beta = .429$ ,  $p < 0.001$ ), and prepare lesson before class ( $\beta = .425$ ,  $p < 0.001$ ) respectively, yielded negative and positive effects on female students' leadership capacity, but identified no effect on male students' leadership capacity. Finally, regarding co-curricular learning experiences the data showed that positive activities demonstrated positive impacts on student leadership capacity, whereas passive activities demonstrated negative impacts on both genders in this research.

#### 4. Discussion

Though there are not many previous research studies on student leadership capacity in Vietnamese universities or others in the world, there exist similarities regarding the relationship of student leadership capacity between previous researches and this research. The findings of this research contribute to filling critical gaps in both theories and practices regarding development of gender-specific student leadership for Vietnamese universities in particular and Asian Pacific higher education in general.

Gender differences exist regarding family SES and university experiences of Vietnamese university students. The research of M. Q. Duong, C. L. Wu, and M. K. Hoang (Duong et al., 2019) shows that gender inequalities exist in family SES of Vietnamese university students. There was the opposite result with this research when they said that female students in Vietnam were significantly lower than the average levels of mother education and parental occupation of the male peers. Both male and female students in the Vietnamese higher education institutions came from families across a wide range of socioeconomic strata, whereas the female university students generally came from more diverse SES families (Duong et al., 2019).

The findings of this research echo of Duong et al., which also demonstrates that female students are more strongly engaged with university learning experiences compared to male students (Duong et al., 2019). Similarly, J. Desai (Desai, 2001) and P. Horton (Horton, 2013) also share that Vietnamese female students perform better in university learning experiences than male

counterparts. As an explanation for this result, P.L. Nguyen (Nguyen, 2006) says that Vietnamese families have tended to rapidly withdraw their females, but male families do whatever they can to ensure their sons enter universities longer than female counterparts who do not perform well academically from universities. This might be especially true for Vietnamese society when a man is the breadwinner in his family – financially contributing to the family while his wife does not have to enter the labor force (Bernard, 1993; Vu, 2008). This perspective has created a gap in the family support for learning in university of gender. Male students always receive family support to study in university, because family male students aspire to be able to find good jobs after graduation in order to take care of their small families (e.g., his wife, children and parent). The results of this research also point out that gender inequalities do exist in university students' learning experiences, and female university students in Vietnam attainment appears to be more closely related to academic performance than family support.

The findings of this research confirm that the leadership efficacy of the female students is significantly higher than that of the male counterparts at VNUHCM, which is supported by C.L. Wu and W. Bao (Wu, Bao, 2013) who report that female students have lead leadership roles at the Chinese elite universities. By contrast, other researches show that woman students have less efficacy and expectations related to leadership in higher education institutes (Adams, Keim, 2000; Boatwright, Egidio, 2003; Duong et al., 2019). This may be because the Vietnamese society has undergone extensive economic and political changes since the commonly known as economic renovation of Vietnam was implemented in 1986. The research of T.R. Müller (Müller, 2007) identified that this renovation has been attained the dominant male roles in Vietnamese society. According to D. Bélanger and J. Liu (Bélanger, Liu, 2004), Vietnamese women have been present in various social fields though H.T. Vu (Vu, 2020) admits that the number of women holding leadership positions is still limited compared to that of men. The Vietnamese government, thus, has to secure a designated number for female representation in all levels and fields in order to have a more balanced gender representation in the government system agencies (Munro, 2013). Female Vietnamese students should join holding leadership positions in the university to have the opportunity to participate in leadership roles at the workplace after graduation.

Our research suggests that family SES has a significant effect on the leadership capacity of both genders at VNU-HCM. Meanwhile, the research of Duong et al. (Duong et al., 2019) findings demonstrate that only family SES of female students has positive impacts on student leadership capacity. The previous research discovers the connection between family SES and the student learning outcomes in Vietnamese higher education. Its inconsistency can be attributed to the sample difference. In view of this approach, the research indicates that there are clearly difficulties for poor families when their children attend beyond high school, even specific poor Vietnamese families typically cannot pay for higher education (Bélanger, Liu, 2004). Vietnamese government, thus, has introduced different policies of financial assistance for students of disadvantaged SES families, including tuition exemptions, reductions, scholarships for ethnic minority students, orphans, war martyrs or veterans' children, etc. In addition, these students are also allowed to participate in loan programs with low interest rates to support their studies (Tran, 2019). The student loan programs, however, is considered modest for documents, background SES families, time-consuming. Thus, the administration of student loan programs are important, namely building verifiable eligibility standard and reducing the paperwork and collateral required for this program approach.

Similarly, almost items of university learning experiences in this research employed a significant differences effect on the leadership capacity students of both genders in the VNU-HCM. The research of P. M. King (King, 1997) indicated that student leadership development can also be a challenging and important purpose in the university and the increased presence of both curriculum and co-curriculum activities (Astin, Astin, 2000). Vietnamese students overly focus on examinations (Kelly, 2000) and are ignorant of the benefits of co-curricular activities in universities for their competence development (Duong et al., 2019). For teaching approach, the research of B. De La Harpe, A. Radloff, and J. Wyber (De La Harpe et al., 2000) found that student-centered, process-focused approaches and teacher–student interactions (Duong, Le, 2018) are successful procedures for advancing capacities for students of in higher education settings. This finding is inconsistent with that of Duong et al. (Duong et al., 2019), which had negative impact between university library and the leadership efficacy of both male and female students. However,

the researches of J. Bryant, G. Matthews, and G. Walton (Bryant et al., 2009) and K.R. Smith (Smith, 2002) indicated that there is a positive connection between library in the higher education institutions and learning of student are collecting and developing into active learning centers for students.

The fact that this positive influence of library usage was displayed from a top-level of VNU-HCM: increasingly invested infrastructures. Although previous researches have not demonstrated a direct linkage between oral examination, emphasis on analysis, actively participate in class and leadership capacity, we drawn that students with positive effects among these factors may perceive themselves to have leadership capacity. Students participating in the predominantly opposite-gender organizations are perhaps apportioned with more attention and resources (Duong et al., 2019). These results altogether suggested that participating in opposite-gender co-curricular activities could enable students to transcend the division and experiences of traditional gender roles, helping students of both genders freely explore their capacities.

## 5. Conclusion

This research explores gender differences in family socioeconomic status (SES) and university learning experiences in Vietnamese higher education and investigates how family SES and university learning experiences influenced male and female students in terms of leadership capacity at VNU-HCM. The empirical results have thus addressed the two research questions. It is hoped that the barriers found in this research might be useful for policy makers and administrators to develop leadership capacity programs for students (including curricular and co-curricular activities). To prepare students for the process of international integration, the study urges the VNU-HCM to focus on improving family SES and university learning experiences factors in the process of constructing a holistic intervention to enhance leadership capacity for students of both genders. This study also contributes to filling the gap in the literature of students' leadership capacity in both theory and practice. Further research will continue to explore larger population groups covering all universities in Vietnam and disciplines to accumulate abundant empirical information on the learning experiences and outcomes as well as using other factors which have effects on Vietnamese students' leadership capacity.

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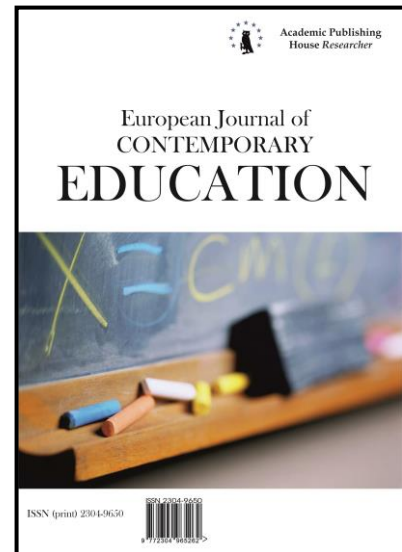
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## **Technology of Pedagogical Assistance to the Formation of the Student as a Subject of the Educational Space**

Rezeda M. Garanina <sup>a,\*</sup>

<sup>a</sup> Samara State Medical University, Samara, Russian Federation

### **Abstract**

The article reveals the essence of the technology of pedagogical assistance, which has the main identification aspects, features and quality characteristics. The multidimensional technology of pedagogical assistance proposed by the author makes it possible to solve the urgent pedagogical problem of the formation and development of the subject of the educational process, capable of self-organization, self-creation and self-realization in the future profession. For the optimal implementation of the research concept, the corresponding criteria and indicators of the effectiveness of training and education were developed, the corresponding tools for monitoring, identifying and measuring the diagnosed qualities of the subject and the results of the student's activity in the process of objective control. As a result of the research, the main directions of pedagogical influence on the development of cognitive activity, cognitive independence and self-development of a student, the formation of his subjective characteristics, optimization of the formation of subjectivity have been identified and analyzed; summarized the results of the application of multidimensional technology of pedagogical assistance in the educational environment of a medical university. The issues of creating pedagogical conditions for the coordination of subject-subject interaction and cooperation, the development of communication skills, the productive development of the information space, an increase in the subject potential and the formation of the subject position of the future specialist are discussed. The proposed concept is especially relevant in the context of the technological renewal of education, increasing the density of information flows, since theoretical educational material is presented in the form of logical-semantic models of the principles of block display of information, the use of which contributes to the effective assimilation of educational material. The technology proposed by the author is completely diagnosable, the elements of pedagogical technology turned out to be reproducible and, in general, ensure the achievement of the planned research results.

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\* Corresponding author  
E-mail addresses: [CorolevaAnna@yandex.ru](mailto:CorolevaAnna@yandex.ru) (R.M. Garanina)

**Keywords:** technology of pedagogical assistance, logical-semantic model, subjective characteristics, cognitive abilities, self-education, self-development, the formation of subjectivity.

### **1. Introduction**

In a constantly changing environment that opens up new opportunities for lifelong education (the rapid introduction of digital technologies and the informatization of society), new requirements are imposed on the future specialist in improving knowledge, skills, mastering new types of activity (in related areas), self-study and self-development.

The profession of a doctor requires a student to form competencies that allow him to quickly and freely master new ways of organizing independent activities, acquire competencies that will allow him to freely navigate the labor market, ensure successful professionalization, adequately represent the content and quality of his work in the professional community throughout his life.

In the educational space of the university, which is a complex, multicomponent, dynamic, social system, purposeful and conscious interaction of all subjects of the pedagogical process is organized. Students, acting as the subject of pedagogical assistance, need pedagogical assistance aimed at creating optimal conditions for the development of each student, at educating a competitive specialist who is able to actively build his professional career and skillfully carry out his professional activities.

The purpose of this work is to identify the main vector directions of the technology of pedagogical assistance to the formation of students in the actualized conditions of the need for the introduction and use of modern and progressive methods of organizing the educational process. A higher school teacher is tasked not only with becoming a carrier of modern knowledge and skills, but also with mastering the subjective role of a kind of student's guide in the educational space, the digital world and the world of new technologies (including blockchain technologies for combining the scientific knowledge base).

Another important task is to improve the quality of the presentation of educational material (blocks of disciplines, integrated programs, case technology, project activities of the student and other methods and ways of active learning), since it is in the educational sphere that actual information and new knowledge are most often generated, which are transformed into competence and able to ensure the demand and competitiveness of the future specialist in the labor market.

### **2. Discussion**

“The priority of professional education in the XXI century should be the formation of personal and corporate competitiveness of the future specialist” (Evplova, 2018).

For an accessible perception of the content of our work, it is advisable to consider the basic concepts we have used: “pedagogical assistance”, “technology”, “pedagogical technology”, “technology of pedagogical assistance”. The very meaning of the word “assistance” presupposes joint activity or cooperation in something, “active participation in someone's affairs in order to facilitate, help” (Ozhegov, 2003).

Pedagogical assistance is carried out in the pedagogical process, which, according to P.F. Kaptereva, “a holistic process”.

Pedagogical assistance “gives the training of a future profession a special meaning, as it provides a holistic spiritual development and professional improvement of the personality of the future specialist” (Shishkina, 2005).

As you know, any assistance implies, first of all, purposeful guidance of the student's independent learning activity, which consists in the ability to softly but persistently stimulate and direct the student's cognitive activity, develop his subjectivity, plan joint actions, the intended nature of which is productivity, efficiency, prospects the process of forming the subject position of the future specialist. Pedagogical assistance involves conscious cooperation, co-creation, unity of actions between the teacher and the student, and the pedagogical skill of the teacher is both a guarantee and a success of creating an atmosphere of creative interaction that meets the intellectual needs and value attitudes of students on the way to professional self-determination.

Accordingly, pedagogical assistance is a conscious, purposeful, systematic, consistent activity of a teacher aimed at creating optimal conditions for subject-subject interaction in the pedagogical process in order to provide assistance or support to students in their educational activities aimed at achieving the set goals, obtaining quality education and the formation of the student's subject



position. The presence of a subject position is a prerequisite for the subject's readiness to "immerse" in professional activity, to self-government in it, to the process of optimizing independent planning, design, organization, algorithmization, self-assessment and self-control.

In the explanatory dictionary of Vladimir Dahl, we can read the following definition: "Technology is the science of technology. Technique is art, knowledge, skills, methods of work and their application to business" (Dal', 2014). Technology is an art, skill, skill, a set of processing methods, state changes (Allport, 2002). The technology provides for "elaboration and algorithmicization of specific actions, starting with setting goals, the certainty of steps, operations leading to the goal" (Zagvyazinskij, 2004).

We believe that technology is a concept (representation) associated with the process of cognition, thinking, activity (including creative, heuristic and creative), planned in accordance with the goals of the pedagogical process and aimed at achieving the planned learning and upbringing results.

Pedagogical technology is a description of the process of achieving the planned learning outcomes (I.P. Volkov) (Selevko, 1998).

Pedagogical technology – a set of psychological and pedagogical attitudes that determine a special set and arrangement of forms, methods, methods, teaching methods, educational means; it is the organizational and methodological toolkit of the pedagogical process (B.T. Likhachev) (Selevko, 1998).

Pedagogical technology is a system of functioning of all components of the pedagogical process, built on a scientific basis, programmed in time and space and leading to the intended results. (G.K. Selevko) (Selevko, 1998).

Pedagogical technology is a well-thought-out model of joint pedagogical activity in the design, organization and conduct of the educational process with unconditional provision of comfortable conditions for students and teachers (V.M. Monakhov) (Selevko, 1998). Pedagogical technology means a systemic set and order of functioning of all personal, instrumental and methodological means used to achieve pedagogical goals (M.V. Klarin) (Selevko, 1998).

V.P. Bespalko defined technology as "a systematic and consistent implementation in practice of a pre-designed educational process", that is, technology is "a project of a certain pedagogical system, implemented in practice" (Bespalko, 1995).

As you know, pedagogical technologies differ from any other technologies in that they contribute to more effective and efficient teaching of students by increasing cognitive interest and motivation, and in our understanding, they are designed to contribute to the formation and development of the student's subjectivity.

Pedagogical technology is a systematic method of creating, applying and defining the entire process of teaching and assimilating knowledge, taking into account technological and human resources and their interaction, which aims to optimize the forms of education (UNESCO).

Consequently, the basis of any pedagogical technology should be a sequence of procedures for transforming the educational and professional activities of the student in accordance with the goals of training. In this context, pedagogical technology can be defined as a kind of algorithmic sequence of pedagogical procedures that guarantees the achievement of the didactic goal (Oleshkov, 2011).

"Technological effectiveness is becoming the dominant characteristic of a teacher's activity, as it leads to a transition to a qualitatively new level of efficiency, optimality and science intensity of the educational process. Therefore, we can confidently say that technology is not a tribute to fashion, but a style of modern scientific and practical thinking" (Osipov i dr., 2018).

In our opinion, any pedagogical technology is a complex model of subject-subject interactions in the educational space, a situationally determined sequence of actions of a teacher and a student, aimed at achieving a specific pedagogical result.

As a result of many years of work, we came to the conclusion that the effectiveness of the educational process increases with a wide and intensive use, for example, of problem-based learning technology, when teaching with the use of case technology, in comparison with traditional ones. As a result, students' motivational and cognitive processes are initiated, opportunities open up for freedom of thought activity of the subject of learning, effective assimilation of educational material due to the high emotional involvement of students and the creation of a situation of success, which contributes to an increase in the level of development of cognitive activity and



cognitive independence, a focus on mastering a large volume is formed. knowledge, attitude towards self-development. We find confirmation of our conclusions in the works of foreign scientists, which speak of increasing learning outcomes when using, for example, the technology of problem-based learning, the development of the ability to innovative thinking, assessment skills and self-assessment (Albanese, Mitchell, 1993; Martin et al., 2007; Macdonald et al., 2002).

“Modernization of healthcare in the Russian Federation and the task of rational management of human resources are impossible without competent specialists who are familiar with modern management technologies and are able to solve organizational and economic problems. In this regard, the development of a scientifically grounded strategy for the systematic training of qualified health management personnel with state thinking is of particular relevance. The formation of a new generation of health care managers is possible through the implementation of additional educational programs” (Glybochko, 2015).

For the successful implementation of the technology of pedagogical assistance, the teacher himself must not only have digital literacy, computer programming skills, search, exchange of information, but also carry out systematic work to create conditions for the systematic improvement of the quality of teaching, expand the possibilities of life-long education, ensure the availability of online learning, design individual educational route of the student.

Personal example, personal achievements of the teacher, informing, stimulating, visual designation of the advantages of education and the prospects for the development of the subject (with specific examples), pragmatic motives (obtaining a diploma, the prospect of high wages), the possibility of self-realization in the profession, the formation of a subject position (creation of one's own scientific directions, scientific developments, fame in the scientific world), satisfaction of their own needs, ambitions, implementation of life plans and strategies.

The desired result can be achieved unobtrusively, but firmly offering ways and means of overcoming difficulties in life, study, interpersonal relationships, arming with optimism and certainly relying on the humanitarian strategy of pedagogical activity. “The qualitative characteristic of the technology is the presence of the “subject-subject” position of the participants in the educational process. The learner becomes a subject only in the educational environment in which he is given the opportunity for self-realization and self-actualization” (Amirov i dr., 2017). An important role is also played by the intellectual-volitional orientation of the student, the ability to self-government and manage his educational activities, and an important goal is the ability to self-organization, self-development and self-realization (Hubackova et al., 2014; Kokkos, 2015; Laal et al., 2012; Laal et al., 2014).

“The subject position is, first of all, an expression of the cognitive activity and cognitive independence of the student in the educational environment of the university. The subject position, as a strictly individual, unique internal personality trait, can become an indicator of the level of autonomy, independence, activity, responsibility, self-development and self-control of the student” (Garanina, 2019).

Summarizing the stated concepts and definitions, let us give a definition to the term “technology of pedagogical assistance”. We believe that the technology of pedagogical assistance is, first of all, a technology for promoting the self-development of a student as a subject of the educational process in order to stimulate the process of his self-creation in his future profession: self-awareness, self-targeting, self-forecasting, self-organization, self-education, self-improvement, self-management and self-realization in the professional community. The final result of the designated, multidimensional, long in time, laborious in volume and scale, continuous pedagogical process is the planned achievement of the planned goal - the formation of the student's subjectivity in the educational process. Achieving this result is impossible without a clear understanding of the mechanisms, methods and methods of implementing the process of pedagogical assistance.

The teaching staff as a whole (and each teacher in particular) should perceive holistically, precisenessly understand and clearly imagine why and how the activity to achieve the designated result will be built (that is to say, there should be its own “know how”). Such global ideas require mutual understanding in the teaching staff, coordination, coherence, unanimity, and most importantly, consistency, consistency and continuity of their implementation.

### **3. Materials and methods**

To ensure the effectiveness of our research, we used the following methods of pedagogical research: theoretical – diagnostics of the subject qualities of students and analysis of monitoring data, modeling of educational information, generalization of the results of pedagogical influence; practical – observation of the educational activity of students, comparison of the subject characteristics of the student with his previous results (“Self-Competition”), polling, questionnaires, monitoring of the cognitive activity of students, pedagogical experiment (content and results of pedagogical influence, interaction); mathematical – data logging, data visualization.

To solve the problem of pedagogical stimulation of the development of students' subjectivity within the framework of the technology of pedagogical assistance, we provided for the provision of psychological and pedagogical assistance to students in search of answers to the questions: what is my subjectivity? What personal qualities should I develop in myself in order to show subjectivity? What is my independent study activity? What goals should I formulate to achieve the desired result? Why do I need self-development and self-education? What should I do to form my own subject position in educational, educational research, educational and professional activities?

In order to ensure the logic of the research, we formulated the following tasks: 1) studying the state of the issue in historical retrospect and in modern research; 2) the organization of effective educational activities of students, promoting the growth of their cognitive independence, the development of cognitive interest and the manifestation of creativity; 3) optimization of training and ensuring the successful assimilation of educational material; 4) assistance to students in the development of thinking abilities, an increase in intellectual potential, the formation of the ability to independently acquire knowledge, the development of the ability to model their own activities in conditions of problem learning and case technology; 4) development and verification of the effectiveness of multidimensional technology of pedagogical assistance to the formation of student subjectivity in the educational environment of a medical university.

The name of the technology “Pedagogical assistance” reflects the main problem – assistance to the subject development of the student and the formation of his subject position – the solution of which requires thoughtful planning, a systematic approach to its organization, monitoring and control. The methodology of our research allowed us to determine the main identification aspects, highlight the essential features and qualitative characteristics of the technology of pedagogical assistance:

a) the presence of a goal, the achievement of which is expected at the end of the pedagogical experiment – the formation of a competent competitive specialist;

b) development of diagnostic tools that allow tracking the process and results of pedagogical influences – criteria, indicators, methods and methods of assessment, monitoring, analysis of results, determination of the levels of results;

c) theoretical substantiation – the theory of personality self-development, cognition, motivation, problem-based learning, project activities, training optimization;

d) scientific concepts of teaching, adaptation and socialization: humanization of education, personality-oriented, innovative learning, activity, developmental, pedagogical stimulation;

e) methodological approaches – systemic, anthropological, personality-oriented, competence-based, subject-activity;

f) pedagogical categories – pedagogical tasks, a holistic pedagogical process, pedagogical skills, education, development, the formation of a subject position;

g) conditions for the implementation of assistance technology (requirements for the educational space of the university) – informatization of the educational space, rational management of teaching staff, an effective motivational mechanism, the implementation of additional educational programs, the use of innovative educational technologies, simulation training;

h) compliance of the design, content, implementation and management processes with the basic requirements of modern pedagogical technology to promote the development of the student's personality and the formation of his subject position: integrity and consistency, flexibility and dynamism, optimality, effectiveness, reproducibility, period of validity.

The methodology of our research involves a comprehensive study and assessment of the professional and personal qualities of a teacher. An important role function is assigned to a higher school teacher within the framework of the technology of pedagogical assistance – to promote the development of subjectivity and the formation of a student's subjective position in his educational activities. At the same time, the requirements for the teacher's personality are increasing: it must

be an erudite, creative person, an enthusiast and master of his craft, an interesting interlocutor, an authoritative specialist, psychologist, humanist, capable of dialogue with the student, to provide advice, to create a situation of success. The teacher's activity within the framework of the technology of pedagogical assistance can become a source of fairly new information about the subjects of the educational process, their interaction; it allows you to identify, study and extrapolate to the entire educational space of the university those relationships, methods of influence that are inaccessible for knowledge by traditional methods.

Of great importance in the process of pedagogical assistance is the stimulation of the student's desire for knowledge, including the independent search for knowledge, monitoring of personal growth and voicing (including public) of positive changes in the trajectory of personal development (encouragement by word, awarding). In addition, "The ability of graduates of educational organizations to self-study and independently "obtain" new knowledge becomes for them "a tool" for acquiring the missing competencies" (Romanov, 2019). Therefore, within the framework of our research, we experimentally tested a complex of psychodiagnostic techniques that allow us to study the cognitive components of students' abilities and subjective qualities.

To solve the problem of designing content, selecting methods and organizing students' activities within the framework of pedagogical assistance technology, we carried out systematic work with students of the medical, pediatric faculties and faculty of Preventive Medicine of Samara State Medical University to unite the team of students, to develop their subject qualities, and manifest their personal capabilities and subject position; and this was facilitated by joint activities: visiting educational, sports events, thematic conversations with the active participation of students in them, curatorial hours, research projects, participation in scientific conferences, participation in the volunteer movement. Separate stages of monitoring were implemented at the experimental site of the Department of Pedagogy and Psychology of the Bashkir State Medical University.

To achieve the objectives of the study, we used the principle of pedagogical monitoring, the object of which is a multidimensional technology of pedagogical assistance to students, which contributes to an increase in the level of motivation of students, the development of cognitive abilities of students, an increase in the quality of education, the development of self-education skills, an increase in the intellectual productivity and subjective potential of a student, the development of communication skills as the result of pedagogical influence.

We considered pedagogical monitoring as a method of monitoring the effectiveness of the application of the technology of pedagogical assistance to students, system diagnostics of the subject characteristics of students. The organization and conduct of monitoring allowed us to track the dynamics of increasing the level of motivation, the development of the cognitive characteristics of students, communication skills, to ensure the systematic and maximum individualization of control, a reasonable combination of types and forms of assistance.

Research on the effectiveness of the impact of the technology of pedagogical assistance was carried out at the Samara State Medical University, Bashkir State Medical University for 3 years (2016–2019). The research covered 171 1st year students of the medical and pediatric faculties.

To provide pedagogical diagnostics as a method of forecasting, to determine the directions of pedagogical assistance in the formation of the subjective qualities of students, to identify criteria for assessing the effectiveness of the multidimensional technology of pedagogical assistance, we conducted surveys and questionnaires among students of control and experimental groups. The purpose of the survey was to identify the quality and effectiveness of the use of pedagogical assistance technology to increase the level of motivation, cognitive activity, cognitive independence, the development of subjectivity and the formation of the ability to self-development.

The methods of questioning and polling allowed us to interview a fairly large number of students, analyze their answers in a short time and interpret the results. Questionnaire methods are easy to conduct, do not require large costs, and the use of questions with a limited set of answer options allows us to hope for reliable results.

Empirical methods of research as a means of collecting scientific and pedagogical facts ensured a focus on the direct study of the personal developmental possibilities of students' independent work on the basis of the really emerging experience of its organization, on the systematization of factual material. Empirical research methods made it possible to establish the relationship between the process of the teacher's influence on the student as an object of pedagogical research and the results obtained, as well as on the relationship between the

pedagogical conditions created and the degree of effectiveness of solving of the pedagogical tasks.

The survey involved 171 people (28.1 % (48 people) – boys, 71.9 % (123 people) – girls): 6 control groups (86 people) and 6 experimental (85 people). The average age of the respondents is 17.6 years.

The participants of the study had to indicate the gender, age, involvement of the student in educational and research activities or in the work of student organizations and to answer 28 questions, which we conditionally divided into four blocks: 1) characteristics of their own cognitive activity, 2) characteristics of their own cognitive independence, 3) readiness to work independently (autonomously), 4) readiness for research activities (information search, analysis, generalization, summarizing, self-presentation).

The study (questioning) was carried out using a self-organization activity questionnaire test (QSA, authors N. Fischer and M. Bond, adapted by E.Yu. Mandrikova; diagnosed the subject's ability to self-organize and his tendency to use external means of organizing activities); methods Seregina I.A. ("Methodology for determining the level of subjectivity (Seregina I.A.)"); T.I. Ilyina ("Methodology for studying the motivation of studying at a university" (T.I. Ilyina)); tests of A.A. Karelin – "Test for determining the degree of independence", "Test for assessing communication skills" (A.A. Karelin. Great encyclopedia of psychological tests. M.: VLADOS, 2003).

Statistical research methods (statistical observation, grouping of observation materials, primary statistical data processing, registration method, study of the dynamics of changes in phenomena, forecasting), which we used to process the empirical data obtained in the process of conducting and generalization of the results of the pedagogical experiment, provided us with the opportunity to study the dynamics changes in students' personal qualities, competent analysis, interpretation and evaluation of statistical indicators, provided an opportunity for theoretical generalizations.

In the course of scientific research in the process of realizing the goal of the research and in accordance with the given direction and the selected pedagogical conditions, the planned tasks were modified and complicated. To test the reliability of the hypothesis, we formed 2 groups of students: control and experimental. The control group consisted of 1st year medical students (total number 86 people). For the purity of the experiment, the control group was formed from the number of students of the second stream of the medical faculty, the experimental effects on which were not carried out. The experimental group included students of the first stream of the Faculty of General Medicine, who studied at the department in additional (elective) courses, individual programs and took part in all events organized within the framework of the offers of pedagogical assistance technology, both at the university and at the faculty levels. Their number was 85 people.

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For identifying of the differences in the indicators of motivation for learning (identifying the motive "the need to achieve success"), cognitive activity and cognitive independence, communication skills as a result of the impact of the technology of pedagogical assistance in experimental (when teaching through case-tasks) and control groups (when teaching according to traditional method), we performed statistical calculations using the nonparametric statistical Mann-Whitney U test. The choice of the Mann-Whitney U test as a calculation was made by us because it allows us to compare a variety of indicators of development, to identify differences between small samples, it makes it possible to compare more than three features and to evaluate the differences between two samples (control and experimental groups) in the level of development of which – any indicator or characteristic that can be measured quantitatively.

In addition, the calculation technique using the Mann-Whitney criterion is quite simple and has a certain reliability and versatility. To carry out statistical calculations, we used the calculation technique outlined by E.V. Sidorenko (Sidorenko, 2000). Algorithm for calculating the Mann-Whitney U test: we compare the indicators for the experimental and control groups, compile a single ranked series, determine the larger of the two rank sums ( $T_x$ ) corresponding to the sample with  $n_x$ -elements and calculate the value of the Mann-Whitney U test using the formula:

$$U_{emp} = n_1 n_2 + \frac{n_x (n_x + 1)}{2} - T_x$$

Where:

$n_1, n_2$  – the number of students in the samples,

$T_x$  is the larger of the two rank sums,

$n_x$  is the number of students in the sample with a larger sum of ranks.

The obtained value of the  $U_{emp}$  test is compared according to the table for the selected level of statistical significance ( $p = 0.01$ ) with the critical value  $U$ .

#### **4. Results**

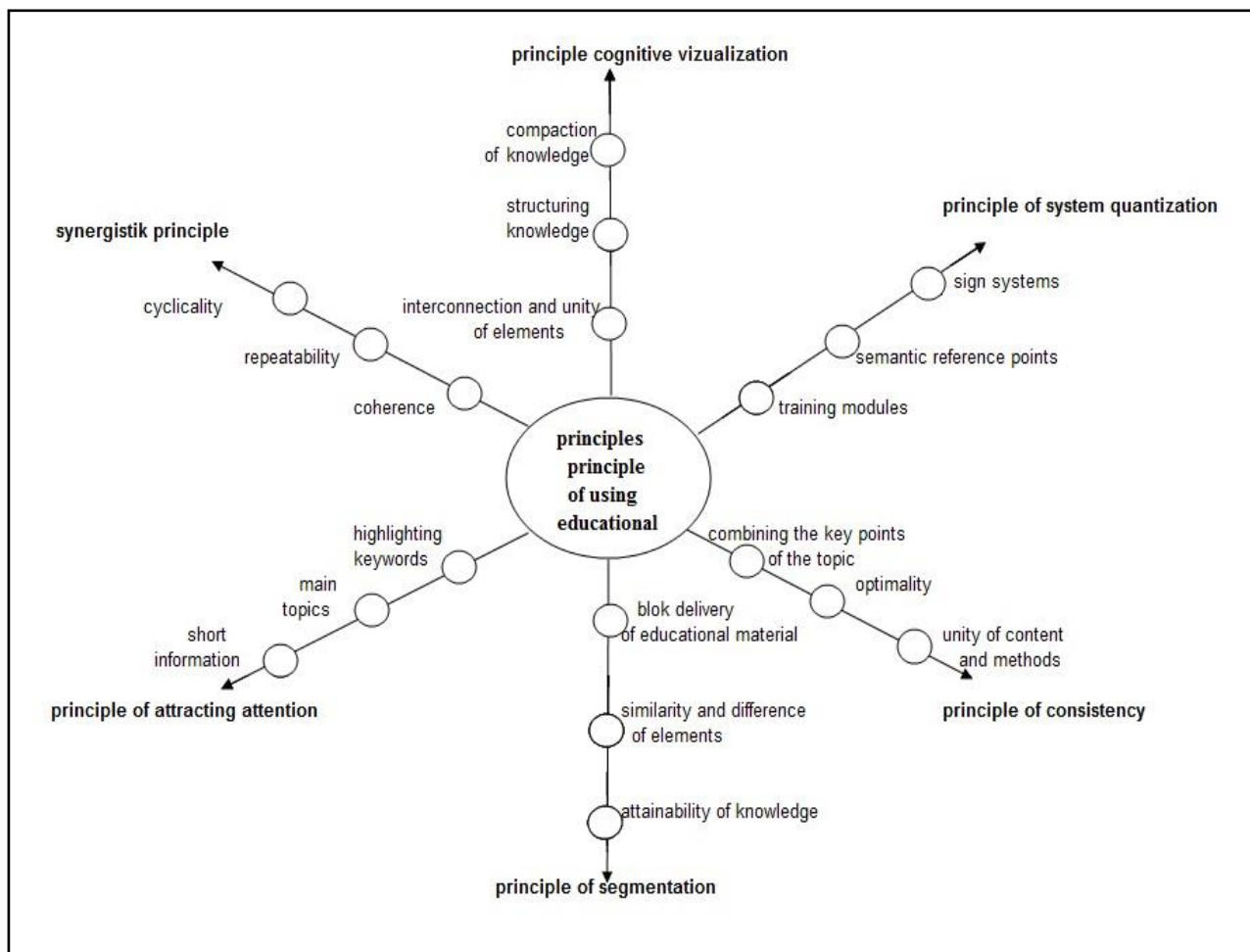
Practice shows that students differ in the level and degree of readiness to study in higher education, in the level of mental abilities, in the displayed cognitive interests, cognitive activity, and the level of motivation. The teacher's orientation in the learning process towards the average student turns out to be insufficiently effective and generally unjustified, since students with a high and low level of knowledge and abilities are out of sight, therefore, differentiation and individualization of training are the optimal solution of the problem of improving the quality of education.

To solve the pedagogical task of organizing the effective educational activity of students, promoting the growth of their cognitive independence, the development of cognitive interest and the manifestation of creativity, we proposed a multidimensional logical-semantic model that reveals the possibilities and clearly reflects the principles of the presentation and use of educational information.

The expediency of the block presentation of educational material (Figure 1) lies in the possibility of implementing several, in our opinion, the most important principles: synergetic principles (coherence, repetition, cyclicity), principles of cognitive visualization (interconnection and unity of elements, of structuring and consolidation of knowledge through logical models), the principles of systemic quantization of educational information (breaking the educational material into modules, highlighting of the semantic reference points, using various sign systems), the principle of consistency (unity of content and methods, optimality, presentation of the main educational material: nothing superfluous, combining the key points of the topic), segmentation (block presentation of educational material, similarity and difference of block elements, reachability of what was seen) and the principle of attracting attention (highlighting keywords, terms and messages (brief information)).

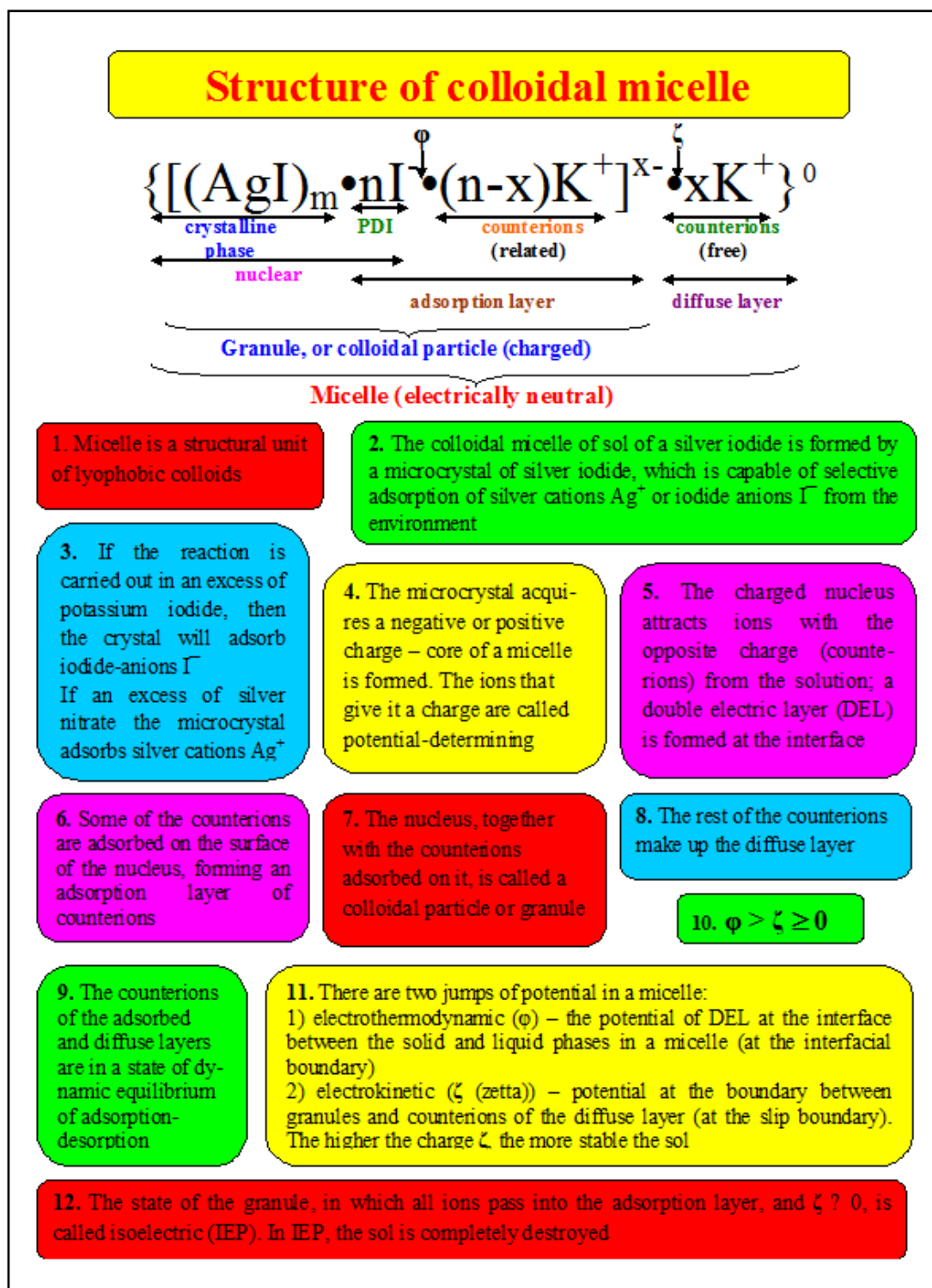
To solve the problem of facilitating the optimization of learning and ensuring the successful assimilation of educational material, we distribute the educational material into information thematic blocks-modules, which allows us to submit a sufficiently large amount of complex information in a structured, concise, but capacious form. This work requires good professional knowledge of the teacher himself, his creative attitude to work and additional personal time.





**Fig. 1.** Logical and semantic model of the principles of block representation of educational material

For example, in a practical lesson on the course “Colloidal chemistry” (one of the complex sections of chemistry), we use a block model, in which brief and concise form the structure of a micelle is displayed in a clearly and accessible way. Let us give an example of block-modular presentation of educational material on the discipline “chemistry” on the topic “Colloidal solutions. Structure of the micelle” (Figure 2).



**Fig. 2.** Block-modular presentation of educational material on the discipline “chemistry” on the topic “Colloidal solutions. Structure of the micelle”

Such presentation of the material is of interest to students, such block-modules are quite informative functional units, in which both the content of education and the technology of its assimilation are combined: information is easier to assimilate in a fairly short time and is better remembered (the increase in performance in the experimental groups was 9.22 %, quality of education – 11 %).

Let us compare the level of progress and the quality of teaching of students in the control groups, who studied without the use of the technology of pedagogical assistance, and the

experimental groups, the training of which was carried out within the framework of the technology of pedagogical assistance.

**Table 1.** Dynamics of qualitative changes in academic performance and quality of student learning in the process of pedagogical influence

Groups	Quantity of students in group	Academic performance		Quality of learning	
		Quantity	in %	Quantity	in %
CG-1	14	11	78.57	4	28.57
CG-2	14	12	85.71	5	35.71
CG-3	15	13	86.67	6	40.0
CG-4	14	12	85.71	4	28.57
CG-5	14	12	85.71	4	28.57
CG-6	15	12	80.0	6	40.0
Total for all control groups	86	72	83.72	29	33.72
EG-1	15	14	93.33	8	53.33
EG-2	14	11	78.57	6	42.86
EG-3	14	14	100.0	6	42.86
EG-4	14	13	92.86	5	35.71
EG-5	14	13	92.86	6	42.86
EG-6	14	14	100.0	7	50.0
Total for all experimental groups	85	79	92.94	38	44.71

To identify and verify significant differences in performance and quality of education in the control and experimental groups, we will perform calculations using the nonparametric statistical Mann-Whitney test and obtain a table of ranks (see Table 2). To do this, we will rank the data on the progress and quality of student learning, which are presented in Table 1, and combine the two samples into one. The ranks are assigned in ascending order of the measured value, i.e. the lowest rank corresponds to the lowest score. Using the proposed ranking principle, we obtain a rank table (Table 2):

**Table 2.** Ranking of experimental data on the scale “Academic Performance”

Academic performance in experimental groups	Rank	Academic performance in control groups	Rank
78.57	1.5	78.57	1.5
92.86	8.5	80.0	3
92.86	8.5	85.71	5
93.33	10	85.71	5
100.0	11.5	85.71	5
100.0	11.5	86.67	7
Сумма	51.5	Сумма	26.5

To calculate the empirical value of the criterion, we use the formula:

$$U_{emp} = n_1 n_2 + \frac{n_x(n_x + 1)}{2} - T_x = 6 \cdot 6 + \frac{6(6 + 1)}{2} - 51.5 = 5.5$$

For  $n_1 = 6$  and  $n_2 = 6$ , the critical value of the criterion according to the Mann-Whitney table for the selected level of statistical significance is equal to:  $U_{kp}(0.05) = 7$ . Since the inequality  $U_{emp} <$

$U_{cr}$  is fulfilled, this means that the differences are significant and significant, and, therefore, the null hypothesis is rejected.

**Table 3.** Ranking of experimental data on the scale “Quality of education”

Quality of training in experimental groups	Rank	Quality of training in control groups	Rank
35.71	4.5	28.57	2
42.86	9	28.57	2
42.86	9	28.57	2
42.86	9	35.71	4.5
50.0	11	40.0	6.5
53.33	12	40.0	6.5
СУММА	54.5	СУММА	23.5

To calculate the empirical value of the criterion, we use the formula:

$$U_{emp} = n_1 n_2 + \frac{n_x(n_x + 1)}{2} - T_x = 6 \cdot 6 + \frac{6(6 + 1)}{2} - 54.5 = 2.5$$

The critical value of the criterion according to the Mann-Whitney table is equal to:  $U_{cr}(0.05) = 7$ . Since the inequality  $U_{emp} < U_{cr}$  is fulfilled, this means that the differences are significant and significant, and, therefore, the null hypothesis is rejected.

Let's compile a summary table of empirical values for all indicators “Academic performance” and “Quality of learning” (Table 4):

**Table 4.** Empirical values of the Mann-Whitney U-test for the scale “Academic performance” and the scale “Quality of learning”

Scale name	The mean value in the control groups	The mean value in the experimental groups	Empirical value of the criterion	The level of significance
Academic performance	83.728	92.937	5.5	0.043*
Quality of learning	33.570	44.603	2.5	0.012*

\*  $p \leq 0.05$

Thus, the differences are revealed:

1) on the scale “Performance” between the control and experimental groups of students ( $U_{exp} = 5.5, p \leq 0.05$ ). As can be seen from Table 4, the average value of academic performance in the control groups (83.728) is less than the average value of this indicator in the experimental groups (92.937). According to the table of critical values, we find that  $U_{cr}(0.05) = 7$ . The significance of differences between the compared samples is quite high and amounts to 95 %;

2) on the scale “Quality of learning” between the control and experimental groups of students ( $U_{exp} = 2.5, p \leq 0.05$ ). As can be seen from Table 4, the average value of the quality of teaching in the control groups (33.570) is less than the average value of this indicator in the experimental groups (44.603). According to the table of critical values, we find that  $U_{cr}(0.05) = 7$ . The significance of differences between the compared samples is quite high and amounts to 95 %.

In the interests of assisting students in the development of mental abilities, an increase in intellectual potential, the formation of the ability to independently obtain knowledge, the development of the ability to model their own activities, we actively use problem learning, which is a means of forming universal educational actions of the student: setting a goal, the need to solve a problem that has arisen, and finding the necessary information response, stimulation of interest in learning, development of analytical, heuristic and creative abilities of the subject.

The problem-based teaching method has a high motivating potential (Table 5): students who are faced with problematic questions and create problem situations increase cognitive interest, cognitive activity and cognitive independence (an increase in experimental groups by 27.42 %, see the Table 7), a basis is created for the formation of systemic and deep knowledge.

**Table 5.** Dynamics of qualitative changes in students' motivation in the process of pedagogical influence

Groups	Quantity of students in group	The need in achievement of success					
		High		Medium		Low	
		Quantity	in %	Quantity	in %	Quantity	in %
CG-1	14	0	0	8	57.14	6	42.86
CG-2	14	1	7.14	8	57.14	5	35.71
CG-3	15	1	6.67	9	60.0	5	33.33
CG-4	14	1	7.14	8	57.14	5	35.71
CG-5	14	1	7.14	9	64.29	4	28.57
CG-6	15	1	6.67	9	60.0	5	33.33
Total for all control groups	86	5	5.79	51	59.29	30	34.92
Eg-1	15	4	26.67	10	66.67	1	6.67
EG-2	14	2	14.29	9	64.29	3	21.43
EG-3	14	3	21.43	9	64.29	2	14.29
EG-4	14	2	14.29	10	71.43	2	14.29
EG-5	14	3	21.43	11	78.57	0	0
EG-6	14	3	21.43	10	71.43	1	7.14
Total for all experimental groups	85	17	19.92	59	69.45	9	10.63

Thus, the increase in the level of motivation in the experimental groups with a high level of motivation was 14.13 %, compared with the control groups; the increase in the level of motivation in the experimental groups with an average level of motivation was 10.16 %, compared with the control groups; the proportion of students with a low level of motivation in the experimental groups decreased by 22.7 % compared to the control groups.

Calculations using the nonparametric statistical Mann-Whitney test allowed us to obtain empirical values that also indicate the reliability of differences between the compared samples in the indicator “need in achievement of success”.

**Table 6.** Empirical values of the Mann-Whitney U-test for the indicator “The need in achievement of success”

Scale name	The mean value in the experimental groups	The mean value in the control groups	Empirical value of the criterion	The level of significance
A high need in achievement of success	5.793	19.923	0	0.003*
An average need in achievement of success	59.285	69.447	1	0.006*



Scale name	The mean value in the experimental groups	The mean value in the control groups	Empirical value of the criterion	The level of significance
A low need in achievement of success	34.918	10.637	0	0.004*

\*  $p \leq 0.01$

For a high level of "the need in achievement of success" value  $U_{exp} = 0$ , for a medium level – 1, for a low – 0. According to the table of critical values, we find that  $U_{cr} (0.01) = 3$ . It is obvious that the reliability of differences between the compared samples is quite high and amounts to 99 %. The obtained statistical data testify to the effectiveness of the application of the multidimensional technology of pedagogical assistance, first of all, such components as problem learning and differentiated learning, about its optimal impact on increasing the level of motivation, which is the key to success in the student's cognitive activity, a condition for the effectiveness of his learning, development, creativity.

**Table 7.** The dynamics of qualitative changes in the cognitive and creative abilities of students in the process of pedagogical influence

Groups	Quantity of students in group	Cognitive interest		Cognitive independence		Creative abilities	
		Quantity	in %	Quantity	in %	Quantity	in %
CG-1	14	4	28.57	4	28.57	4	28.57
CG-2	14	4	28.57	3	21.43	3	21.43
CG-3	15	6	40.0	5	33.33	4	28.57
CG-4	14	5	35.71	4	28.57	4	28.57
CG-5	14	4	28.57	3	21.43	2	14.29
CG-6	15	4	26.67	3	20.0	2	13.33
Total for all control groups	86	27	31.4	22	25.58	19	22.09
Eg-1	15	10	66.67	8	53.33	5	35.71
EG-2	14	8	57.14	6	42.86	4	28.57
EG-3	14	8	57.14	7	50.0	5	35.71
EG-4	14	7	50.0	6	42.86	3	21.43
EG-5	14	9	64.29	5	50.0	4	28.57
EG-6	14	8	57.14	7	50.0	5	35.71
Total for all experimental groups	85	50	58.82	39	45.88	26	30.59

As a result of the positive and optimal impact of the applied pedagogical technology, students in experimental groups have a higher level of cognitive interest (by 27.42 %), cognitive independence (by 17 %), there is a tendency to actualize creative abilities (by 8.5 %).

The main indicators of the student's cognitive activity can be considered the focus on acquiring new knowledge (positive motivation), the ability to actively use special methods in independent work (methodology, algorithm, etc.), the desire for the continuous development of intellectual and creative abilities, an increase in subjective potential. The result of the activation of cognitive activity are qualitative changes of subject characteristics: the formation of universal educational actions, the skills of independent educational and research activities, the foundations of self-study and self-education.

Similar calculations using the nonparametric statistical Mann-Whitney test made it possible to obtain empirical values of cognitive abilities, which also indicate the reliability of differences

between the compared samples (control and experimental groups) in terms of “cognitive interest”, “cognitive activity” and “cognitive independence”.

Reforming the ranks and subsequent ranking of indicators allowed us to apply the formula for calculating the empirical value of the Mann-Whitney test. For the indicator “cognitive interest” the empirical criterion was 0, for the indicator “cognitive activity”  $U_{emp} = 0$  and for the indicator “cognitive independence”  $U_{emp} = 3$ . We'll find the critical point using the Mann-Whitney table:  $U_{cr}(0.05) = 7$ ,  $U_{cr}(0.01) = 3$ . We'll calculate the empirical values of the U-Mann-Whitney test (Table 8).

**Table 8.** Empirical values of the Mann-Whitney U-test for indicators “cognitive interest”, “cognitive activity” and “cognitive independence”

Scale name	The mean value in the control groups	The mean value in the experimental groups	Empirical value of the criterion	The level of significance
Cognitive interest	31.348	58.730	0	0.003**
Cognitive activity	25.555	48.175	0	0.004**
Cognitive independence	22.460	34.045	3	0.012*

\*  $p \leq 0.05$ ; \*\*  $p \leq 0.01$

Since  $U_{cr} > U_{emp}$  – we reject the null hypothesis in favor of  $H_1$  with a probability of 95 % (in terms of “cognitive independence”) and 99 % (in terms of two other indicators); the differences in sample rates are significant.

Problem-based learning organically complements the case method (presentation of a problem situation, problem conditions, problem questions, problem analysis), the difference is that when teaching with a problem method, a specific problem (situation) is indicated, a problem question is voiced, and when teaching a case method, a student receives a certain amount of information, on the basis of which he himself must formulate a problem, find answers to problem questions and a solution to a problem problem. At the same time, when teaching the case-method to solve the problem problem, it becomes possible to use a whole complex of knowledge not only in the discipline of “chemistry”, but also interdisciplinary knowledge, to show their cognitive and creative abilities.

The main purpose of the case method, as one of the methods of interactive learning, which allows you to combine and accept both theory and practice at the same time, is the formation of the ability for active independent activity. The case method contributes to the development of the ability to work with a large amount of information, systematize and analyze it, and make adequate decisions; the student develops a stable skill of independent solution of practical problems (the increase in the experimental groups was 21 %).

The need of technologization and intensification of the educational process in a medical university, motivated use of integrated teaching methods, multidimensional presentation of scientific knowledge is dictated by the need to improve the level of professional training of future doctors who have to work in conditions of open opportunities and prospects of the development of high-tech industries, a high level of science intensity of modern medicine

One of the directions of the technology of pedagogical assistance is the joint work of the teacher with the students, cooperation, co-creation in the preparation of the case, the selection of content and the systematization of information, the joint development of educational-research (ERWS), social projects (volunteer activities), conducting thematic curatorial hours (student speeches, presentation of achievements); the result of assistance is the actualization of educational work (this is especially important for first-year students), the preservation of continuity in teaching (school-university), ensuring the cohesion of the student body, the development of students' communication skills (an increase in the indicator “ability to listen and engage in dialogue’ in experimental groups was 31 %, see Table 9). With active subject-subject interaction and independence of students, the psychological structure of the educational situation as a whole changes, since a system of internal stimulation of the widest range of interactions of relations,

communication between teachers and students and between students themselves is created (Amirov i dr., 2018).

**Table 9.** The dynamics of a qualitative change in communication skills students in the process of pedagogical influence

Groups	Quantity of students in group	Ability to listen and engage in dialogue		The ability to build productive interaction		Mastery the art of public speaking	
		Quantity	in %	Quantity	in %	Quantity	in %
CG-1	14	3	21.43	4	28.57	2	14.29
CG-2	14	2	14.29	4	28.57	1	7.14
CG-3	15	4	26.67	6	40.0	3	20.0
CG-4	14	3	21.43	5	35.71	2	14.29
CG-5	14	3	21.43	3	21.43	3	21.43
CG-6	15	5	33.33	5	33.33	3	20.0
Total for all control groups	86	20	23.26	27	31.4	14	16.28
EG-1	15	9	60.0	5	33.33	4	26.67
EG-2	14	7	50.0	6	42.86	3	21.43
EG-3	14	8	57.14	6	42.86	2	14.29
EG-4	14	8	57.14	7	50.0	3	21.43
EG-5	14	6	42.86	5	35.71	5	35.71
EG-6	14	8	57.14	8	57.14	4	28.57
Total for all experimental groups	85	46	54.12	37	43.53	21	24.71

To confirm the reliability of the differences, we also use the formula for calculating the empirical values of the U-Mann-Whitney test.

1) For the indicator “ability to listen and engage in dialogue”:

$$U_{emp} = n_1n_2 + \frac{n_x(n_x + 1)}{2} - T_x = 6 \cdot 6 + \frac{6(6 + 1)}{2} - 57 = 0$$

According to the table, we find  $U_{cr} (0.01) = 3$ . Since  $U_{cr} > U_{emp}$ , we reject the null hypothesis in favor of  $H_1$  with a probability of 99 %; the differences in sample levels are significant.

2) For the indicator "ability to build productive interaction":

$$U_{emp} = n_1n_2 + \frac{n_x(n_x + 1)}{2} - T_x = 6 \cdot 6 + \frac{6(6 + 1)}{2} - 53 = 4$$

From the table, we find  $U_{cr} (0.05) = 7$ . Since  $U_{cr} > U_{emp}$  – we reject the null hypothesis in favor of  $H_1$  with a probability of 95 %; the differences in sample rates are significant.

3) For the indicator “proficiency in the art of public speaking”:

$$U_{emp} = n_1n_2 + \frac{n_x(n_x + 1)}{2} - T_x = 6 \cdot 6 + \frac{6(6 + 1)}{2} - 52 = 5$$

The critical value of the criterion according to the Mann-Whitney table is equal to:  $U_{cr} (0.05) = 7$ . Since the inequality  $U_{emp} < U_{cr}$  is satisfied, this means that the differences are significant and significant, and, therefore, the null hypothesis is rejected with a probability of 95 %. Let us calculate the empirical values of the U-Mann-Whitney test for the indicated indicators (Table 10).

**Table 10.** Empirical values of the Mann-Whitney U-test for indicators “The ability to listen and engage in dialogue”, “the ability to build productive interaction” and “mastery of the art of public speaking”

Scale name	The mean value in the control groups	The mean value in the experimental groups	Empirical value of the criterion	The level of significance
Ability to listen and engage in dialogue	23.097	54.047	0	0.003*
The ability to build productive interaction	31.268	43.650	4	0.024**
Mastery the art of public speaking	16.192	24.683	5	0.034**

\* $p \leq 0.05$ ; \*\* $p \leq 0.01$

Thus, the differences are revealed:

1) on the scale “the ability to listen and enter into a dialogue” between the control and experimental groups of students ( $U_{\text{exp}} = 0$ ,  $p \leq 0.01$ ). As can be seen from Table 10, the average value of this indicator in the control groups (23.097) is less than the average value of this indicator in the experimental groups (54.047). According to the table of critical values, we find that  $U_{\text{cr}}(0.01) = 3$ . The reliability of the differences between the compared samples is quite high and amounts to 99 %;

2) on the scale “the ability to build productive interaction” between the control and experimental groups of students ( $U_{\text{exp}} = 4$ ,  $p \leq 0.05$ ). As can be seen from Table 10, the average value of the quality of education in the control groups (31.268) is less than the average value of this indicator in the experimental groups (43.650). According to the table of critical values, we find that  $U_{\text{cr}}(0.05) = 13$ . The significance of differences between the compared samples is quite high and amounts to 95 %;

3) on the scale of “mastery of the art of public speaking” between the control and experimental groups of students ( $U_{\text{exp}} = 5$ ,  $p \leq 0.05$ ). As can be seen from Table 10, the average value of the quality of education in the control groups (16.162) is less than the average value of this indicator in the experimental groups (24.683). According to the table of critical values, we find that  $U_{\text{cr}}(0.05) = 7$ . The significance of differences between the compared samples is quite high and amounts to 95 %.

The communicative competence of the future doctor, being a part of the professional culture, includes the ability to listen and hear the interlocutor (which is especially important for the future doctor), to build productive communication and interaction with him. The ability to show reflection, trying to understand the patient's inner world, to influence with words, if necessary, to convince, to show empathy, endurance, to form an emotionally motivated benevolent environment – all this makes it possible to comprehensively solve the issues of interpersonal communication in a multicultural society, successfully implement professional activities, constantly mastering and improving your professional skills.

The summarized data from Table 11 clearly show the effectiveness of the technology of pedagogical assistance, which was carried out through the timely socio-psychological adaptation of the student in the educational space of the university, cooperation and interaction in drawing up joint projects, preparing thematic cases, compiling reports for student scientific conferences and gaining experience in public speaking conducting a discussion, the need to answer questions, defend your point of view, defending the project, arguing the theses of the report, etc. The increase in the communicative “ability to listen and engage in dialogue” in the experimental groups was 31 %, compared with the control groups, “the ability to build productive interaction” – 12 %, the level of “mastery of the art of public speaking” – 8.5 %.

In order to generalize the results of pedagogical diagnostics, to ensure the possibility of predicting the expected result of pedagogical assistance to students, to identify criteria for the formed subjective qualities and to assess the effectiveness of the application of the multidimensional

technology of pedagogical assistance, we systematized the results of experimental work. Table 4 presents the main goals, the formed subjective characteristics of students and the results of the application of the multidimensional technology of pedagogical assistance to the formation of student subjectivity in the educational environment of a medical university.

**Table 11.** Criteria for evaluating the effectiveness of pedagogical assistance technologies

Technology	Purpose of application	Expected result	Formed subjective qualities	Efficiency of the technology application
differentiated learning technology	1) creating optimal conditions for identifying the abilities of the students  2) realization of the principles of personality approach	1) ensuring the successful assimilation of educational material  2) the development of cognitive interest and cognitive activity	1) development of abilities  2) increment of intellectual productivity  3) increasing the level of student motivation	1) preservation of individuality of the personality  2) increasing of the level and quality of education
technology of modular training	1) realization of the activity principle in learning  2) reflexive governance of learning	1) optimization of the learning process  2) increasing the efficiency and dynamism of the educational process	1) development of independence  2) formation of skills of self-control and self-rating	1) individualization of learning  2) increasing cognitive autonomy
technology of the problem learning	1) realization of the principles of systemic and scientific approaches  2) involvement in search activities	increase of cognitive interest, cognitive activity and cognitive independence	1) increasing the level of positive motivation to learn  2) development of thinking, analytical, heuristic and creative abilities	1) the increase of intellectual potential  2) formation of the ability to independently
case-technology	1) realization of the principles of interactive learning  2) the formation of students' creative approach to solving educational and research problems, the desire for independent scientific research	1) the development of the ability to model one's own educational activity, to work with a large amount of information  2) apply theoretical knowledge to solve practical problems	1) development of skills of self-presentation and self-realization  2) the ability to make decisions and act in non-standard situations	1) satisfaction of educational needs  2) development of skills of self-learning and self-education, communication skills
technology of cooperation and co-creation	1) realization of the principles of project learning  2) increasing the efficiency of learning	1) effective development of the information space  2) building of skills working in team	1) development of creative activity  2) the ability to independently make decisions	1) development of subject-subject relations  2) development of communication skills



technology for promoting the formation of a subject position	realization of the scientific principle of the process formation of the subject position	1) timely adaptation and socialization of the subject in the educational space of the university  2) the formation of a student's need for a fundamental education	1) the ability to independently make decisions  2) the formation of students' creative approach to solving professional problems, striving for independent scientific search	1) an increase of the subject potential  2) the formation of the subject position of the future specialist
	Diagnostic and prognostic stage		Stage of realization	Stage of Monitoring and evaluation

### 5. Conclusion

Our proposed technology of pedagogical assistance to the formation of the student's subjectivity is completely diagnosable: it contains criteria and performance indicators, the appropriate monitoring tools, identifying and measuring the diagnosed quality of the subject and measuring the results of the teacher and student's activity in the process of objective control.

Elements of pedagogical technology turned out to be reproducible (teachers of senior courses participated), ensure the achievement of planned results, with skillful use, contribute to the growth of motivation, cognitive interest, cognitive activity, cognitive independence, the subject of the student, the development of communicative abilities, actualize his independent efforts for self-development and self-actualization. Each teacher has the opportunity to obtain a certain (or the same) result with a systematic approach to his activities within the framework of the technology of pedagogical assistance (dynamics and analysis of the impact of the impact, analysis of his own pedagogical activity, planning the further development of subjectivity, prospects). Obviously, the quality assurance of education is facilitated by such strategies, through the conscious and purposeful implementation of which, in a complex of managerial and pedagogical decisions, it is possible to “create high expectations and transparent requirements for educational results, individual support and motivation” of students, “develop skills that increase the chances of successful socialization graduates” (Pinskaya i dr., 2018; O' Dougherty et al., 2013; Henderson, 2013).

The proposed technology of pedagogical assistance has the main identification aspects (the presence of a goal, diagnostic tools, the possibility of theoretical justification, the application of methodological approaches, the presence of pedagogical conditions, consistency, reproducibility), features (stimulation of motivation and active cognitive activity of the student) and qualitative characteristics (learning efficiency, quality knowledge of students, the ability to apply knowledge in practice, readiness for independent activity in the future profession).

The studied theoretical material can be presented in the form of a logical-semantic model of the principles of block display, the use of which contributes to the effective assimilation of educational material. The process of mastering the technology used can be implemented by any teacher who shows a creative attitude to his work, especially since the technology we have proposed is aimed at optimizing the processes of developing cognitive activity, cognitive independence and self-development of a student, the formation of his subjective characteristics, the formation of the subjectivity of the future specialist, the formation of his subjective position in educational activities, “on the development of the individual's readiness for rapidly making changes in the professional environment, readiness for new conditions of activity by developing the ability to independently solve cognitive (and subsequently professional) problems, to various forms of manifestation of clinical thinking, to cooperate with medical personnel and other health professionals” (Amirov i dr., 2018), readiness to compete in a professional environment, including competition with oneself, against one's previous result (“Self-Competition”), which embodies the categories of progress, self-improvement and professional development (Apicella, 2017).

The formation of a student's subject position occurs during the entire period of study and is manifested in his ability to independent activity in the educational space of the university. Mastering the educational space, adaptation, socialization, assimilation of new social roles (headman, member of the SSS, member of the trade union committee, etc.), participation in events of different levels, extracurricular educational activities, subject-subject relationships, cooperation with teachers and other students – all this is realized through the technology of promoting the formation of the subject position.

“Since the search for a solution is always the art of the teacher, then various methods and techniques can be applied in solving a specific problem of forming the subject position of the student” (Garanina, 2019).

The instructor's unobtrusive guidance, its directed (sometimes pointwise) influence, the provision of alternative options for action, the designation of perspective, the teaching of algorithmic actions, the cultivation of critical self-assessment skills, the combination of reasonable exactingness with respect for the student's personality play an important role in the formation of the subject, in its development and self-development, in the formation of communication skills, in the development of methods of academic mobility, which becomes a necessary condition for the adaptation of higher education to the needs of the modern world order (Wojciuk, 2015).

The relevance of today is such that “at present there is an acute problem of reorientation of students from passive adaptation to an active position, understood as the formation of a stable need for continuous self-education and self-development”, a subjective attitude to learning, the chosen profession (Somkin, 2019).

The high cultural level of organizing and conducting events, the teacher's speech culture, erudition, mobility, the ability to be not only a translator, but also a conductor in the world of knowledge and information also contribute to an increase in the efficiency and effectiveness of the management of classroom and extracurricular independent work of students, the formation of subjectivity and the formation of their subjective positions in educational activities.

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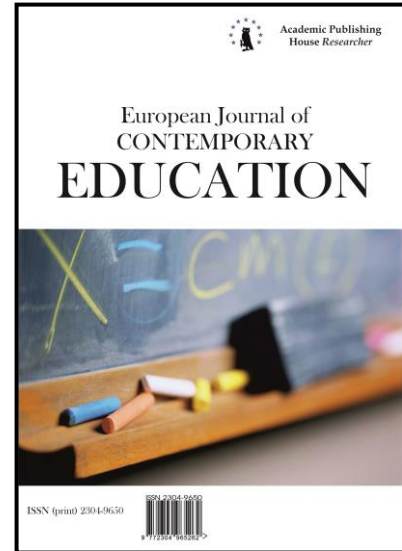
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## Present-Day Challenges to an Education System

Yuliya M. Gruzina <sup>a</sup>, Marina A. Ponomareva <sup>a, \*</sup>, Irina A. Firsova <sup>a</sup>, Marina V. Mel'nichuk <sup>a</sup>

<sup>a</sup> Financial University under the Government of the Russian Federation, Russian Federation

### Abstract

The development of the information society is giving rise to new challenges to and new requirements for education. The challenges, most importantly, include various structural and institutional changes, which are setting new goals and objectives before the Russian education system, the most significant of these being the creation of a single, all-Russian, educational space, improvement of the quality of education, development of the nurturing component of the educational process, and coordination of the content-related foundations.

The current process of innovative modernization is helping ensure competitive advantage for the Russian school system amid the challenges of the 21<sup>st</sup> century information era, where education, as an open system, develops the student not as someone who is a passive learner but as an individual with a proactive stance toward the development of their competencies. Just about any educational organization is making today a wide use of various innovative resources in the educational process, including a school website, an electronic grade book, and others. The development of the Moscow Electronic School project is helping ensure today the high-quality conduct of classes in just about any school.

This paper examines some of the key trends in the development of Moscow's education system in the mid-term horizon, analyzes some of the key methods for implementing in Moscow a set of laws and regulations adopted at the federal level in the early 2010s, and describes some of the key mechanisms underlying and outcomes of the changes in Moscow's education system which have taken place over the last few decades, based on which the authors identified a set of universal approaches that could be implemented in the education systems of major Russian cities. The authors also identified a set of possible challenges of the modern period based on an analysis of existing trends in the development of technology and changes in the educational needs of society and formulated a set of key considerations regarding the development of Moscow's education system in the mid-term horizon. The paper describes several digital technologies and platforms

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\* Corresponding author

E-mail addresses: [MAPonomareva@fa.ru](mailto:MAPonomareva@fa.ru) (M.A. Ponomareva), [YMGruzina@fa.ru](mailto:YMGruzina@fa.ru) (Yu.M. Gruzina), [IFirsova@fa.ru](mailto:IFirsova@fa.ru) (I.A. Firsova), [MVMelnichuk@fa.ru](mailto:MVMelnichuk@fa.ru) (M.V. Mel'nichuk)



currently employed in the sphere of education that are cutting-edge information systems designed for the development of digital educational processes.

**Keywords:** education system, education in Moscow, strategy for education.

### 1. Introduction

The key strategic areas for the development of education in Russia for the period through to 2025 have been formulated based on the key professional areas for the development of its labor market. There are a whole set of statutory documents that chart the course for the country's future development, including Federal Law No. 273-FZ 'On Education in the Russian Federation' of December 29, 2012 ([Ob obrazovanii...](#)), Decree of the President of the Russian Federation No. 642 'On the Strategy for the Scientific-Technological Development of the Russian Federation' of December 1, 2016 ([O strategii...](#)), Decree of the President of the Russian Federation No. 208 'On the Strategy for Economic Security in the Russian Federation for the Period through to 2030' of May 13, 2017 ([O Strategii ekonomicheskoi bezopasnosti...](#)), Resolution of the Government of the Russian Federation No. 2039-r 'On Adopting the Strategy for Enhancing Financial Literacy in the Russian Federation for the Period 2017–2023' of September 25, 2017 ([Ob utverzhdenii Strategii...](#)), and 'A Concept on the Spiritual-Moral Development and Nurturing of the Personality of Russian Citizens' ([Kontseptsiya dukhovno-nravstvennogo...](#)).

Issues related to the development of education have been the subject of wide discussion in the scholarly community since the early 1990s. Researchers have explored various aspects of past and current transformations in the area. Attempts have been made to determine the orientation of the reform vector and forecast its effects. Transformations undertaken across the education system have been explored by E.D. Dneprov ([Dneprov, 2012](#)). Scholar V.P. Chudnov examines the condition of Russia's education system and discusses the progress of the transformations in his work 'Russian Education: Its History and Current State' ([Chudnov, 2013](#)).

Attempts to analyze the first few years' outcomes of Russia's education reform have been made in a monograph by V.M. Brainin ([Brainin, 2015](#)). V.A. Kapranova has made a number of attempts to make the case for the need to orient the Russian education system to the standards practiced in Europe and the US ([Kapranova, 2016](#)). V.M. Mel'nichuk has given an expert assessment to the education system in her article 'The Traditional Imperative and the Innovation Paradigm in the Context of Higher Education' ([Mel'nichuk, 2016](#)). The Higher School of Economics and the Center for Strategic Research have published a report featuring 12 strategic solutions for novel education ([Dvenadtsat' reshenii..., 2018](#)). A work by I.M. Remorenko ([Remorenko, 2017](#)) discusses several tools for regulating education. Yu.M. Gruzina and I.A. Firsova note in their work that stimulating youth engagement in science is a priority amid the development of the digital society ([Gruzina, Firsova, 2018](#)).

Any reform undertaken to help develop the education system is expected to optimize it by reference to the concrete-historical and social-situational priorities set at each stage in the development of society.

The scholarly community is divided as to the number of reforms undertaken in the area of education in Russia and the time periods in which they were undertaken. For instance, A.M. Novikov believes that there have been no more than six educational reforms in Russia – between 1957 and 1992, while the figure suggested by E.D. Dneprov and V.I. Strazhev is five. Of definite interest is the take on reforms in the area of education offered by B.L. Wolfson, who drew the attention of the scholarly community to the fact that the last few decades have been characterized by education reforms being undertaken all over the world: "The whole world has been "hit" with a "reform epidemic". Reforms to education never start with a clean slate – each nation has its own history of undertaking education reforms. Failure to learn the lessons of the past is fraught with serious consequences" ([Kapranova, 2016](#)). The interplay between the secondary, vocational, or higher education systems and society appears to be a dual process that is accompanied by greater acquisition and assimilation of knowledge, has at its heart a need to upgrade knowledge, results in significant changes in the structure of employment, and leads to a need for new qualifications and competencies. These processes will only gain traction, resulting in the need to overhaul and regularly upgrade the disciplines taught and the actual curricula. As a consequence, institutions that will be at advantage are educational organizations that will be

capable of anticipating coming socio-economic changes in society, conducting internal audits, reacting in a timely manner to those changes, and offering highly innovative educational services.

“In today’s world, education is being developed in a climate of intense confrontation between traditions and innovations. Education reforms are multi-aspect (structural rebuilding of the links within the education system, modernization of the content of education, and modernization of the education subsystems).

Although the orientation of education reforms, priorities in them, and ways to carry them out are determined by the specific conditions in each country, there are invariant aspects of education reforms that reflect a set of common objectives set before the national education systems.

The success of any education reform is ultimately determined by the involvement and coordinated efforts of all the interested parties (developers of the reform, departmental managers, researchers, the pedagogical community, parents, students, and the general public)” (Kapranova, 2016).

In the context of what was said above, it may be worth drawing upon some statistical data attesting to the influence of global trends on the state of present-day education in order to identify and assess some of the key challenges that the Russian education system may face in the future.

One such trend is the digitalization of society all over the world, which is going to have an effect on the structure of the present-day labor market and may result in the elimination of as many as 25 % of all jobs after 2020 (BAIN & Company, 2020). This, in turn, may have an effect on the content of educational competencies. Among the skills expected to be sought after the most by employers in the future are the following supra-vocational skills:

- multilingualism and multiculturalism;
- skills of interdisciplinary communication, founded on an understanding of technologies and processes in various sectors;
- consumer-based marketing skills;
- project and process management skills;
- multitasking and time management skills;
- command of information technology;
- teambuilding;
- systems thinking;
- ability to optimize the business processes of each staff member;
- being client-oriented;
- environmental thinking (Skolkovo, 2020).

School education is the primary stage of a person’s socialization process. This is where they can master a set of skills that, having undergone further development as part of higher education, will turn into competencies sought after by prospective employers.

Digitalization is actively making its way into school, vocational, and higher education, with the use of virtual and cloud technology in education, online courses, and electronic textbooks becoming increasingly common nowadays. The trend toward greater use of digital technology is reflected in the significant increase in its volume and the increased focus on streamlining the spectrum of educational services offered by institutions of learning (U rossiyan obnaruzhili...).

However, it appears to be logical to consider the trend toward the digitalization of school education in company with trends associated with the development of social relations, the latter tending to be of a negative nature.

Today, one is witnessing growing social tensions and inequality in society amid a redistribution of income in favor of highly skilled, sought-after talent. There is stiffening competition among cities for human capital. The above trends are affecting the level of graduates of institutions of vocational and higher learning who, on account of their financial circumstances, end up being educated in educational institutions with subpar academics.

A 2017 study by The Boston Consulting Group (BCG) helped identify the following trend: over 80 % of Russia’s employable population do not have today the skills and competencies required for work in today’s marketplace (the study engaged 22 companies with a combined workforce of over 3.5 million) (Strategiya razvitiya...). What follows from this is that there is a need to foster cutting-edge digital competencies in the workforce. This involves certain difficulties, as mastering a profession is viewed from a standpoint of fostering a set of competencies that are elastic and creative, which is a key condition for being vocationally mobile and being able to

continually enhance one's vocational skills in a climate of digitalization and continued social changes. The above may lead one to suggest that the issue of achieving effective mastery of key competencies in the systems of vocational and higher education could be resolved via network interaction among educational organizations, as this approach can help ensure the further development of the intellectual potential of learners with a wide range of sought-after competencies and enable the use of those competencies in practice in the future. So what needs to be done to enable network interaction among different-level educational institutions?

In the authors' view, strategic areas for the development of education should be founded on the following suggestions:

- each learner's educational path should be built and assessed based on their "digital traces" and competencies gained;
- information should be obtained primarily through an online format;
- methodological support for the learning process should be built based on the use of practice-oriented technology, including exercisers and simulators, with a focus on less classroom work;
- there is a need for the global certification of educational programs by employers;
- the system of assessing learner achievements should be based on the blockchain principle\*;
- network interaction should be built on a vertical basis (school – community college – institution of higher learning) and a horizontal basis (network interaction among same-level educational institutions).

As noted by a number of officials in charge of educational clusters, educational organizations in Moscow have developed a number of both horizontal and vertical mechanisms aimed at achieving real and practical results and built based on the three 'T's': integration, intensity, and innovation. However, under conditions of the new multitier, differentiated economic paradigm that is being put in place across Russia's constituent regions, there is a need to make as much use as possible of synergy effects in order to modify existing educational models and technologies.

## 2. Materials and methods

High-quality education is a key to success in competition among metropolises. The government's projected image of the future education system is that of one having the conditions necessary to ensure the future competitiveness of graduates in the labor market, and its current strategy sets the objective of harmonious and integral development of the education system in the Russian capital over the next 10 years, as part of fulfilling a social mandate. Seen as central to resolving the objectives for the development of the capital's education system are the following principles: promoting lifelong education; promoting practice-oriented learning; integrating formal and non-formal education to help develop talents through the creation of the best conditions and opportunities for each learner; promoting the development of one's cultural identity as part of the urban community; promoting a more open socio-cultural environment for the preparation of graduates who will be sought-after by employers; promoting the consolidation of urban communities (*Strategiya razvitiya...*). Among the key organizational mechanisms underpinning the implementation of the Strategy today are the following:

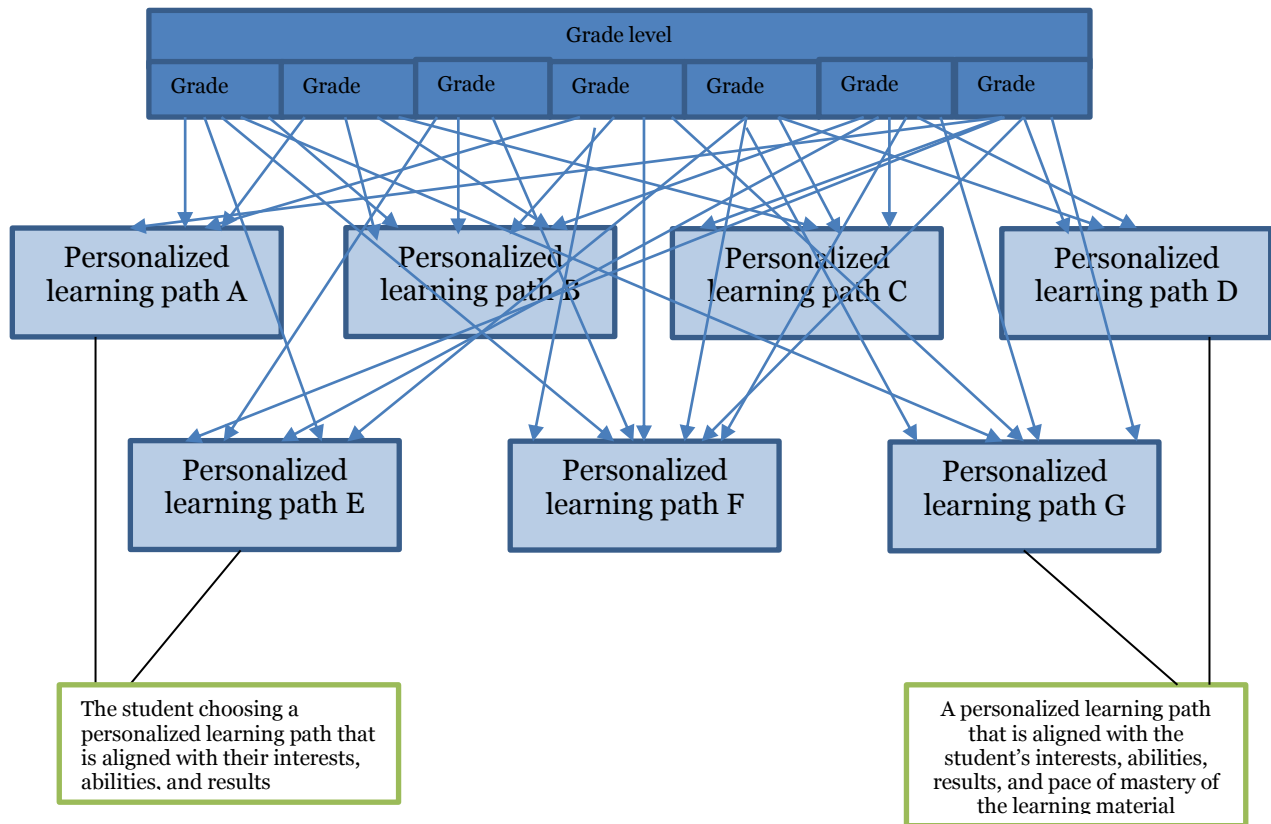
1) There is the Moscow Electronic School (MESh) project, which provides a platform that offers electronic learning materials and an information system that accumulates learners' "digital traces", which makes it possible to create unique mechanisms for building the learning process (e.g., the use of new pedagogical thinking for the administration of decision-making processes based on analysis of learners' "digital traces").

2) There is the system of personalized learning paths in open teams (POTOK), proposed by A.B. Molotov, whereby a tailored learning process will be developed for each individual learner based on their choice of disciplines to study. The learner will be able to build an individual learning path of their own, which will be multi-vector and will consist of a core part and an optional part (subjects that are not part of the core curriculum). It will also provide a vector for the development of soft skills, with a focus on developing, fostering, and enhancing personal skills and social

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\* Blockchain technology involves the use of a decentralized and distributed digital ledger consisting of records called blocks that is used to record transactions across many computers so that any involved block cannot be altered retroactively, without the alteration of all subsequent blocks.

attitudes. Thus, supplementary education will cease to be “additional” and will become an indispensable practice-oriented part of core education. This mechanism will help expand basic education by enriching it with what is academically best for the learner.

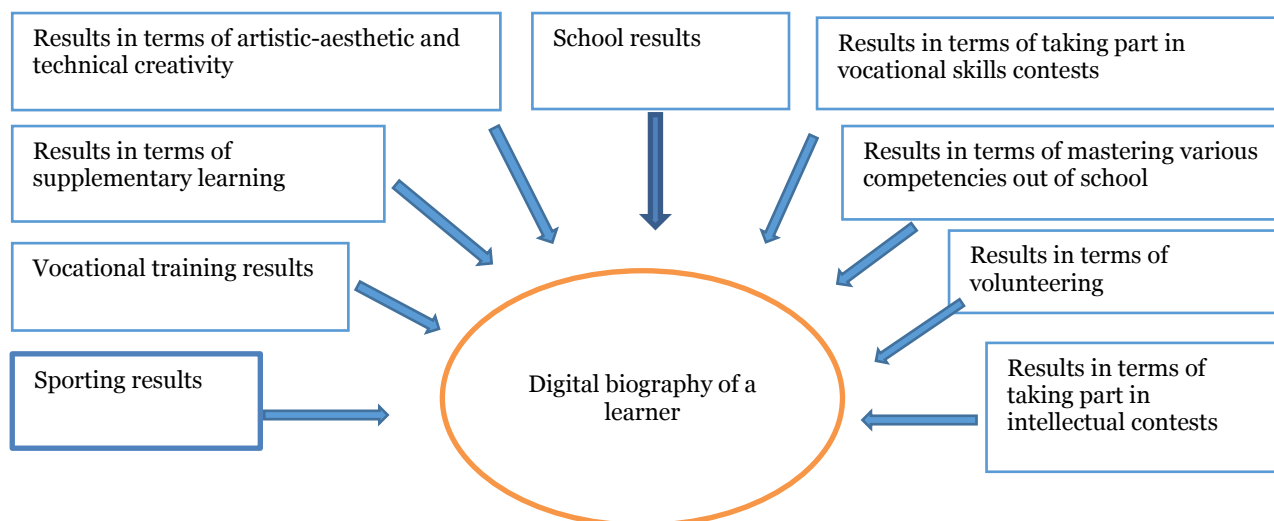


**Fig. 1.** Diagram illustrating the Personalized Learning Path in Open Teams (POTOK) mechanism (Molotkov, Chernobai, 2015).

The POTOK mechanism will make it possible to take account of learner results and form POTOK groups for each class for large numbers of students. POTOK group classes of this kind can be conducted both at educational institutions and at any culture and science organizations. POTOK is designed to help foster in students the skills of self-learning, self-development, and self-advancement along a learning path of their own design.

3) The Moscow Electronic School mechanism may be considered in the context of the Regional Educational Testing System (ROST). A negative consideration is that currently learners' extracurricular achievements are not recorded in their diploma. However, there are quite many examples reflecting the successful development of prevocational skills and harmonious personal development via non-formal education. There appears to be a need to develop a uniform system for assessing the achievements of learners pursuing non-formal education for all organizations to follow.

In terms of technology for this process, it may be possible to implement special Ministry of Education-certified educational programs by way of a global ROST system. The scheme of operation of the ROST mechanism, which is based on deductive logic, will make it possible to obtain and summarize information on the development and achievements of learners. This system will help ensure the priority-based development of learners, with a focus on taking into account their individuality and helping them make the right decisions about which path may be best for them.



**Fig. 2.** Diagram illustrating the Regional Educational Testing System (ROST).  
Produced by the authors.

In this context, there is a need to reconsider the system of prevocational education and understand that academic disciplines can no longer remain the same – they ought to increasingly become practice-oriented, with a focus on anticipating the direction of the development of the capital’s economy in the 21<sup>st</sup> century and its demand for various types of workforce. This will require major upgrades to key subject disciplines, with a focus on laying the groundwork for independent practical activity with a view to helping achieve real objectives in a digital economy. Given the logic underlying the new concept on organizing the learning process, there will be major transformations to the schools’ educational environment, with these changes expected to have a particular effect on the education of senior high school students (grades 8 to 11). It will provide a benchmark for the development of all levels of school education and will help students make a more informed choice of occupation.

The current ranking system appears to be motivating the capital’s general education institutions to respond to the new needs of society as promptly as possible. Quite possibly, certain educational establishments have sought to anticipate the needs of society, bearing in mind the absolute priority of the needs and interests of a developing individual and the need to create all appropriate conditions for the abilities and potential of talented learners to be developed to the fullest extent possible (*Strategiya razvitiya...*). One of the new motivating criteria in the ranking system is the coefficient described below. This coefficient reflects the change in score from last year.

For each school, a separate school coefficient is computed:

$$C_s = (S_c / S_l) * k_r, \text{ where}$$

$C_s$  is the coefficient computed for each school under a particular Interdistrict Council of Principals (MRSD);

$S_c$  is a school’s total ranking points for the current year;

$S_l$  is a school’s total ranking points for the last year;

$k_r$  is the correcting coefficient which factors in the place in last year’s rankings (employed if the  $S_c/S_l$  ratio is greater than or equal to one):

- $k_r = 1$  – for schools placed first to 50<sup>th</sup>;
- $k_r = 1.1$  – for schools placed 51<sup>st</sup> to 100<sup>th</sup>;
- $k_r = 1.2$  – for schools placed 101<sup>st</sup> to 200<sup>th</sup>;
- $k_r = 1.3$  – for schools placed 201<sup>st</sup> to 300<sup>th</sup>;
- $k_r = 1.4$  – for schools placed 301<sup>st</sup> to 450<sup>th</sup>;
- $k_r = 1.5$  – for schools placed 451<sup>st</sup> and below.

For an MRSD consisting of  $n$  schools, the MRSD coefficient is computed:

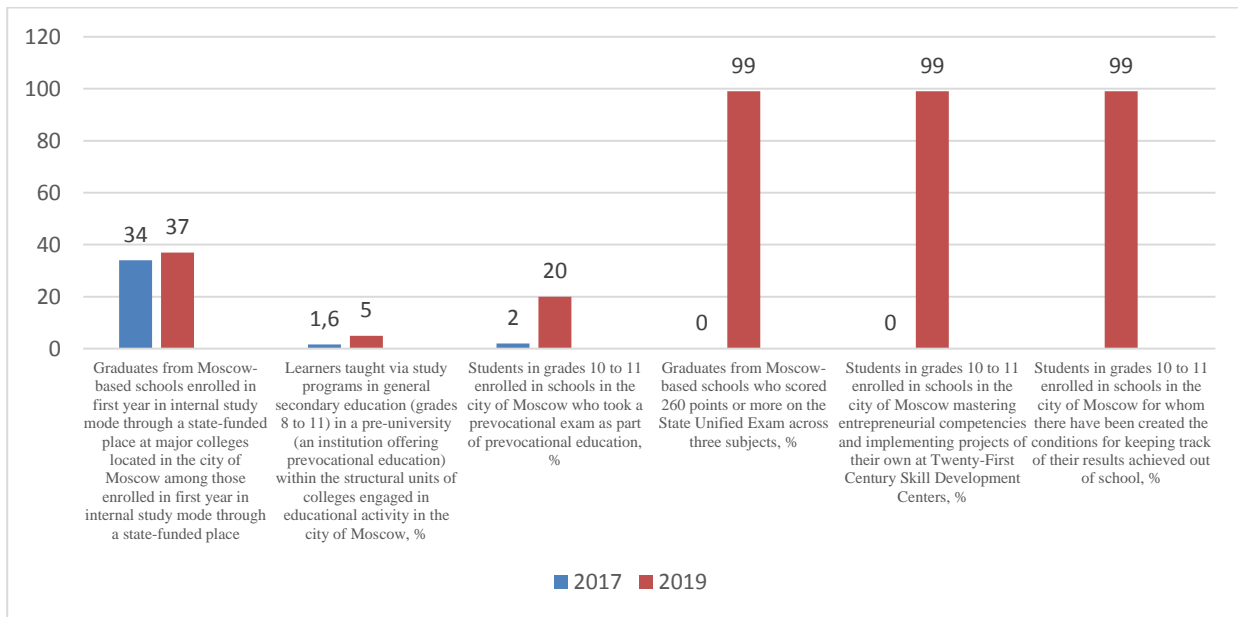
$$C_{MRSD} = C_{s1} * C_{s2} * C_{s3} * \dots * C_{sn-1} * C_{sn}.$$

Each school’s score is multiplied by the MRSD coefficient.

This system encourages less successful schools to perform better, helping make their contribution to the overall success of the MRSD more significant. On the other hand, it motivates



successful schools to provide some support to their less successful counterparts under the MRSD, as greater figures for each individual school mean a greater total coefficient for the entire MRSD. Figure 3 displays the planned measurable indicators.



**Fig. 3.** Performance in terms of implementing the Strategy for the Development of Education in the City of Moscow for the Period through to 2025. Produced by the authors based on data from a source ([Strategiya razvitiya...](#))

In today’s climate of digitalization transforming the economy and society, the role of the teacher is becoming increasingly important in the educational process. The teacher is performing a variety of functions nowadays: a motivator, a guide, an integrator, a nurturer, etc. In this context, the question arises as to how to build a teaching workforce with new competencies. Here are a few suggestions on how this can be done: 1) attract professionals from other sectors into the education sector; 2) identify leaders through specialized contests and Olympiads for teachers; 3) provide retraining and advanced training as a way to remediate the deficiencies in teaching that the instructor is aware of. A key objective in this respect is to form in each educational organization a 20–25-percent pool of transformation leaders, who will be setting an example for their fellow teachers and helping foster an atmosphere of healthy competition.

### 3. Results

The changes in the education system of the city of Moscow that have taken place since 2010 may be nominally divided into statistical, socio-pedagogical, and economic changes. The statistical changes are illustrated by the following figures. In the 2017–2018 school year, preschool, secondary, and vocational education was provided in Moscow to over 1,420,000 children, with 420,900 of these provided with preschool education. To compare, in 2010 the city’s kindergartens, schools, and community colleges were attended by 1,120,000 children, with 288,600 of these provided with preschool education.

The capital is currently home to 587 large multi-specialty schools, which offer both general and supplementary education, with 90.5 % of these providing preschool education. In 2010, Moscow had in operation 1,599 schools and 2,045 preschool educational organizations.

The average number of students per school was 437 in 2010 and 1,583 in 2017 (exclusive of preschoolers). Currently, Moscow’s education system employs 166,200 people, including 92,700 pedagogical personnel concerned with the core educational process, with 54,000 of these being teachers. In 2010, Moscow’s education system employed 237,600 people, with the number of pedagogical personnel being about the same. The amount of state funding Moscow’s education system received, through the city’s Department of Education, increased over the seven-year period

from 2010 to 2017 151.2 % – from 165.7 billion to 250.4 billion rubles. This, in company with the authorities' effective financial-economic activity, helped increase pay for the pedagogical workforce involved in all stages of the educational process and improve significantly the material-technical base of the educational organizations.

In the view of a number of experts, in 2010 Moscow exemplified a city with a polarized education system. While being pretty much homogeneous, it also featured educational institutions that were inherently innovative – these institutions were building the School of the Future.

Among Moscow's 1,599 educational organizations in operation at the time, there were 78 gymnasiums, 35 lyceums, 177 schools offering programs of advanced study of certain subjects, and over 100 centers for education and schools of health. Prior to the introduction of per capita financing, the size of funding committed to educational organizations depended on factors like status, staffing plan, and size of the school's grounds. Following the shift to the above standard, Moscow adopted 15 different standards for different types of general-education institution. Specifically, in 2010 standard expenditure per student attending a regular school was 63,100 rubles per year, a gymnasium or a lyceum – 120,000 rubles per year, an advanced study school – 74,300 rubles per year, a center for education – 102,300 rubles per year, and a school of health – 112,200 rubles per year (Molotkov, Chernobai, 2015).

Since 2011, the authorities have implemented a variety of measures and launched a set of mechanisms aimed at improving the quality of education in Moscow. These initiatives, based on the insights provided by the professional community between the 1990s and 2000s and the experience accumulated in Moscow's education system, helped get it back to leading positions in the education sector not only domestically but internationally as well. A glowing testimony to the adequacy, reasonableness, and optimality of the objectives set and mechanisms adopted to achieve them is the results achieved in 2018 by pedagogues in Moscow-based schools and community colleges and across the capital's education system as a whole, as well as the successes of Moscow-based schoolchildren. These results, which provide a foundation for further development, are best described by the following characteristics:

- democraticity of education;
- high quality of education, which matches the international level;
- maximum fulfillment of students' aspirations through the provision of appropriate conditions for their abilities and potential to be developed to the fullest extent, so that they could apply them for the benefit of the city's economy in the future;
- constructiveness and efficiency.

When it comes to the democraticity or accessibility of education, of importance is the fact that the number of children provided with preschool education has risen since 2010 from 288,600 to 420,900. Plus, there is 100-percent accessibility of places in preschool clubs for children aged 8 months to 2 years residing in the city of Moscow. A crucial indicator is the number of first-graders attending a public primary school in the same district they live in. In the 2017–2018 school year, this group accounted for 89 %, compared with 32 % in the 2010–2011 school year. In the 2017–2018 school year, public schools under Moscow's Department of Education welcomed 106,000 new first-graders (2010 – less than 80,000). Over 60 % of all first-graders entered a school by transfer from a preschool club at the same school (2010 – less than 1 %) (BAIN & Company, 2020).

The authorities' efforts to build a system of supplementary education within the capital's education system have paid off. Specifically, the total number of preschoolers and schoolchildren aged 5 to 18 attending a supplementary-education study club is, according to data from the Single Records Service, currently over 990,000. In 2010, supplementary education in Moscow was concentrated in 158 centers for children's creative work, which were scattered unevenly around Moscow. The total number of learners pursuing supplementary education was around 360,000. To help make education more accessible, the authorities have built since 2017 a whole host of educational facilities in Moscow: 14 buildings for schoolchildren that can accommodate a combined 9,678 students (57.1 % of these were built with funds from the city's own budget, 42.9 % – with funding from investors) and 18 buildings for preschoolers that can accommodate a combined 2,560 students (22.2 % of these were built with funds from the city's own budget, 77.8 % – with funding from investors) (BAIN & Company, 2020).

A major indicator of the quality of education in Moscow is the increase in the number of graduates from Moscow-based schools with high scores on the State Unified Exam. Specifically, the number of students who scored over 260 points across three subjects rose 272.5 % from 6,900 (2010) to 18,800 in 2019, with 9,800 of these scoring from 220 to 260 points (2010 – 5,300) and 7,600 scoring 270 points or more (2010 – 1,500). The number of students who scored 100 points in one subject on the State Unified Exam rose more than 3.5 times – from 11,300 to 40,200. Ninth-graders who scored a ‘4’ or ‘5’ across four exams accounted in 2019 for 57 % of all students who passed the exams (2010 – 24 %) (BAIN & Company, 2020).

In terms of the content-based orientation of education in Moscow, between 2010 and 2019 there was a significant rise in the number of school graduates with very high scores (91 to 100 points) in natural sciences and technical disciplines: Mathematics (the core level) – from 207 to 809 students, Informatics and Information and Communications Technology – from 280 to 553 students, and Physics – from 454 to 761 students. In 2019, 715 students from 227 Moscow-based schools became runners-up and final stage winners at the All-Russian Olympiad for Schoolchildren (VSOSh), i.e. 37 % of all of the tournament’s runners-up and final stage winners that year. Overall, in the period 2015–2019 VSOSh winners and runners-up represented 321 Moscow-based schools, i.e. over half of all schools in Moscow. In 2010, there were 278 VSOSh winners and runners-up from 74 Moscow-based schools.

Table 1 and Figure 4 illustrate the dynamics of the performance of Moscow-based schoolchildren in the All-Russian Olympiad for Schoolchildren.

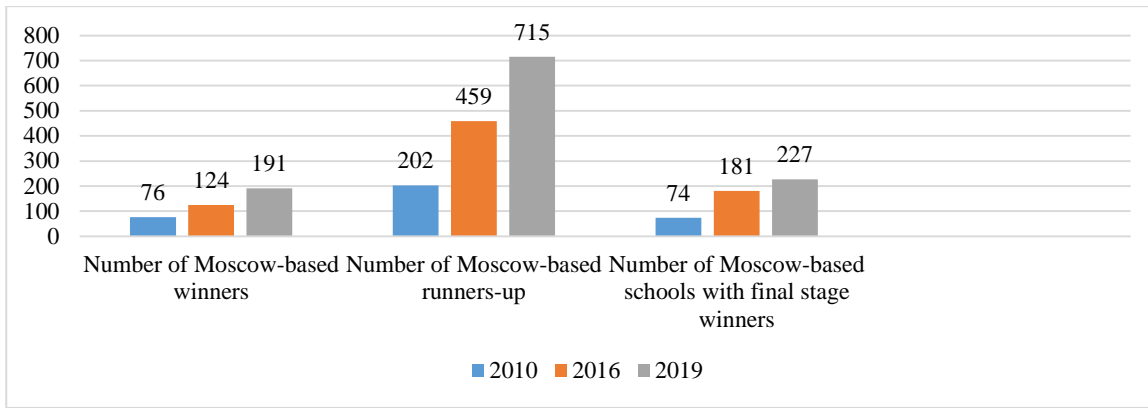
**Table 1.** Performance of Moscow-Based Schoolchildren in the All-Russian Olympiad for Schoolchildren

Year	Number of Moscow-based winners	Number of Moscow-based runners-up	Number of Moscow-based schools with final stage winners	Total participants in the Olympiad
2010	76	202	74	40,500
2016	124	459	181	367,000
2019	191	715	227	393,366

There has been a boost in the competitiveness of graduates from Moscow-based schools in terms of entering Moscow’s top colleges. In the current climate of having to take the State Unified Exam, the average graduate of a Moscow-based school gets to compete with 5–7 % of the best graduates from other constituent regions of Russia who come to Moscow to pursue higher education.

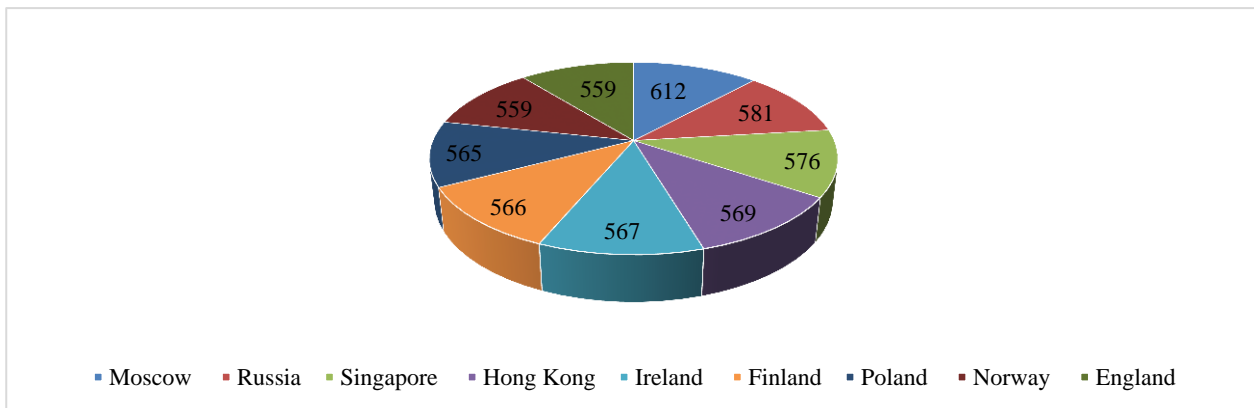
Using Pearson’s chi-squared test, the authors assessed the statistical significance of differences between the following two relative indicators: (1) number of Moscow-based winners and runners-up and (2) number of Moscow-based schools with final stage winners. The figure is 0.973307, which suggests a strong link between the indicators’ values.

The significance level for the data in Figure 4 (the period 2010–2019) is 0.1602 (p < 0.1; differences found at trend level).



**Fig. 4.** Performance of Moscow-based schoolchildren in the All-Russian Olympiad for Schoolchildren Produced by the authors

The fact that the quality of education provided by schools in the city of Moscow matches the international level is attested by the findings from a 2019 PISA (Programme for International Student Assessment) study. On two of the metrics measuring the quality of education, reading literacy and mathematics literacy, Moscow’s education system made it in 2019 into the world’s top six best education systems. Moscow’s secondary schools exhibited a high correlation with the results of the first five leaders, which is testimony to the accessibility of quality education to all schoolchildren in the city, regardless of area of residence and financial circumstances. This fact was captured in the report of the study’s organizers. Figure 5 illustrates the distribution of the first 10 positions in the PISA rankings.



**Fig. 5.** Results from a 2019 PISA study. Produced by the authors based on data from a source (BAIN & Company, 2020)

Since 2016, Moscow has staged an event known as the Olympiad of Metropolises, an international competition for students aged 14–18 residing in the world’s largest cities. Students work together in teams of eight competing in four subjects – Physics and Chemistry (this includes doing theoretical and experimental assignments) and Mathematics and Informatics (solving problems). Moscow has finished first in the medal count three times in a row. In 2019, the tournament featured 36 teams (288 students) from metropolises around the world. In 2016, there were 22 teams (176 students).

The focus on the development of each child’s talents is being implemented not only at schools but numerous museums, theaters, colleges, centers for technological support for education, and technology parks as well. The city has become a key provider of both core and supplementary education. At year-end 2019, Moscow had in operation 1,927,641 supplementary-education study clubs for children aged 5 to 18, with 78 % of those providing their services free of charge. The number of unique learners pursuing supplementary general-development programs of study at

educational organizations under Moscow's Department of Education is currently over 840,000 children aged 5 to 18, while the number of children attending supplementary-education study clubs in the city is, according to data from the Single Records Service, currently over 990,000 (BAIN & Company, 2020).

The Moscow Electronic School project, launched on September 1, 2016, is aimed at making as much use as possible of information technologies and services to enhance the quality of education. The project envisages major technical upgrades at educational organizations and the creation of a platform for electronic learning materials. As part of the project, since 2016 the schools have so far received 21,900 interactive panels and 44,000 notebooks for the teachers.

As of May 1, 2018, the platform provided the following electronic educational materials:

- 17,000 approved and published lesson scenarios developed by teachers;
- 205 electronic study guides from publishing houses;
- 289 electronic study guides developed by teachers in Moscow-based schools;
- 181 literary works included in the school curriculum;
- 1,803 integrated interactive applications from leading Russian developers.

#### **4. Discussion**

Russia's education reform has been aimed at remediating the imbalance between what the education system has to offer and what society actually needs. Its focus tends to be characterized primarily by a processual orientation (organizational activity by the administration and joint activity by teachers and students) and a content-based orientation (study programs, curricula, and cultural-educational activity). The focus on organizational and financial mechanisms that induce adjustments to both the content of education and the structure of the school system, as the central unit within the education system, has been smaller. That being said, in Moscow extensive transformations have been carried out in the area of development of new organizational and financial mechanisms specifically. The most crucial of the new organizational mechanisms is the Moscow Electronic School digital platform, which, basically, is a universal "digital databank" of assignments and algorithms for the conduct of classes that is designed to help develop the primary competencies (knowledge, abilities, and skills) central to mastering vocational competencies at institutions of vocational learning and those of higher learning. The common accessibility of the MESH platform makes it possible to minimize the social distance between the various categories of learners at educational institutions.

Thanks to the resources offered by the MESH platform, it is possible today to conduct classes in a high-quality manner at each school.

The Government of Moscow has introduced a number of incentives for the development of the MESH project, which include the following:

- in 2017, the pedagogical community was provided with a batch of grants for its contribution to the development of the MESH project, with grant size ranging from 5,000 to 150,000 rubles;
- a raise in the amount of 10,000 rubles per month for taking an active part in the development of the project. Currently, this benefit is enjoyed by teachers at six pilot schools in Moscow and 5,000 teachers who are the most active users of lesson scenarios from the MESH platform.

As of May 1, 2018, 212 teachers from 119 schools in Moscow received 236 grants for their contribution to the implementation of the MESH project.

Between October of 2017 and March of 2018, the 10,000-ruble raise was provided to 8,998 teachers actively using the MESH platform. On September 1, 2018, the city's authorities made entitled to the raise all teachers in Moscow-based schools who will be using lesson scenarios available on the unique platform.

#### **5. Conclusion**

The strategy for the development of education is indissolubly linked with the development of society as a whole. The development of the future generation ought to be in sync with the development of the digital society. Accordingly, the development of educational organizations, most importantly schools, should also be founded on some of the key principles examined in this work.



A significant achievement in terms of digitalization of the educational process is the development of the Moscow Electronic School digital platform, which contains databanks of assignments and algorithms for the conduct of classes on all school subjects and is a commonly accessible digital resource for all learners regardless of their social and financial circumstances.

A definite benefit of the MESH platform is that it makes it possible to capture the “digital traces” of each learner across the courses taken by them by way of analysis of their performance on assignments of varying level of complexity. Such “digital traces” can be combined into a “digital track”, a sort of a learner’s digital portfolio that reflects their priorities in terms of mastering particular vocational competencies.

The objective for secondary and higher educational institutions is to ensure that a learner’s digital track is maintained, with a focus on the further development of top-priority knowledge, abilities, and skills gained at school.

Consequently, there is logic in the position that there is a need to put in place a Vocational Digital School platform and a Higher Digital School one in order to accumulate the “digital traces” of learners pursuing tertiary education and build an objective “digital portfolio” for each learner, with a special focus on their top-priority skills, which should provide the basis for the development of supra-vocational skills that are sought after the most by employers today.

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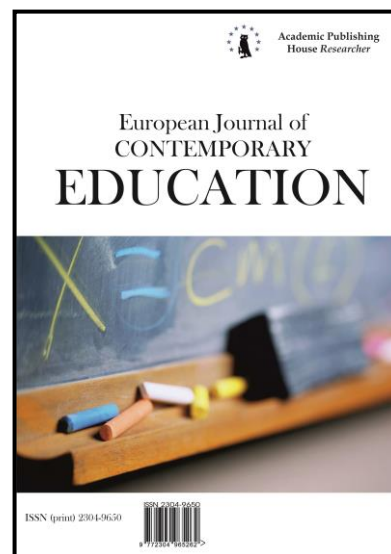
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## The Effect of Awareness Raising and Explicit Collocation Instruction on Writing Fluency of EFL Learners

Fatemeh Khonamri <sup>a</sup>, Faegheh Ahmadi <sup>a</sup>, Martina Pavlikova <sup>b</sup>, Lucia Petrikovicova <sup>b, \*</sup>

<sup>a</sup> University of Mazandaran, Babolsar, Iran

<sup>b</sup> Constantine the Philosopher University in Nitra, Nitra, Slovakia

### Abstract

Recent research in SLA indicates that collocations are an indispensable aspect of language learning. Its importance in learners' writing ability is, therefore, undeniable. Thus, the present study attempted to explore the effect of explicit teaching of collocations on learners' awareness and use of them in their writing. It differed from previous studies in that the main focus was on learning the collocations of the most important nouns. To this end, the present study used a mixed method approach with a pretest-treatment-posttest quasi-experimental design and qualitative analysis of questionnaire to investigate the questions. To collect data, an experimental and a control group were selected on the basis of the results of a proficiency test (PET). The participants were conveniently chosen as samples from a grand total of 58 students. The learners were further randomly assigned to two groups: one experimental group and one control group. The participants in the experimental group (N = 15) received weekly interventions based on explicit teaching of collocations but the control group (N = 15) received no instruction regarding collocations and had their regular procedure. The results of independent and paired sample t-tests (sig < 0.05) indicated that there was a significant difference between the two groups' performances in the achievement collocation test. Thus it can be concluded that teaching English collocations to EFL learners and raising their awareness will enhance their proficiency in writing and improve their collocational competence. The qualitative analysis of the responses to questionnaire also supported a positive impact of the method on students' fluency in writing.

**Keywords:** awareness raising, explicit instruction, vocabulary, lexical approach, collocation, writing, fluency, EFL, learners.

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\* Corresponding author

E-mail addresses: [lpetrikovicova@ukf.sk](mailto:lpetrikovicova@ukf.sk) (L. Petrikovicova), [fkhonamri@umz.ac.ir](mailto:fkhonamri@umz.ac.ir) (F. Khonamri), [faeqehahmadi@yahoo.com](mailto:faeqehahmadi@yahoo.com) (F. Ahmadi), [mpavlikova@ukf.sk](mailto:mpavlikova@ukf.sk) (M. Pavlikova)

## 1. Introduction

Vocabulary, in contrast to grammar, has long been neglected in language teaching and has mostly been taught through the other language skills; whereas grammar has always been considered as a separate module and this alone has led to assuming an inferior position for vocabulary. Fortunately, the shifts of sands in language teaching have influenced teaching practices resulting in an evolution in understanding the complex processes of language acquisition. Techniques improved as teachers gained insight into what kinds of courses and lessons might both accelerate language acquisition and make these courses and lessons more enjoyable. Above all, striking changes took place in the language classroom, as learners felt empowered to take control of their own learning. One of the most influential changes of the last decade of the twentieth century was the shift of focus, proposed by many theorists and practitioners, from grammar as the central anchor of language teaching to the lexicon. For example, McCarthy (1990) summarizes the importance of vocabulary teaching for second language (L2) learners in the following statement:

"No matter how well the student learns grammar, no matter how successfully the sounds of L2 are mastered, without words to express a wide range of meanings; communication in an L2 just cannot happen in any meaningful way." (p. viii)

It is accepted that choosing words carefully in certain situations is more important than choosing grammatical structures (Harmer, 1991). Zimmerman (1997), too, comments that "vocabulary is central to language and of critical importance to the typical language learner". Laufer (1998) contends that "learners associate progress in language learning with an increase in the number of words they know". In short, the importance of vocabulary cannot be better stated than in David Wilkins' statement, "Without grammar little can be conveyed; without vocabulary nothing can be conveyed" (Lewis, 1997a: 16), or by Sinclair, who stated that "A lexical mistake often causes misunderstanding, while a grammar mistake rarely does" (Lewis, 1997a: 16).

Within the area of vocabulary research, researchers have stressed the importance of word combinations, which are usually referred to as formulaic language involving idioms, collocations, preferred ways of saying things, routines, set phrases, and proverbs. They argue that these formulaic expressions are widespread in language discourse and distinguish the speech of native from non-native speakers (Conklin, Schmitt, 2007). As a sub-category of formulaic language, collocations that are a transitional area between idioms and free combinations (Benson et al., 1986) have attracted the attention of language researchers who attempt to investigate their acquisition. For example, McCarthy (1990) states that "in vocabulary teaching there is a high importance of collocation", suggesting that "the relationship of collocation is fundamental in the study of vocabulary, and collocation is an important organizing principle in the vocabulary of any language" (p. 12).

Although, some of the old approaches have tried to teach vocabulary, words have been introduced only in lists which proved to be useless. Many researchers have raised the importance of teaching vocabulary like Michael Lewis who questioned "the grammar-vocabulary dichotomy" and advocated a lexical approach (1993, 1997, 2000) which is mainly interested in teaching collocations or "common word combination" (2000: 127).

Finally, the 1990s saw the development of the Lexical Approach, based on the idea, proven by research, that much of the mental lexicon of a native speaker consists of prefabricated chunks, fixed and semi-fixed phrases and collocations; and that s/he uses these chunks in order to express or interpret language (Lewis, 2000; 1997a; 1997b). In fact, learning a language is the result of many competences grouped together; hence, we should work on these competences to achieve the learning objectives. We are used to hearing of communicative and linguistic competence but "collocational competence" is usually an unfamiliar phrase. Collocational competence is "the ability to accurately combine chunks of language thus enabling production of fluent, accurate and stylistically appropriate speech." (Heikkilä, 2005: 1). Without this competence students are facing many problems in writing their assignments. One of these problems is the mistakes as "students tend to create longer utterances because they do not know collocations which express precisely what they want to say" (Hill, as cited in Michael Lewis, 2000: 49). Crystal (cited in Heikkilä, 2005: 2) also claims that collocations "differ greatly between languages, and provide a major difficulty in mastering foreign languages". Therefore, they need help in the classroom to pass over collocational problems.

As for English language teaching in EFL (English as a Foreign Language) context, although many EFL learners have a good knowledge of English grammar and vocabulary, they still seem to



have serious problems with acquiring the ability to use English. The majority of communication relies on the numerous combinations of quite limited word bank rather than a vast number of individual items. This inefficiency seems to be, to some extent, due to the lack of collocational knowledge among EFL students, and to a large extent, the inadequate emphasis given to collocational patterns in their textbooks, and the type of instructions they receive. Moreover, collocations have not usually been a major focus of teaching and research in our country.

In order to enhance EFL learners' writing competence, English teachers have put a lot of efforts, spending lots of time devoting themselves to correcting students' writings and trying to find out the difficult areas in students' English compositions. However, the same errors keep happening. In fact, as Bahn and Eldaw (1993) state, it is usually the case that the majority of EFL learners have different problems in their oral and written production. These problems are due to inadequate or lack of knowledge about the companies that words keep; that is, collocation. Eventually, collocations are required to be taught so that the learners would be aware of them because they would help learners not only to understand lexis but also to communicate ideas more effectively when they write. Teaching collocations would provide the learner with a helpful device in writing. It could facilitate the task of writing by making it easier, more precise and more natural and native like.

In spite of the importance of collocation in EFL teaching, however, few studies have explored the collocational knowledge of Persian-speaking learners of English in an EFL environment (Salimi et al., 2010; Ghonsooli et al., 2008; Kralik, Mahrik 2019a, Kralik, Mahrik 2019b; Gadusova, Haskova, 2015; Haskova, Lukacova, 2017; Pushkarev, Pushkareva, 2018, Pushkarev, Pushkareva, 2019).

Therefore, following Michael Lewis's views, this study assumes that teaching collocations would raise students' proficiency in language learning. An examination of learners' writing, clearly indicated the "mis-collocations" that were widespread in their written assignments. It is therefore the goal of this study to directly teach or focus on teaching collocations, to guide learners to locate useful combinations in reading passages, and to provide practice in combining words so that the students would eventually develop the ability to transfer this knowledge to their writing.

#### Research Questions

The following questions guided the present research:

Q1: Is subjects' awareness of collocations raised as a result of instruction on collocation?

Q2: Does collocation instruction have any effect on learners' writings?

Q3: What are the kinds of changes in students' writings, if any, during the treatment period?

#### Review of the related Literature

##### The Importance of Learning English Collocations for L2 Learners

Many researchers have stressed the importance of collocations in language learning. Brown (1974) suggested that learning collocations improves the learner's oral proficiency, listening comprehension and reading speed. In addition, she argued that we speak and write in chunks and learning collocations helps learners observe how native speakers in both spoken and written contexts use language chunks. Moreover, Brown (1974) has contended that this knowledge helps language learners use these expressions themselves. According to Brown, together with context and concept, collocations should be included when we teach advanced learners new words because of their crucial significance in language learning. Like Brown (1974), Lewis (2000) stated that learning chunks of words helps language learners develop their communicative competencies better than learning words in isolation. Along the same lines, Pawley and Syder (1983) pointed out that collocations play a significant role in language learning. They lead to the improvement of language competence. Therefore, Pawley and Syder (1983) argued that the more fixed expressions, including collocations, language learners use in useful basic chunks, the more they produce native-like language structures. In addition, Ellis (2001) claimed that direct instruction for collocations is important in language learning because they represent an important aspect of L2 vocabulary development. Furthermore, some researchers like Nation (2001) argued that knowing a word involves knowing the words that co-occur with it. In addition, he emphasized that collocations are parts of the reception and production of vocabulary knowledge. Therefore, collocations should be taught to language learners to be able to produce the target language appropriately (Nation, 2001). Similarly, Laufer (1988) argued that collocations help in many levels of the development of vocabulary development, which she considers a crucial aspect in vocabulary learning. She further



stressed their importance in improving learning strategies, such as guessing. Hearing the word intense, the native speaker knows that it is connected with either pressure, heat, light, energy or feeling and that one of these words will follow. They also know that the word convenient is not used with people. So, a sentence like I am not feeling convenient about meeting new people is not judged as acceptable. This guessing strategy can be developed by learning collocations.

One problematic question that remains unresolved concerns whether or not having a large store of vocabulary and a basic knowledge of grammar are enough for fluent and successful communication in second language acquisition (Rudzka et al., 1985). But it is usually the case that the majority of EFL learners, even advanced ones, have various problems in their oral or written productions (Bahns, Eldaw 1993; Rudzka et al., *Ibid*; Taiwo, 2004). This is in spite of the fact that they apparently seem to have sufficient lexical or grammatical knowledge. Such erroneous utterances like 'the manager of the university', 'heavy tea'; 'to take fish' and 'to be bad in something' are not due to poor lexical or grammatical knowledge. These problems arise partly from lack of knowledge about the companies that words keep, i.e., collocation.

Hill (1999, p.4) states that lack of collocational competence can be a cause of EFL students' problems in learning English collocations. It may also be suggested that one reason for the EFL students' problems in learning English prepositions is that they usually try to learn the meaning and use of prepositions individually without paying sufficient attention to their collocational properties (Flowerdew, 1999).

EFL learners have trouble where collocations are language specific. Thus, in such a case, they tend to carry over the collocational patterns of their L1 (First Language) into L2 (Second Language) settings. Gabrys-Biskup (1992) contends that lexical transfer occurs in the learners' use of collocations. Consequently, the question of transferability of collocational patterns from L1 into L2 setting is an indication of cross-linguistic effect in the context of inter-language acquisition. There is now abundant empirical evidence that first language transfer is a real and central phenomenon that must be fully taken into account in SLA (Second Language Acquisition) (Ellis, 1986). And one of the areas of SLA that is strongly influenced by L1 is the transfer of collocational patterns (Gabrys-Biskup, 1992).

In the light of the abovementioned studies, it can be concluded that many researchers have studied the significance of collocations from different perspectives. Some of these involve memorization and fluency. Others address collocations in relation to language appropriateness, word knowledge, and teaching effectiveness. Since collocations are related to all these factors, they are important for language learners. Nevertheless, several L2 studies have reported L2 learners' low performance on collocation tests (Al-Zahrani, 1998; Bahns, Eldaw, 1993; Biskup, 1992; Caroli, 1998; Channell, 1981; Cowie, Howarth, 1996; Dechert, Lennon, 1989; Elyildirm, 1997; Farghal, Obiedant, 1995; Hussein, 1991; Gitsaki, 1999; Granger, 1998; Herbst, 1996; Koosha, Jafarpour, 2006; Lennon, 1996; Zhang, 1993; Mohamoud, 2005; Martynska, 2004; Matsuno, Sugiura, 2002; Nesselhauf, 2003; Shei, Pain, 2000; Zughoul, Abdul-Fattah, 2003; Zhang, 1993). Also, it seems uncontroversial that L2 learners' collocational errors are higher than other errors they commit (Ellis, 2001). Thus, learners' problems with collocations are an ingrained fact that has been confirmed by many studies in both ESL (English as a Second Language) and EFL (English as a Foreign Language) environments.

#### Empirical Studies of Teaching Explicit Collocation and Language Skills

Zhang (1993) was the first scholar to explore the possible correlation between the knowledge and use of English collocations and the quality of college freshmen's writing. At a mid-size public university in Pennsylvania, in the United States, the 60 college freshmen in his study were categorized into two groups: 30 native and 30 non-native speakers of English. Within each group, two subgroups, i.e., Good writers and Poor writers, were established based on a writing test. Each subject completed one fill-in-the-blank collocation test and one writing task. The collocation test was used to measure the subjects' collocational knowledge; the writing task was used to elicit the subjects' use of collocations and writing proficiency. In this experiment, Zhang (1993) found that (1) native English writers performed significantly better than non-native writers on the collocation test, and Good writers within either group performed significantly better than Poor writers; (2) as for the use of collocations in their writing, native writers surpassed the non-native writers, and Good writers within either group surpassed Poor writers; (3) in terms of writing performance, a significant difference was found between non-native Good and Poor writers. Zhang drew two

conclusions based on the observed correlations. Collocational knowledge is a source of proficiency in writing among college freshmen. Besides, quantity, but more important, quality for use of collocations distinguish between native and non-native college freshmen writing as well as between Good and Poor college freshmen writing.

Al-Zahrani (1998) investigated the knowledge of English lexical collocations among four academic levels of Saudi EFL university students and the relationship between the participants' collocational knowledge and their general language proficiency. In his study, the collocational knowledge of 81 Saudi male university English majors was measured by a cloze test, comprised of 50 "verb+noun" lexical collocations. Furthermore, the participants' general English proficiency was assessed by a writing test and a paper-and-pencil TOEFL (Test of English as a Foreign Language) test. Al-Zahrani found that there was a significant difference in his subjects' knowledge of lexical collocations among the different academic years. The knowledge of lexical collocations increased with the subjects' academic years. Besides, he reported that there was a strong correlation between the subjects' knowledge of collocations and their overall language proficiency.

Similarly, Nesselhauf (2003) analyzed the writing of German advanced learners of English and found that the most frequent miscollocation type is wrong choices of verbs. He explained that the verb in a collocation has a restricted sense, which makes its correct use more difficult if learners cannot fully distinguish subtle differences among verb collocates. The collocations not congruent in learners' first language (L1) and second language (L2) were far more difficult for learners to acquire.

Liu (1999) investigated collocational errors in 127 Chinese college students' final examination papers and their 94 compositions. The error analysis revealed that verb – noun collocation errors (verb + noun/pronoun, verb + propositional phrase) appeared most frequently. In one of her collocation studies, Liu (2000) led the field in investigating the effects of collocation instruction on students' writing performance. Forty-nine freshmen English majors at a Taiwanese university participated in the study. During an 18-week semester, in a three-hour weekly class, Liu (2000) gave her students a series of twenty-minute mini-lessons on collocations (e.g., the introduction of six major lexical collocation patterns, collocations without direct L1 equivalents, and de-lexicalized verbs as collocates of nouns). To assess their writing ability and use of collocations, the subjects were asked to write a composition in class at the beginning and the end of the semester without using a dictionary. The two compositions were analyzed and compared for the patterns of acceptable and unacceptable lexical collocations. It was found that the students in the second composition generated a greater number and variety of acceptable lexical collocations although they did not improve much in their writing of the second composition.

With the help of computer technology, Liu (2002) examined V–N miscollocations in Chinese learners' essays through lexical semantic investigation. She indicated that 87 % of the lexical miscollocations (233/265) were attributed to V–N miscollocations and 93 % of them were due to the misuse of verb collocates. As for reasons behind miscollocations, 56 % of missed collocations were semantically related such as synonyms (e.g. \*carry out my goal instead of achieve my goal), hypernyms (e.g. \*create songs instead of compose songs), and troponyms (e.g. \*break the foundation instead of damage the foundation). Another 38 % of the V–N miscollocations were traceable to L1 interference: split category (e.g. add and increase) and direct translation (e.g. \*write homework instead of do homework). Among various types of collocations, the verb – noun lexical collocation was found to be particularly difficult for learners to acquire; further, V–N miscollocations can be attributed to three main reasons: (a) L1 interference; (b) misuse of de-lexicalized verbs; and (c) lack of knowledge of collocational restrictions in semantically related lexemes such as synonyms, hypernyms, and troponyms.

Recognizing the importance of collocation for foreign language learning, some researchers provided explicit collocation instruction on Chinese EFL learners in classroom settings, and found positive effects (Lin, 2002; Liu, 2002; Tseng, 2002). Liu (2000) has found that after collocation instruction, learners produced more 232 T. Chan and H. Liu varieties of collocations in their writing, particularly in de-lexicalized verbs. In a traditional classroom context, Lin (2002) examined the effects of collocation teaching on receptive and productive collocation competence of high-achievers and low-achievers in a group of EFL high school students regarding the V–N lexical collocation structures. The results indicated that all students made more progress in receptive collocation tests than productive ones, but low-achievers performed better in productive tests after

collocation teaching. Both groups held positive attitudes toward collocation teaching activities. Tseng (2002) divided 94 high school participants into an experimental group, who received 12 weeks of explicit collocation instruction, and a control group, who did not receive any training. Before the instruction, the students took a pre-test on collocation, wrote a composition, and filled in a background questionnaire about vocabulary learning behaviors. The results in questionnaires indicated that students knew little about the concept of collocation. After collocation instruction, the experimental group far exceeded the control group in the post-test regardless of their prior collocation levels. The experimental group's performance was found to have no significant difference across the six collocation types they investigated, while at the beginning of the collocation teaching they found de-lexicalized verb collocations easier to produce.

Furthermore, Hsu has investigated the influence of using collocations on fluency in writing. In 2007, he has conducted an empirical study about the impact of lexical collocations on the writing of Taiwanese College English majors and non-English majors. His empirical study consists of an on-line writing test on the same topic which has been evaluated through a web-based writing programmer. Correlation has been found between writing proficiency and using collocation. But none of the researchers has tried to teach collocations as a treatment to see whether teaching collocations could lead to fluency in writing. This research has approached the problem of mis-collocations in foreign language writing by trying to teach collocations in order to see if there is a correlation between using collocations and writing proficiency after the treatment.

From studies discussed above, it is clear that collocations as one important type of knowledge in foreign language have posed learning difficulties to EFL learners; specifically for those from a Chinese background. Moreover, types of collocations seem to behave differently under the influence of collocation instructions.

## **2. Materials and methods**

### **Participants**

The participants in this study were 30 EFL Iranian students who were learning English in an Institute in Mazandaran province, located in the north of Iran. The participants were male and female with the age range of 16 to 19. They all spoke Farsi as their mother tongue and were mainly from middle socio-economic background. They belonged to two groups with similar Linguistic proficiency. They were recognized as intermediate level through the results obtained from PET. The participants were conveniently chosen as samples from a grand total of 58 students. The learners were further randomly assigned to two groups: one experimental group and one control group. From these, those who eventually realized the full requirements comprised the participants. That is, in the experimental group, those participants who did not write all their paragraphs for the study were removed from the pool of the participants. Twenty-eight in all had to be excluded. Therefore, 15 students remained in each group.

### **Data Collection Instruments**

In order to test the research hypotheses, five testing instruments, two types of teaching materials, and one questioner were developed and used by the researchers in this study. A variety of exercises and tasks were used as well. The last tool of enquiry used by the researchers was students' writing samples. They are as follows:

1. As it was already mentioned, in the first phase of this study, the PET was given to the participants to determine their levels of proficiency and to homogenize them.

2. To determine the collocational knowledge of the participants, an integrative test of collocations of the most important nouns was given to the students as the pre-test. It included five collocation exercises extracted from McCarthy and O'Dell textbook (appendix) and organized in five sections: A, B, C, D, and E. The standardization was done through a pilot study on five students. Then the test was given to 30 participants who had been selected through cluster random sampling. The pre-test consisted of two parts: part one tested learners' collocations knowledge, and part two tested their use of collocations in writing.

3. After twenty half-an-hour sessions instructions on collocation of nouns with specific treatment for each group, the integrative test on collocation of nouns was administered as the post-test in order to determine the impact of specific instructions the participants received. Students were also asked to take another writing exam at the end of the term with identical topics to assess

their writing and use of collocation. To closely analyze the process of learning, students were asked to write six writing samples.

4. Another tool of enquiry was the questionnaire for students. It aimed at investigating students' collocation knowledge and use on one hand, and their writing fluency on the other hand. It was developed by the researchers to try to collect information intended for this study. However, the items were collected from a similar questionnaire which was done on first year English students at Guelma University in Algeria. The questions were framed clearly so that the respondents could understand what was meant and provide the relevant information. Additionally, to ensure the clarity and comprehensiveness of the questionnaire, it was pilot tested with a number of students with appropriate characteristics similar to the intended population. The internal consistency for the questionnaire came out to be 0.68 using  $\text{kr}20$  formula. In fact, an item analysis revealed that certain questions demonstrated low item-to-scale correlation (0.28) and thus were removed. The content validity of the questionnaire was also satisfactory. It was designed by the researchers and then some experts examined and made the necessary changes to it. However, the questionnaire could not provide access to what is "inside a person's head" (Tuckman, cited in Cohen and Manion: 305) and as Cohen and Manion claim: "...at the heart of every case study lies a method of observation" (1980: 125), it is better to put the target sample under observation through experiment to gain "research-relevant information". Both the experiment and the questionnaires would help the researchers to collect data about the status of teaching collocations and the problems that students encounter in writing especially mis-collocations. Before the pretest, the researchers had investigated students' writing fluency and knowledge of collocations by administering a questionnaire directed to the students. The questionnaire had been administered in the first session of the class, precisely at the beginning of the experiment on June, 24th, 2011. Summer term had started on June, 18th but the questionnaire had not been administered until all the students had joined the class. A total of 20 minutes was sufficient for students to answer all the questions. The questionnaire was divided into two parts: part one aimed at getting information about students' background knowledge, and part two made a survey about students' knowledge of collocations on one hand and their writing fluency on the other hand.

5. The collocational information about the words came from the Cobuild Collocation Sampler and Oxford Collocation (2002). This particular dictionary was chosen for its wealth of information regarding word collocations. Students' writing samples were measured by the Sampler at <http://www.Collins.Co.UK/Corpus/CorpusSearch.aspx> to determine which combinations to accept as collocations. It should be noted that Lewis (2000) points out that in evaluating collocation, co-occurrence should not by itself be a criterion. The Cobulid Collocation Sampler provides the 100 most frequent words for the collocates of a word, using T-scores.

6. When preparing the materials, the researchers bear some criteria in mind. Woolard (2000) and Lewis (1997a, 2000) claim that it is impossible to teach thousands of words within limited class time and that students should be encouraged to fly with their own wings. In addition to this, it is believed that students acquire language by noticing it. Furthermore, the aim was not to teach "brand new" vocabulary. Both new and previously "known" nouns were selected. The purpose was to make students as collocationally competent as possible within the limitations of the study. According to the above mentioned points, for materials preparation, one book "Key Words for Fluency" by George Woolard (Intermediate collocation practice) was first scanned and target nouns selected, following Woolard' (2005) claim that "nouns are the most important words we know. All the other parts of speech are important too, but they do not tell us as much as nouns do." Thus, in some chapters, as all the words had already been presented to the students, the aim was to show them that there might still be something to learn about a word they thought they knew. For example, the students were already familiar with business, work and job for which the Persian equivalent word was provided. To show the differences in meaning and in usage, their collocations were given. Hill (2000) also asserts that "when teaching collocations, teachers need to pay close attention to individual collocations. We should present collocations as we would present individual words." At higher levels, when students learn less common vocabulary items, they need to be made aware that some words are used in a very restricted number of collocations. As it was observed that there was a time-constraint and that students might not be as familiar with the words in the coming chapters as in the previous ones, the numbers of collocates provided in the lists were decreased in the weeks after this. Accordingly, ten chapters and total of 60 nouns were organized.

Each chapter was supposed to be taught per week. According to Hill (2000), Students also need to know how to use new vocabulary items, which makes it necessary to know about their collocational field and contexts in which they are used. Contextualizing the taught collocations, then, the researcher chose some parts of "English Collocations in Use" by Michael McCarthy. As a matter of fact, following teaching collocations, in each session, the combination of collocations was also prepared in a context. Here it should be noted that it was the teacher's responsibility to draw students' attention to the meaning of the words, the context, and the collocations, as these students were being given an awareness-raising instruction. "English Idioms in Use" another book by Michael McCarthy was chosen due to participants' desires. In addition to the context provided for the selected nouns, the researcher prepared some more sentences which were carefully selected and applied either from the internet, the concordances, or oxford Collocation Dictionary. The aim was to expose students to as much probable English as possible. The researchers would also use translations of the chunks whenever possible or asked, as like Lewis (1997a) believes, translation is inevitable and necessary. Both Lewis (1997a, 2000) and Harwood (2002) point out, recycling is very important in teaching. Recycling is not doing the same thing twice, but revisiting the same thing in different ways and adding variety and novelty to it. Keeping this suggestion in mind, revision materials were prepared for every three units holistically also covering what had been presented in the previous chapters. Accordingly, four revision chapters were prepared with a holistic view. That is, the first of these chapters was designed to revise the collocations presented in the first three chapters; the second covered the collocations in the first six chapters and the last was designed to revise the collocations presented in all the chapters. Because of this, the last revision chapter was longer than the previous ones. All in all, the materials chosen for the treatment were selected due to involving a series of common topics and related tasks which formed the backbone of the course. While Experimental group exposing collocation related to each word, the Control group only provided by the list of words and context in which those words used. Without calling their attention to the collocations used in the context.

#### Procedure

To conduct the present study, five general patterns of collocation of nouns were recognized and investigated by the researchers. These patterns were as follows:

1. adjective + noun collocation: a busy road, a safe journey, strong tea;
2. noun + noun collocation: a birthday party;
3. verb + noun collocation: make coffee, serve tea, run a shop;
4. noun + of + noun: a loaf of bread;
5. noun + verb naming an action: bomb explodes, bees buzz;
6. common expressions: be free for lunch, dress for dinner, a pile of dishes;
7. idiomatic expressions: to be at best, to be in the air.

As a matter of fact, following Lewis' (1997a, 2000), and Woolard' (2005) claim that nouns are the heart of collocations, the researcherS chose 60 nouns for instruction. For each noun, students were prepared by the above mentioned patterns. Previous studies put emphasis on only one or two patterns of collocation. However, in this study the focus is on different combinations of collocations with nouns, as well as, common expressions. The main focus of this study was supposed to be on lexical collocation; however, due to students' interests in common expressions and idiomatic expressions, these two issues were added to the course as well. Consequently the prepared chapters involved both lexical and grammatical collocations. Twice a week the students attended their regular one hour and 30 minutes classes, where they developed their English to improve their speaking, listening, reading, and writing skills. An extra 30-minute session, however, was allotted to work on the collocation with the experimental groups.

Then the participants went through a twenty-session treatment, i.e., the control group (N-15) underwent their term materials including audio, video and textual input without explicit teaching of collocation. On the other hand, the experimental group received an explicit instruction. During exploration of those materials, the experimental students (N-15) were made aware of word combinations, specifically, collocations through different techniques such as textual analysis, dictionary use, storing collocations, translation activity etc. During the semester, the instructor taught 10 chapters chosen from the two text-book materials that were provided and special attention was paid to the collocation. Moreover, the researcher asked students to write a journal related to the topic that they have been taught in each session. However, due to time constraints,



students agreed to write about six topics. In addition, they were informed about the special correction coding, especially the meaning of FIC (Find Its Collocation), that when a student used a wrong word for a combination, the noun was circled and the student asked to find its collocation. The students' job was to check the dictionary and use the correct collocation in their work. Finally, Students rewrote their paragraphs correcting the mistakes. If there were still mistakes, the teacher gave the right answer and asked the students to rewrite the completely corrected paragraph. Although both groups were asked to prepare writing journals, only the experimental group was informed about the special correcting coding. In other words, the control group was only made aware of their mistakes by the teacher without raising their attention to the FIC. Furthermore, for every chapter the instructor designed additional exercises of the types suggested by Lewis (1993, 1997, 2000), Nation (1994, 2001) and Thornbury (2002) to promote vocabulary acquisition. These activities included word families and parts of speech relations, collocations, phrasal verbs, cognate awareness, and dictionary use.

Finally, after the specific treatments were given to the experimental group, a post-test was administered to check the effects of the instructions. The control group, too, was given explicit vocabulary instruction. They sometimes used traditional vocabulary materials in which words were taught as individual items and sometimes only the meanings of the words were taught, but the group was not given the collocation instruction or collocation materials.

The post-test involved the integrative collocation test and the second writing exam as well. At these stages, the students' writings were corrected holistically (on a scale from zero to 30) and were scored twice. In addition to the researchers, students' papers were corrected by another rater. They first underlined all possible lexical collocations recognized in the students' writing according to the five subtypes of lexical collocations and grammatical collocations which were investigated in this study. The researcher judged whether a lexical collocation was acceptable with the help of the BBI Dictionary of English Word Combinations (Benson et al., 1997), Oxford Collocations Dictionary for Learners of English (Lea, 2002), and the online corpora: American National Corpus (<http://americannationalcorpus.org>), and Cobuild Collocation Sampler (<http://www.collins.co.uk/Corpus/CorpusSearch.aspx>). Online corpora were utilized in this study because evidence showed that a corpus could illustrate how words collocate (Aghbar, personal communication, 2002; Schmitt, 2000; McCarthy, 2004b). The two online corpora were used because they were free of charge. In addition, they were designed to include a wide range of samples from different registers and language domains. Besides, although the purpose of the writing was to elicit the subjects' use of collocations, it was also used as a measurement for the subjects' writing fluency. When an acceptable lexical collocation was found with spelling or grammatical errors, it was also counted as a valid one. It was deemed as an effort to use lexical collocations.

### **3. Results and discussion**

#### **Findings related to Students' Questionnaire**

Since students' level in English may indicate their level in writing, they have been asked how they appreciated their level. A percentage of 66.66 %, which constitutes the majority of students in the experimental group, represents those who have a medium level. 53.33 % of students in the control group are medium. In the experimental group 20 % of students claims that their level in English is bad. In the control group there is a percentage of 26.66 % that represents students with bad level in English. Less than 20 % in the experimental group and just 20 % in the control group claim that they are good; none has claimed that s/he is very bad or very good. Table 1 indicates students' responses to the items of the questionnaire.

**Table 1.** Students' Appreciation of their English Level

	The experimental group		The control group	
	Number	Percentage	Number	Percentage
Very bad	/	/	/	/
Bad	3	20 %	4	26.66 %
Medium	10	66.66 %	8	53.33 %
Good	2	13.33 %	3	20 %
Very good	/	0 %	/	0 %
Total	15	100 %	15	100 %

Source: own research

**Table 2.** The Most Difficult Skill for Students

	The experimental group		The control group	
	Number	Percentage	Number	Percentage
Listening	3	20 %	2	13.33 %
Reading	/	/	/	/
Speaking	6	40 %	5	33.33 %
Writing	6	40 %	8	53.33 %
Total	15	100 %	15	100 %

Source: own research

As indicated in [Table 2](#), 53.33 % of the population of the control group has selected writing as the most difficult skill. However, in the experimental group speaking and writing are in the same rank with 40 %, and listening comes in the second rank with a percentage of 20 %. In the control group speaking comes in the second rank with a percentage of 33.33 %. Concerning listening, only a few students have opted for it. None has considered reading as the most difficult skill. We can notice, here, that the two productive skills (speaking and writing) represent a challenge for the majority of the students.

Another issue raised in the questionnaire was related to students' appreciation of their level in writing. [Table 3](#) reports the results.

**Table 3.** Students' Appreciation of their Level in Writing

	The experimental group		The control group	
	Number	Percentage	Number	Percentage

Very bad	/	/	1	6.66%
bad	8	53.33 %	7	46.66%
Medium	7	46.66 %	6	40%
Good	/	0 %	1	6.66%
Very good	/	/	/	/
Total	15	100%	15	100%

Source: own research

As shown in Table 3, concerning students' level in writing, only one student in the control group has claimed that it is very bad, and one student has claimed that it is good. 40 % of students in this group have said that it is medium, whereas the rest has considered it as bad. In the experimental group more than half the students have claimed that their level is bad, the other half has said that it is medium.

As for the sources of difficulty in writing, Table 4 illustrates the percentages.

**Table 4.** Sources of Difficulties in Writing

	The experimental group		The control group	
	Number	Percentage	Number	Percentage
Grammar	3	20 %	1	6.66 %
Vocabulary	7	46.66 %	8	53.33 %
Both	5	33.33 %	6	40 %
Total	15	100 %	15	100 %

Source: own research

In the experimental group nearly a little less than half of students (46.66 %) has claimed that the source of difficulties in writing is vocabulary. 33.33 % of them have stated that it is both grammar and vocabulary that make their writing difficult. 20 % represents three students who have claimed that it is grammar. In the control group nearly half the students have stated that lack of vocabulary hinders their writing, while 40 % have claimed that both grammar and vocabulary make writing a difficult task. A small percentage of 6.66 % (1 student) has stated that the problem is due to grammar.

Another area that was investigated through some items of the questionnaire was related to students' knowledge of collocations. Table 5 describes the results.

**Table 5.** Students' Knowledge of Collocations

	The experimental group		The control group	
	Number	Percentage	Number	Percentage
Yes	1	6.66 %	1	6.66 %
No	14	93.33 %	14	93.33 %
Total	15	100 %	15	100 %

Source: own research

According to the above table, a high majority of students do not know collocations except one in each group. Fourteen students have answered “no” which indicates that 93.33 % of the whole sample do not know “collocations”.

Findings Related to the Effect of Collocation Instruction on Students' Awareness of Collocation

This section presents results from the quantitative analysis of the data derived from the pre-test and post- test scores of learners' achievement test of collocation scores. A test of normality was run first based on the results of the pre-test to ensure that the participants are all at the same level of knowledge at the beginning of the study. As shown in Table 6, the data is normal and participants are not different in terms of the variable under study.

**Table. 6.** Tests of Normality

	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	df	Sig.
Score	0.101	29	0.200*	0.966	29	0.339
*. This is a lower bound of the true significance.						
a. Lilliefors Significance Correction						

In order to answer the first research question, an independent sample t-test was run to see whether the two groups differed in their performance on collocations. The descriptive statistics of t-test for comparing the performance of the two groups on achievement test of collocation are presented in Tables below.

**Table 7.** Independent Sample T-Test of Collocation Achievement Test

	Leven'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	
								lower	upper
DV Equal variances assumed	8.723	.006	11.147	28	.000	7.67	.688	6.258	9.075
Equal variances not assumed			11.147	17.776	.000	7.67	.688	6.220	9.113

Source: own research

In the experimental group the mean was 8.67 and the standard deviation was 2.498. The mean for the control group was 1.00 and the standard deviation was .926. The result illustrated that the sig < 0.05, so the mean for the experimental groups' scores was higher than the mean for the control groups' scores. In order to determine whether subjects in the experimental group had been made aware of collocations as a result of instruction on collocation, an independent t-test was performed on the students' scores derived from achievement collocation test. According to Leven's test, the conclusion was drawn that there was a significant difference between variances at 0/05 level of significance. By 95 % confidence interval of the difference (9/113, 6/220), it could be concluded that there was a significant difference between the two groups' performances in the achievement collocation test.

In order to investigate whether there were any gains in the collocational knowledge in the experimental group, a two-tailed matched t-test was run. Table 8 presents the results related to the participants' performance.

**Table 8.** Paired Samples Test of Collocation Achievement Test

	Paired Differences						t	df	sig.(2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95 % Confidence Interval of the Difference					
				Lower	Upper				
Pair 1 Vocabulary-pre-test- Vocabulary-post-test	-8.67	2.498	.645	-10.05	-7.28	-13.439	14	.000	

Source: own research

As shown in Table 8, the t observed was (-13.439) at .000 level of significance. Thus it can be concluded that there was a significant difference between the experimental group's performance in the pre-test and post-test. Therefore, it can be claimed that this difference is due to the kind of instruction the experimental group received and this gives further evidence for rejecting the null hypothesis.

**Findings Related to the Effect of Collocation Instruction on Writing (Quantitative Method)**

This section presents results from the quantitative analysis of the data derived from the pre-test and post-test scores of learners' writing. The descriptive statistics of t-test for comparing the performance of the two groups on writing test are presented in Table 9. An independent sample t-test was used to compare the two groups' performance with regard to writing. Results are illustrated in the following table.



**Table 9.** Independent Sample T-Test of Writing Test

	Leven'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	
								lower	Upper
DW Equal variances assumed	.556	.462	8.899	28	.000	6.27	.704	4.824	7.709
Equal variances not assumed			8.899	22.526	.000	6.27	.704	4.808	7.725

Source: own research

The result illustrated in [Table 9](#) shows that the sig < 0.05, so the mean for the experimental groups' scores was higher than the mean for the control groups' scores. By 95 % confidence interval of the difference (4.824, 7.709), it could be concluded that there was a significant difference between the two groups' performances in the writing test. Furthermore, collocational teaching had impact on improvement of experimental group's writings. Thus, it is quite safe to reject the null hypothesis. Hence, it can be claimed that subjects' writing abilities improved through collocational teaching.

In order to explore students' gain in writing in the experimental group, a paired sample t-test was run. [Table 10](#) indicates the results obtained.

**Table 10.** Paired Samples Test of Writing

Pair		Paired Differences					t	df	sig.(2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95 % Confidence Interval of the Difference				
					Lower	Upper			
1	Writing-pre-test- Writing-post-test	-6.47	2.356	.608	-7.77	-5.16	-10.629	14	.000

Source: own research

It was observed that the mean of writing scores for the experimental group in pre-test was 10.87 and in post-test was 17.33. Regarding the significance level (sig < 0.05), it resulted that there was a significant difference between writing scores of pre and post-test. Thus, it indicates that students' writing abilities in experimental group improved significantly. This result again gives

evidence to reject the H<sub>0</sub> and conclude that the difference between the two mean scores reflects that the experimental improvement is due to collocation instruction.

Findings Related to the Effect of Collocation Instruction on Students' Writings (Qualitative Method)

This section presents the qualitative examination of the data which was done during the term. To come up with a clear picture of subjects' performances during the treatment (throughout the semester), the students' writings were scored analytically based on the guidelines provided by Heaton (1990). To closely analyze the subjects' process of learning and to explore the possible effects of collocational teaching, the different component mean scores on each topic (six topics in total) for both groups were measured and their learning processes were depicted graphically and compared both between groups as well as within the experimental group in terms of their mean gain scores. The experimental and control subjects' performance at the beginning of the term up to the mid-term (third topic) at grammar component of rating scale are almost at the same level and show no progress but from this time onwards, the experimental grammar curve shows rather significant improvement compared to that of their counterparts in the control group. No considerable improvement is observed for the control group during the same period of time (from topic 3 to topic 6, Figure 1).

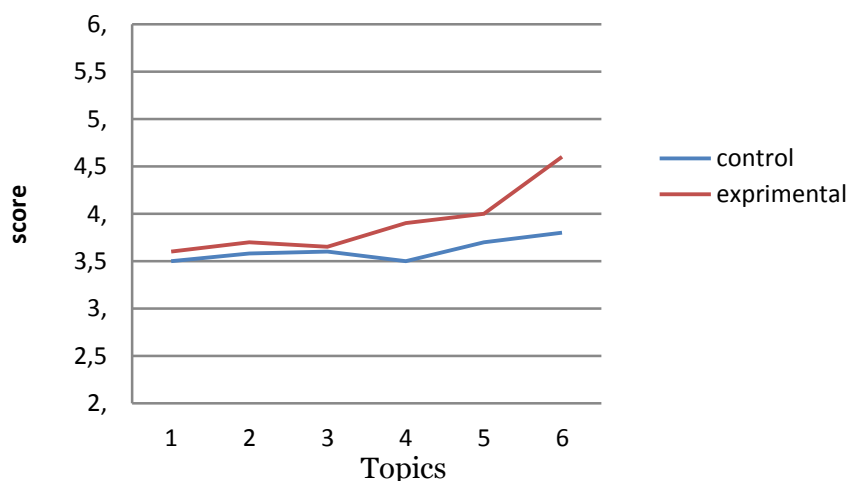


Fig. 1. The control and experimental groups' learning processes at Grammar component

According to Figure 2, both the experimental and control subjects have comparatively improved at vocabulary component but the slope of line for the experimental group grows steeper.

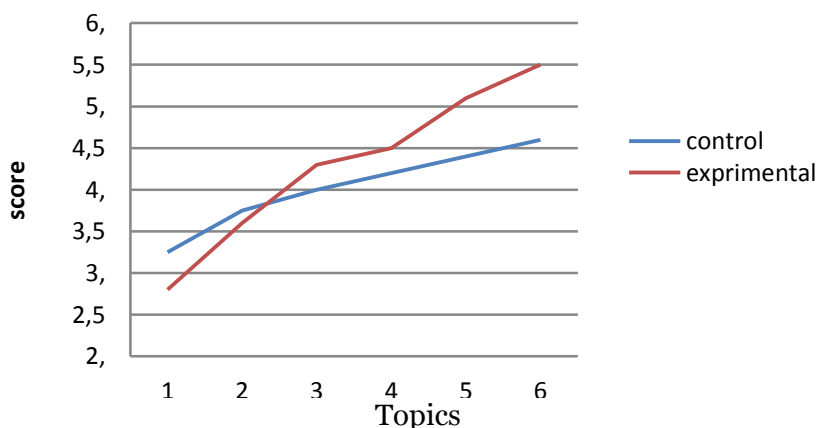
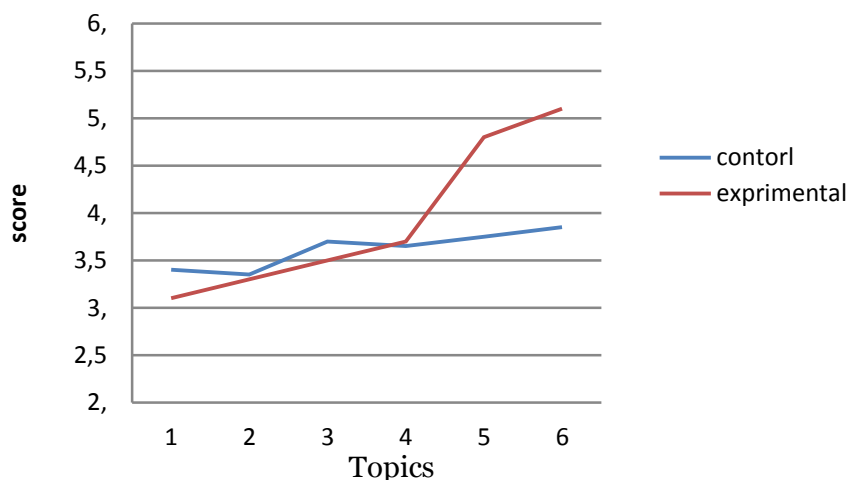


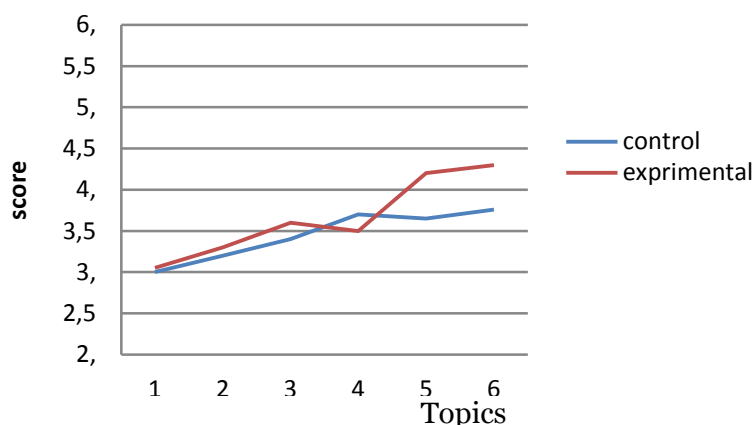
Fig. 2. The control and experimental groups' learning processes at Vocabulary component

This learning process for fluency starts tracing its steady progress right from the beginning of the term until the end. As it is evident in Figure 3, the mean scores of the experimental group are lower than those of the control group for the first topic.



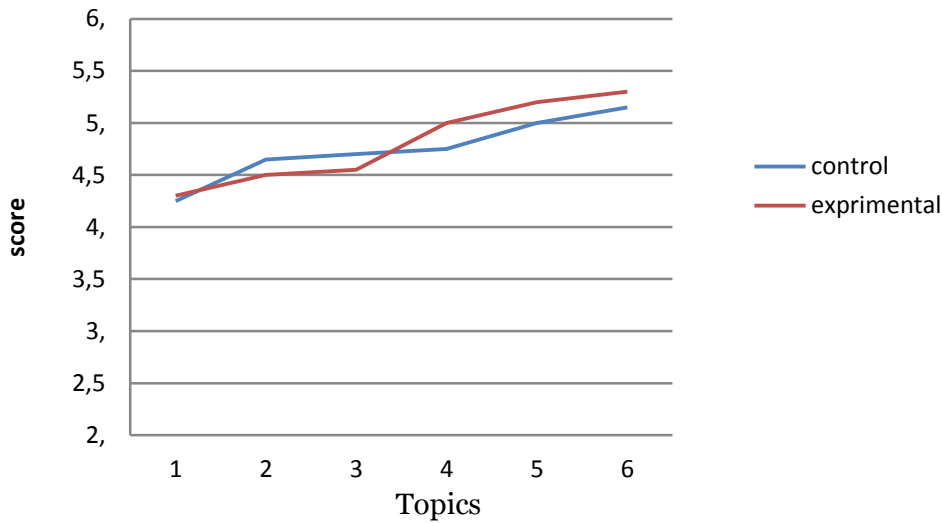
**Fig. 3.** The control and experimental groups' learning processes at fluency component

As Figure 3 shows the control group makes very slow progress in fluency all throughout the semester whereas the experimental group tracks an ordinary progress from the beginning up to the mid-term (the third topic). Totally as the figure shows the slope moves up quite significantly and continues in the same developmental pattern until the end of the semester. This indicates the experimental subjects' dramatic improvement in fluency takes place over the last few weeks of the term. It seems that the type of instruction has an effect on experimental subjects' fluency from mid-term onwards. Regarding relevance component, as it is evident in Figure 4, both the experimental and control groups are found to make an ordinary progress comparatively. However, both groups' lines on the graph rise and drop. This indicates that there is not much considerable difference between these two groups at relevance component of writing although the experimental group shows more improvement in this component.



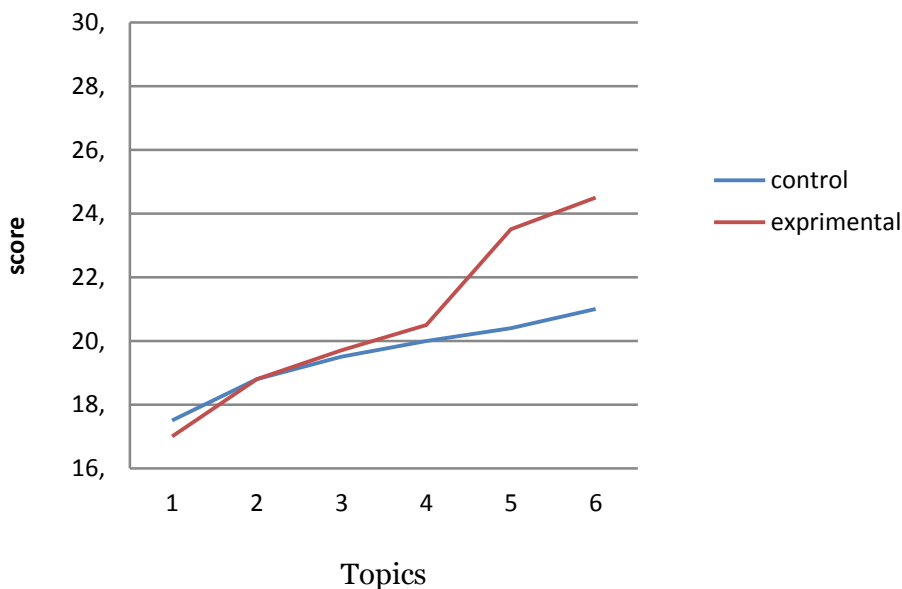
**Fig. 4.** The control and experimental groups' learning processes at relevance component

As to mechanics (Figure 5) shows that there is no significant difference between the experimental and control groups and both groups follow similar patterns although the control group at the beginning of the semester outperforms in mechanics while at the end of the term it appears that the experimental group does better at this component.



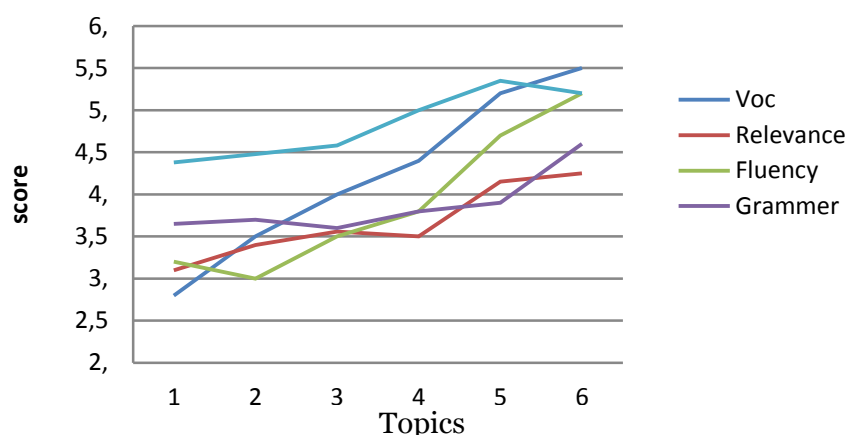
**Fig. 5.** The control and experimental groups' learning processes at Mechanics component

Figure 6 shows that there has been no significant difference between the experimental and control groups regarding writing until the mid-term but from this time period onward, the experimental group's curve on the graph starts increasing dramatically compared to the control group's curve so that in topic 6 their difference reach a maximum of 4.72. It seems that if the treatment period were expanded for experimental group, it would lead to their radical improvement in writing skill.



**Fig. 6.** Comparison of the overall learning processes of control and experimental groups at writing components

A comparison of the experimental group curves for the whole treatment period would reveal the process of experimental subjects' writings improvement by the type of instruction (Figure 7).



**Fig. 7.** The comparison of experimental group's developmental process at each writing components

As it can be observed in [Figure 7](#), the subjects' learning process for vocabulary and fluency components develops quite significantly while this developmental process regarding relevance and mechanics takes place to a lesser extent. This learning process develops to a small extent with regard to grammar component. In sum, the figure shows the positive effect of collocational teaching on vocabulary and fluency components of writing. The comparison of vocabulary and fluency lines on the graph shows that the vocabulary learning process develops more significantly compared to fluency component until the mid-term but from this time onwards the fluency curve develops more rapidly in comparison with vocabulary curve so that it gets a very similar pattern to vocabulary curve toward the end of term.

To recap, this study intended to investigate the effects of collocation instruction on awareness of chunking and students' compositions. The literature indicates that L2 learners have difficulty when writing in the L2. One of the problems in L2 writing is a lack of vocabulary. Some learners themselves are aware of this limitation. Nation (2001) stated that Leki and Carson (1994) “found that second language learners see lack of vocabulary as the major factor affecting the quality of their writing” (p. 178). Nesselhauf (2003) and Kaur and Hegelheimer (2005) would probably add that lack of collocation knowledge also impacts on L2 learners' writing ability. In the beginning of the project when students signed up in the institute, students barely knew the concept of collocation, and they did not pay much attention to collocation knowledge in English vocabulary learning, according to the results of the Background Questionnaire. They did not even know that there was a dictionary of collocations. These explained why students performed poorly in the collocation pre-test.

In this study, the first hypothesis was that learners will not be aware of collocations as a result of collocation instruction. Students who received collocation instruction would be aware of the idea of chunking and specially collocations, and as a result of this would gain good results in the post-test. In fact, three most important basics of collocation instruction, exposure to the natural language, consciousness-raising and explicit teaching ([Hill, 2000](#); [Lewis, 2000](#); [Nesselhauf, 2005](#); [Woolard, 2000](#)), were pursued in this study; significant results were obtained between the groups in addition to the number of collocations used in the students' written paragraphs. The findings were consistent with those of [Lin \(2002\)](#), [Sun and Wang \(2003\)](#), and [Tseng \(2002\)](#): explicit collocation instruction was effective in promoting EFL learners' collocation knowledge. The findings reported here indicate that the control group did not show any significant results when displaying collocation achievement test. It was the experimental group which showed remarkable performance gains in knowledge of collocations between pre- and post- tests. Therefore, the best conclusion to be drawn from the findings related to the collocation awareness might be that collocation instruction has positive effects on students' knowledge of collocations.

The second hypothesis claimed that collocation instruction would not help students to develop their writing ability. In order to investigate this, the grades of the first and the last paragraphs and the number of collocations used in students' paragraphs were compared within and between the two groups. The positive effect of collocation instruction on experimental



students' writings turned out sufficiently profound to be of statistical significance through quantitative as well as qualitative analysis of the data. This finding is consistent with Zhang's finding (1993) which suggests a correlation between knowledge and use of English collocations and the quality of college freshman's writing.

The third research question looked at the students' use of collocation in their writing after being explicitly taught what collocations were and examples of them. This qualitative examination of data also supports a positive impact of the method on students' fluency and vocabulary. Only the effect on students' grammar failed to be of great significance graphically. Hill (1999) and Thornbury (1998) believe that learning lexical strings seem to enable students to extract the grammar themselves as they begin analysing acquired language. One possible justification for this is the fact that the experiment was conducted over 20 teaching sessions and learners required more time to be able to extract the grammar themselves. These findings confirm Farghal and Obiedat's (1995) emphasis on teaching vocabulary collocationally instead of individually and also support Zhang's conclusion (1993) that collocational knowledge is a source of fluency in written communication among college freshmen. All in all, the samples that the students produced indicated that directing the students' attention to collocations had a positive impact on their results. In the students' writing samples the researcher noticed that the students at times had some problems understanding of the words, and yet they could not use the words appropriately. In addition she observed that collocation was one of the problems.

Nation (2001) pointed out that "while it is possible to make significant changes in vocabulary knowledge, it is not easy to move this knowledge to productive use" (p. 182). Nation's comment was observed in the students' use of words in their samples. In some cases, while the students seemed to understand the meaning of the words, they sometimes struggled to collocate some of them. In addition, they did not know the appropriate context in which to use certain words. Finally, as Kennedy (1990) commented: What text-based collocation studies do suggest is that the description of grammar is, from the teacher's point of view, an essential part of methodology, but it needs to be based on more than the orthodox grammatical and lexical description. Just as the teacher of botany does not take students into the jungle and expect them to learn all the plants by simply being exposed to them, so the language curriculum designer and classroom teacher can facilitate learning by systematic presentation of the role of important language items and their linguistic ecology – the company words keep (p. 228).

Another point observed in the students' writings was the transfer of a certain collocation pattern to others. In his study, Howarth (1998) noticed that his learners transferred knowledge of certain combinations to others. For instance, Howarth's students came up with "draw a conclusive comments" from "draw a conclusion." The students also created "reach a high achievement" which appeared to be a combination of "high achiever" and "a high level of achievement" (p. 180). A similar type of transfer was observed in the present study in the use of "cooperative working," "physical working," and "individual working." Even though one collocation example led the students to create inappropriate combinations, the fact that they were creating combinations was an indication that they were attending to the collocations. However, the results of the present study may not be conclusive and, a lengthy study with more subjects in number might enable the achievement of more significant and reliable results. It goes without saying that by the small number of subjects and the relatively small difference in instructional methods administered to the experimental and the control group, the positive effect of 'collocation-noticing' on experimental students' writings turned out to be significant.

## **5. Conclusion**

To sum up, English students are usually incompetent in writing, mis-collocations are widespread in their writing, and their words are associated inappropriately. Therefore, they need to use collocations in order to write more proficiently. As indicated in the statistical findings of this study, teaching English collocations to Iranian learners would enhance their proficiency in writing and raise their collocational competence. In addition to this, the experimental group was observed to take more risks and make more complicated sentences using more collocations in their sentences. In their compositions these learners used more collocations than did those in the control group. The data also support a positive impact of the method on students' fluency and vocabulary until the end of the term.

In addition, Gitsaki (1999 in Smith, 2005) believes that the amount and length of exposure to the target language is an important aspect in collocation development. Lewis (1997a), too, points out that learners do not necessarily learn what teachers teach and acquisition is non-linear.

## 6. Acknowledgements

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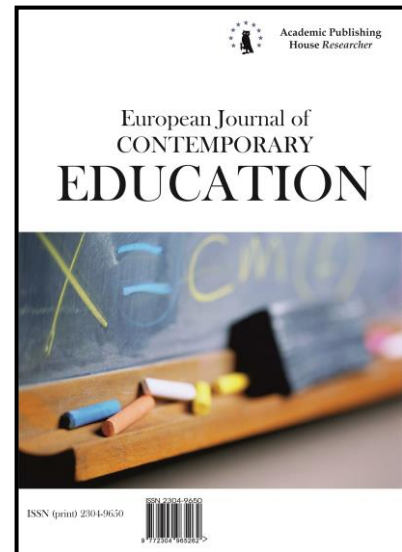
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## **Non-Linear Structured Teaching Material as an Attribute Developing Meaningfulness in Students' Mental Representation**

Nina Kozarova <sup>a</sup>, Jana Duchovicova <sup>a,\*</sup>

<sup>a</sup> Constantine the Philosopher University in Nitra, Slovakia

### **Abstract**

Thinking is the essence of human existence, unquestionably the highest product of human evolution. Yet it is not possible to convey coherently to students the sum and attainment of all humanity's knowledge. Students would be incapable of absorbing such an enormous quantity of knowledge (corresponding to current developments in individual academic disciplines), as this is often highly abstract. Therefore educational content must be selected, to the extent that it presents a representative selection of knowledge. One of the most effective selection methods could be the use of conceptual mapping in the educational process. In this study the authors focus on the issue of structured teaching material and its relational association with creating students' mental representation, and have several objectives. The first is to analyze constructivist-oriented teaching processes; the authors also give attention to basic theses by which it is possible to delineate the main pillars of constructivist-oriented teaching. Attention is also given to learning strategies. No less important is the analysis of non-linear structured teaching material and its specific types, with an emphasis on conceptual mapping and its role in the teaching process – in the empirical part the effect of non-linear material in recording topical unit meaningfulness in students' mental representation. In the research undertaken, the methods of conceptual mapping experimenting and testing were used. The consistency of the conceptual maps was evaluated through the relational method using ordinal variables: meaningfulness of conceptual maps. The authors assessed the quality of the conceptual maps with the aid of IRT theory, specifically the latent correlations model. The research sample comprised 96 respondents. Analysis of results showed that the use of non-linear structured teaching material improved students' results in the experimental groups in the researched operationalization parameter.

**Keywords:** conceptual maps, mental representation of material, meaningfulness, parameter, structured teaching material, strategy.

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\* Corresponding author

E-mail addresses: [nkozarova@ukf.sk](mailto:nkozarova@ukf.sk) (N. Kozarova), [jduchovicova@ukf.sk](mailto:jduchovicova@ukf.sk) (J. Duchovicova)



## **1. Introduction**

### **Constructivism in educational practice**

We have come to believe that, even where every situation provides students the same information, they are not able to perceive all of it at once; therefore, in the perception process they select that information they assess as the easiest to take in, even as they do not recognize the degree of its importance. This means that even in the same situation, each student takes in varying information. The extent to which students select information depends on their experience, i.e. the more experience they have with selecting information, the better able they are to calibrate this filter. In educational practice the information that is crucial to comprehend the material presented (the knowledge of which is essential) must be analyzed, with selecting out of supplementary information that students can assimilate later. Contemporary education ought not only to guide students in taking in knowledge provided by others, but also in organizing basic information such that it creates a support system for their internal knowledge structure.

To date, much research has been done to quantify the advantages, positive effects and disadvantages of constructivism and other theories of learning in educational practice (Reigeluth, 1989; Yilmaz, 2011, Imenda, 2018; Kirschner et al., 2006; Rymarz, 2012; Ertmer, Newby, 2013; Agarkar, 2019 and others). However, there are many arguments that give attention to the theoretical advantages of constructivism (Karagiorgi, 2005; Hendry, 1996; Ernest, 1995; Fosnot, 1992; Warin et al., 2011; Kwan, 2020). Constructivist conditions and how they are applied in educational practice mainly emphasize the individual interpretation of students' schemata, as each student develops his or her learning mechanism through his or her active construction of knowledge.

We see constructivism in teaching as a reflective educational activity, a construction and reconstruction of the students' internal knowledge system, a focusing of attention on supporting the student's active understanding, and a stimulation of higher cognitive functions. Constructivist education is not the transfer and subsequent acquisition of "pre-processed" knowledge, but rather the construction of one's own meaning for specific knowledge and its subsequent systematization into one's internal knowledge structure.

Teaching and learning is understood in the context of a given orientation as a constructive process, as we can achieve more effective results through teaching with (understanding through the use of relevant practical experience. Direct "transfer" of the information that students are meant to learn is characteristic of traditional teaching; this is not necessarily done in a merely mechanical manner, to the contrary it can function just as meaningfully if the student is reacting to new information – processing it. When the student connects the new information with knowledge already attained, the internal knowledge structure becomes activated – i.e. the traditional learning was meaningful. As long as the student merely remembers information given by the teacher, without seeking connections and mutual relationships, the result of the teaching is clearly mechanic.

### **Learning strategies**

It seems that educational practice in Slovakia pays scant attention to identifying teaching methods or strategies that lead to developing competencies of effective learning. The question of what a successful, and above all functional, model of learning should look like must be asked constantly. Schools seem not to realize that the teaching process is more than textual information, and therefore it is incorrect to teach predominantly through the aid of texts. The point is that the human mind is able to comprehend more than abstract information in the text, as learning occurs by the aid of sensory codes (Duchovicova, Fenyvesiova, 2019; Grofcikova et al., 2018; Duchovicova, Kolenakova, 2018, Duchovicova, Tomsik, 2018; Tomsik et al., 2018; Kozarova, Gunisova, 2020).

For students' comprehensive development (remembering always that each student is unique), the educational process must employ a varied palette of teaching strategies. Through them, students obtain effective tools for learning with understanding, problem-solving, and presentation of their own ideas and thoughts. This is also an important part of motivation, where students through various strategies are connected to classroom work and active co-participants in the learning process; moreover, the learning and teaching are not stereotypical (the strategies create a dynamic learning process, with the content its static component). By applying a variety of strategies we can achieve the right teaching methods as chosen by the students, and the development of their metacognition and self-regulation (which create an individual's cognitive



separateness). Last but not least, through varied activities and strategies we can improve how students relate to the given subject, support longer-term remembering of material, expand students' vocabulary, and enhance their creativity.

Importantly, students must be taught to think in broader contexts, to read with comprehension, seek solutions to problems, and present the results of their own efforts. The means of processing information as well as the quality of perception are crucial determinants in the formation and modification of specific learning strategies, as these factors have significant influence on the symbolization, coding and organization of information into functional units, and on work with students' mental representation. A student's learning strategies should always be gauged in the particular context of his or her cognitive antecedents, thinking process, means of processing verbal and non-verbal information, and memory. It is very difficult for students to modify their learning strategies, as learning is often associated with a range of various habits and automatic activities (Anagün, 2018; Bas, 2012; Harrington, Enochs, 2009).

The learning strategies identified by P. A. Ertmer and T. J. Newby (2013) include: structured instruction, instructional explanations, concept mapping, summaries, synthesizers, mnemonics, advance organizers, analogies, demonstrations, and organizing information so as to encourage optimal processing of it. We have analyzed individual teaching strategies in *Metacognitive Development of Students* (Petrova, Kozarova, 2017).

### **Strategies of structured teaching material**

Textbooks have a fixed material content of that the teacher is to communicate to students. We go so far as to maintain that in all but rare cases this text is communicated in linear form (in the composition of sentences in the textbook and in the spoken word). In learning, or the educational process, it is essential to teach students not only individual terms but also the relationships between them – which in textbooks or teachers' presentations often remains hidden. Students, in their effort to comprehend relationships between terms, are often unable to identify the basic structure of material in the text presented – they either construct it for themselves incompletely or include in them inessential or less important relationships. It is important for teachers to guide their students during the educational process so that they prove capable of constructing independently the material's structure, and consequently the whole notional/relational network.

L. Resnick (1996) characterizes three basic indicators that affect the structuring of educational material:

- a) how it is taught (teaching methods, planning of lesson);
- b) student age (appropriateness of content for students);
- c) range of material (mastery of main terms in the material and relationships between them).

Students modify, evaluate and compare the information they take in as they perceive it. The processing of terms occurs through a set of thought operations: abstraction and concretization, analysis and synthesis, generalization, classification, induction and deduction, and comparison. Thus it can be inferred that students' thinking directly conditions the interpretation and structuring of text, as students operate with individual terms and abstract or metaphorical parts of the material. Meanwhile they must respect the symbolic function of texts and adequately construe meaning complexes.

J. Kesselova (2005) points to the importance of constructivist aspects in the effort to comprehend any kind of material. "The level of understanding depends not only on the information in the text and on the way it is presented but also on individual experience and one's knowledge and mental assumptions." We concur with the author's opinions, as it is an individual's cognitive processes that are determinants in analyzing import of material and constructing its content.

A teacher, as an expert in subjects for which he or she has qualified, may regard the structure of the communicated material as transparent and understandable, but students coming in contact with the material for what is often the first time may not "see" the structure or understand its logic.

The teacher's guiding principle should be to explain material to students as pliantly as possible, to put the created "real picture" in language the students understand. A picture thus constructed can be more readily coded into and retrieved from the memory. Schooling in Slovakia seems to have forgotten about techniques that would help students significantly simplify learning. Here we refer to optimally structured teaching material, which forestalls mechanical learning of a

given content while supporting material in a student's own understandable way. It is necessary to heed the patterns and similarities with material students have already learned, to create sufficiently strong associations. This is to penetrate into the structure of the subject being taught.

During lessons teachers present students material with a basic framework, but this is simple transfer of ready knowledge – i.e. of a structure students passively memorize. Any type of structured material is based primarily on the premise of arranging as well as possible the material's key terms and the relations between them. The challenge in current education is that students can often recite the material's facts, data, terms and main ideas, but cannot discern, grasp and interpret relationships between terms, in a so-called notional/relational network. In general we can identify three basic forms of arranging material:

1. linear – teacher's presentation, written text;
2. non-linear – pictorial material;
3. non-linear abstract representation – schemata, graphs, grids.

W. Schnotz and S.P. Ballstaedt (1996) describe the process of comprehension in learning from any text:

1. Students' comprehension in the world of general and symbolic language (analysis of associations as well as overview of the studied text).
2. Mental construction (the purpose of comprehending a text is to develop the capacity to construct or reconstruct an inner understanding of the studied text).
3. Interaction between internal and external influences (interaction between individual layers of the processed information, which could lead to misunderstanding; or reconstruction of earlier-acquired knowledge).
4. Cyclicity of process (comprehension in learning from a text is an open process, as there is a confrontation between new information and that already acquired).
5. Context of the text studied (both original and new information are structured into a specific context).

The conclusion was that teaching ought to occur with the objective of guiding students to comprehension the point of the presented material in an integral context; for the meaning structure and broad-spectrum variability in semantic perception of material fundamentally influence its consequent interpretation.

L. Lederbuchova (2002) stresses that a learner is never a passive receiver of information, but rather always completes the structure and most essential information in the material through his or her perspective – as he or she understands them. In communicating with the material he or she engages his or her perceptual activities, decodes the text's language expressions, and constructs his or her own inner picture. We think that analyzing material and modifying or transforming it is a resource in the search for appropriate methodological procedures in educational processes. As implied above, structured material is important to students' remembering better and more simply (as it provides for higher-quality construction of meanings). Structuring enables us to create conscious links between already-acquired and new knowledge, and can be seen as an active process, in which students create and seek the basic sense; among other things, structuring helps students make learning contextual (they are not learning isolated facts and theories in the abstract, as they are recoded into a more simply memorable form). Moreover, new knowledge cannot be introduced to an internal knowledge structure unless we acquire a certain structure created out of preceding knowledge, as we will show below in our research.

### **Conceptual mapping**

The literature identifies conceptual maps with a variety of names, including: cognitive maps, mind maps, spider webs, network diagrams, knowledge maps, graphic illustration, structured overviews, semantic maps, and cluster arrangements.

Awareness of mapping seems to be relatively low in Slovakia. The literature most often describes conceptual maps as process-oriented teaching, which goes beyond knowledge acquisition to focus conceptually and systematically on how it is acquired. A constructivist conception of teaching is a determining element in using conceptual mapping in the individual phases of a lesson. If students are systematically prepared to construct their knowledge, they will structure the individual aspects of their potential map content even while the teacher is presenting them.

The analysis of relevant bibliographical sources leads us to characterize conceptual mapping as the creation of integrated schemata of structural relationships. It is the organization of a logical structure of certain knowledge, the creation of causal, mutual or final relational levels between a whole and its main parts within school learning (ideas, concepts, hypotheses or principles). We regard the conceptual map as a thought concept at the highest level of thinking. The map is stored in memory as a structure that has accumulated seen and heard data on specific information, together with models of effective negotiation.

The mapping technique draws on the assumption that the human mind stores new information by means of labels and images. It is useful to organize materials according to its sense, to seek associations, and distinguish supplementary from primary information and the unverified from the substantiated. Conceptual mapping as opposed to linear (in the literature called traditional) structuring of information is a system that supports the manner in which the human mind works, as corroborated by considerable meta-analytical research of the cognitive benefits of mapping (Nesbit, Adesope, 2006).

The act of understanding and interpreting conceptual maps is a rigorous and active process with a relational character, as the student identifies his or her own knowledge structure with key elements in the material. Linking information with already-created and functioning networks of knowledge leads by degrees to new forms of understanding. Conceptual mapping can be considered a useful technique for facilitating effective learning and the organization of information received into logical relationships (among terms, ideas and associations), enabling structuring, analysis, synthesis and generalization.

## **2. Discussion and results**

### **Research problem**

Conceptual mapping applied to the teaching process was at the center of our attention for several reasons, particularly because it has the potential to improve current educational practice. Each student is an individual being with preferences for differing ways of processing, systematizing, remembering and presenting information. This research focused on finding the relationship between the teacher's presentation of material, preceded by a didactic analysis of the material, with the resulting student's representation of the material, as illustrated through a conceptual map. The given knowledge students remembered from the material is not the only important aspect. Even more important are the student's comprehension of the presented material, and their ability to work with it, and interconnect associated knowledge (as stored in their internal knowledge structure). The focus was on the relational level of structuring material and students' mental representation of it in the subject of history.

History is considered a subject that students simply have to memorize. We believe that there are procedures and means by which we can explain to students the content of history education with a higher level of understandability, leading to an easier interpretation of given material and lower dependence on memorizing and empty verbalizing.

This study mainly aims at *analyzing the conceptual level of structured teaching material and its associative link to creating upper secondary students' mental representation*.

This research analyzes how the chosen type of structuring material used in communicating the content of the subject influences the conceptualization of students' knowledge, as reflected in the conceptual map. Based on the research objective, we posited the following hypothesis on the causal research problem, addressed through the research method of experimenting:

**H:** We expect students to whom material was presented by non-linear structuring to achieve a statistically significantly higher level of meaningfulness of the recorded assertions in the process of conceptual mapping compared to students to whom the material was presented by linear structuring.

Experts regard one of the most significant aspects of selecting and arranging material to be developmental psychology, more specifically the age conditions and aptitude of students in managing the material. It must be recognized that students' learning capacity has boundaries, which change parallel to their development. In considering target groups, secondary school seemed an optimal environment. It is during secondary school that students gradually attain a state of cognitive development where they are capable of abstraction, working with hypothetical judgments, and thinking in general terms and generalizations. At issue is a formal/abstract way of

thinking, which forms the basis of developing critical thinking. In this period the quality of thought operations changes, and adolescents are able to work with abstract terms and generalizations. The verbal/logical memory comes to predominate over the mechanical. Secondary students also have the mental capacity to construct and reconstruct their internal knowledge structure and the structure of mediated scientific knowledge in the mind. Therefore we deliberately chose an academically-oriented secondary school [gymnázium] in Nitra. In addition to the question of age, the considered criterion was the teaching subject, with the choice primarily determined by the topics contained in the curriculum and the given year group.

In total the research sample comprised 96 students of the given school, four class groups of the first year of four. Due to the character of the research and the hypotheses formulated, the sample had to be divided into two large portions, representing the control and the experimental groups. In the two class groups of the control group, we taught history using a linear-structured material. In the two classes of the experimental group, we taught history using non-linear structuring of material, specifically through conceptual mapping. All research groups were taught throughout the research period by the same instructor: one of this study's authors, a graduate in education with a qualification in teaching History.

**Table 1.** Student numbers

Group	Number of students
<b>Control group A</b> (linear structuring)	26
<b>Control group B</b> (linear structuring)	23
<b>Experimental group A</b> (non-linear structuring)	23
<b>Experimental group B</b> (non-linear structuring)	24

### Research Methods

The effectiveness of the changes was verified through conceptual mapping, using the *experiment* method (research of deliberately induced educational phenomena under controlled conditions prepared in advance). The experiment took place in standard conditions; because of the teaching subject, specific educational content and research objective, we chose the Piaristické gymnázium sv. Jozefa Kalazanského in Nitra. The research focused on experimental examination of how the chosen type of structured teaching material would affect students' mental representation (as expressed in a conceptual map).

We understand structured teaching material to be means (elucidation, explanation and the like) by which educational content is communicated/explained/made accessible to students. It is the teacher's ability to create analogies between what the students already know and the ideas of experts of various academic disciplines. In presenting material to students, the teacher considers the content's structure, choice of key material elements, and how to make it accessible, with regard to the students' mental and developmental level. Here the teaching lasted about 5 months – September to February (enough to cover the given topical unit) – and for all class groups was in instruction of history.

The selection of the type of school is intentional; the choice criterion is a grammar school (gymnázium) as a general educational institution. Within the school the year of study is randomly chosen. In the designated year a thematic unit was chosen for experimental verification in order to avoid possible influence of content on the results. The placement of learners into groups is based on natural conditions of school classroom formation. In order not to affect the results due to unnatural formation of educational group we worked with regular classes. Primarily we relied on how students were divided into classes during the regular classes. The control and experimental classes were determined by random selection as the classes were equivalent.

The work within the experiment was divided into two portions. In the control groups, when explaining the new material (the Ancient World topical unit) the linear structured teaching material to which most students are accustomed was used, with procedures based on traditional teaching methods – i.e. verbal (spoken explanation). The dominant form was frontal teaching,

though elements of group teaching were used as well (during a total of five lessons). Information-communication technologies were used for some lessons, searching information and supplementary teaching texts together with students and enhancing knowledge by analyzing available historical sources in electronic archives.

The chosen approach for the experimental groups while explaining new history materials (the Ancient World unit) was non-linear use of structured material. For this purpose, for each lesson and each new material of the given topical unit, a conceptual map was constructed, by which the material was explained to students. Further methods used included graphic/demonstrative methods (watching and analyzing documentary films). All supplementary chosen teaching material was processed through non-linear structuring. During group teaching (a total of five lessons), students worked on developing a group conceptual map, or added missing terms to the map prepared earlier, in order for the schema to make sense.

Students' mental representation of the chosen unit was analyzed through a *test of conceptual mapping* (the Ancient World); where the conceptual map is constructed by students this represents a graphic schema of their knowledge. The means by which the constructed conceptual maps were evaluated relied on theoretical knowledge of conceptual mapping, as well as on the actual construction of conceptual maps; specifically this was a *Relational method of evaluating conceptual maps*. The research team designated and analyzed the main parameter of operationalization: the meaningfulness of recorded assertions. By meaningfulness we understand a complexity of knowledge and systematic aspect of students' thinking manifested in mental representation. Above all else, precision in the information set down, inter-subject links, the material's connections with the entire unit, and the linking of the history material with other topical units were noted.

The research hypothesis was verified by using several quantitative statistical methods. We have applied the *Item Response Theory (IRT)* to assess whether the teaching process which uses non-linear structuring (in our case conceptual maps) in terms of meaningfulness – (*complexity of knowledge and systematic aspect of thinking in mental representation*) is more effective than the linear structuring presented in standard educational process of a teacher.

IRT theory was used for the evaluation of the quality of the conceptual maps, specifically the *latent correlations model* (Adams et al., 1997). IRT is an alternative to classical test theory (CTT) and allows you to identify the properties of items that classical test theory does not provide. IRT models with one latent variable use two assumptions: the assumption of unidimensionality – the probability of a respondent's answer to an item is affected by only one of his/her characteristics and any other influence is excluded; assumption of local independence – the influence to answer by other test items is not considered as influential apart from a person's character traits. Within the IRT we verified by the application of LRT test which of the compared candidate models is more suitable for the examined data. The quality of conceptual maps was assessed by the *structural method* and the *relational method*. It has been discovered that the learners in the experimental group achieved significantly higher average values in all four latent variables compared to the students in the control group, even though the distribution of any of the variables is not normal in either control or experimental group which we also verified by the Kolmogor – Smirnovov test. These were two selected files, therefore statistical significance was assessed by a non-parametric alternative of a multivariate analysis of variance which does not assume multivariate normality. From the result of the overall multidimensional test ( $\Lambda(4; 91) = 17,89; p < 0,001$ ) it is evident that the four variables in the experimental and control file do not have the same distribution. Subsequently, in the *npmv* programme package at the significance level of 0.05 we searched for variables that cause a statistically significant result. Learners in experimental group achieved statistically significantly better results in all four monitored variables. Stated results are not the subject of the analysis of this study but are related to the evaluation of the statistical significance of the structural method results which are analyzed below.

In the case of the structural method four areas: *concepts, relations, hierarchies and groupings* were evaluated using ten items coded on a three-level scale 0, 1 and 2. The data were also analyzed by application of the IRT theory specifically the *model of correlated latent features* (Adams et al., 1997).

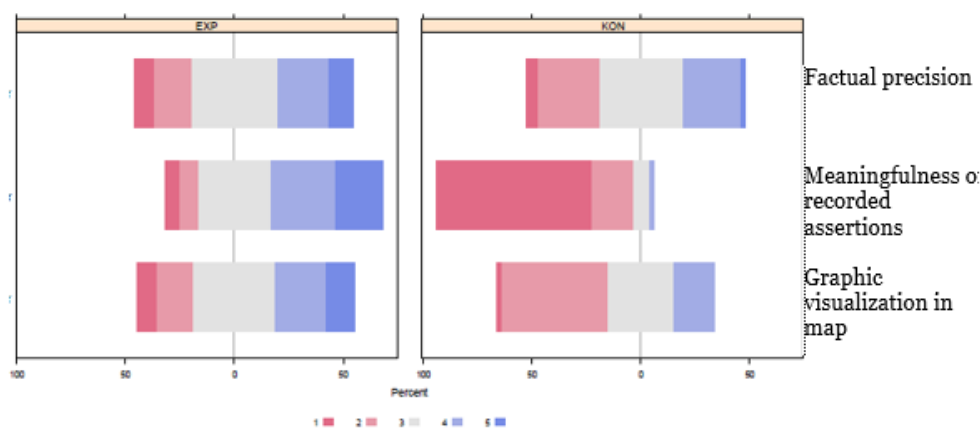


In the matter of relational method three ordinal variables were assessed: meaningfulness, graphical readability and factual accuracy on a five-point scale (1 lowest, 5 highest). The consistency of the conceptual maps was evaluated by a relational evaluation method, using ordinal variables for *meaningfulness of recorded assertions* on a 1-to-5 scale.

**Table 2.** Meaningfulness of recorded assertions

Meaningfulness of recorded assertions	
5	Knowledge in the map is complex. Recorded assertions express integrated ideas and reflect the student's systematic thinking. Information is recorded precisely and in association with material from various topical units. The map features inter-subject links.
4	Knowledge recorded in the map is complex, but the ideas lack aspects of integration, and are not systematically arranged. The assertions include inter-subject links, but association with material is limited to the given topical unit. Association with other history material is slight.
3	The assertions recorded in the map are not integrated, and ideas not arranged systematically. Relatively few inter-subject links between different materials appear on the map. Materials within the topical unit are linked, but there is an absence of association between history material and that of other topical units.
2	Though the map features information, the assertions are incompatible with the terms, and so the individual ideas lose their function and meaning. Inter-subject links are not conveyed in the map, and there is an absence of association with other materials from other topical units. There is association conveyed within the topical unit, but with some imprecision.
1	The conceptual map has no relevant assertions, and knowledge is neither systematic nor integrated. Information is not precisely recorded, and there is absence of inter-subject links and of association with other materials either from this or other topical units.

The evaluation was followed by the comparison of the scores of constructs obtained, given students' group identity (in control and experimental groups), by the nonparametric alternative of one-factor multivariate analysis of variance (Bathke, Harrar, 2008). Test statistics were used to verify the assumption of local independence (Maydeu-Olivares, Joe, 2006) with chi-square partition.



Legend: 1 lowest quality level – 5 highest quality level

**Fig. 1.** Success of solutions in control and experimental groups

### Analysis of research results

The ordinal variable meaningfulness is together with graphical readability and factual accuracy an indicator of the quality of the map. We were interested in whether the quality indicator of a map – *meaningfulness* is statistically significant and different among students of the experimental group in comparison to the students of the control group. As can be seen in [Figure 1](#) and in [Table 3](#), the learners of the experimental group achieve better evaluation in all three indicators.

Likewise the table (*Descriptive statistics of latent variables in control and experimental groups*) shows that experimental group students achieved higher-quality evaluations in all the indicators observed.

**Table 3.** Descriptive statistics of latent variables in control and experimental groups

Group		Factual precision	Meaningfulness of recorded assertions	Graphic visualization in map
EXP	N	47	47	47
	Average	3.15	3.51	3.11
	Median	3	4	3
	SD	1.12	1.12	1.09
	Minimum	1	1	1
	Maximum	5	5	5
	CON	N	49	49
Average		2.65	1.39	2.94
Median		2	1	3
SD		0.80	0.76	0.90
Minimum		1	0	1
Maximum		4	4	5

Since all three variables are ordinal and the assumption of multivariate normality cannot be met, we used a nonparametric alternative of multivariate analysis of variance to compare the results of control and experimental learners. The calculation of statistical significance at the significance level of 0.05 in the npvm software package was applied as well. Corresponding  $p$  – values are not stated cause the *ssnonpartest* function in the npmv package also does not specify them. It turned out that the results of the differences in the category: meaningfulness of recorded assertions between the control and experimental group are statistically significant. By application of nonlinear structuring methods within the curriculum learners achieved statistically significant better results in the category of meaningfulness than students in the control group. Based on the above can be stated that the nonlinear structuring of the curriculum realized through the application of mental maps in the teaching of history has a statistically significant effect on learners' mental representation in the complexity of knowledge and systematic thinking.

To verify the results of the evaluation of the quality of conceptual maps we also compared the results of the structural and relational methods through correlation in groups using Kendall's correlation coefficient. From the values of Kendall's correlation coefficient given in [Table 4](#) which are all statistically significant at the significance level of 0.05 it clearly shows that the majority of correlations between individual pairs of variables according to de Vaus' classification ([de Vaus, 2002](#)) is *substantial even very strong* (0.50-0.69) and a foursome of correlation coefficients is *medium strong* (0.30-0.49). These facts show that the results obtained by the structural method are relatively strongly correlated with the results obtained by the relational method.

**Table 3.** Kendall's correlation coefficient between variables from the structural method and the relational method.

Relational Method	Structural Method			
	Concepts	Relations	Hierarchy	Groupings
Factual Accuracy	0,63	0,59	0,62	0,57
Meaningfulness	0,68	0,70	0,69	0,69
Graphic readability	0,47	0,47	0,47	0,44

In most cases, students learn history mechanically, in order to memorize all facts and information, but they do not learn meaningfully. Consequently the process result does not correspond to optimal expectations. If students' comprehension of the subject of history is to be improved, a variety of teaching strategies must be evaluated and compared. The scope of our analysis consists of comparing the application of non-linear and linear structured teaching material (of the chosen topical unit) to students' mental representation, as recorded in conceptual mapping. Our results show that non-linear structured teaching material is a more suitable strategy than the linear-structuring that is predominantly used in teaching history in academic secondary schools.

Our hypothesis anticipated that students to whom material was presented by non-linear structuring would achieve a statistically significantly higher level of meaningfulness of the recorded assertions compared to students to whom the material was presented by linear structuring. Within this hypothesis we analyzed how systematic students' thinking was, the complexity of their knowledge, the precision and associations in their information, and their use of inter-subject links. From the results it can be deduced that experimental group students achieved higher-quality evaluations on the parameter of operationalizing the meaningfulness of statements recorded. Comparing the results of successful solutions yielded an interesting finding. Control group students were unable to achieve the highest possible evaluation (5) on this parameter. Analysis of the conceptual maps showed to a significant degree that these students did not record relevant statements, and almost completely left out inter-subject links and indication of relationships among the given topical unit's materials. In many cases the students' thoughts lost their import, as they were not compatible with the terms used. It was here we see that control group students did not comprehend how they were meant to work with the material, or how to detect and analyze the relationships and associations within the information. Although they had taken in a good deal of knowledge, it was difficult for them to pace terms within a meaningful system. On the other hand, experimental group students recorded complex knowledge in their conceptual maps. Detailed analysis showed that the mental representations portrayed reflect how systematically they were thinking. The topical unit's material related one to another, and students comprehended the material and proved capable of creating a more heterogeneous knowledge structure (e.g., in their conceptual maps these students: showed that organs of executive power comprise the basic pillars of civil society on which today's societies stand; depicted the rise of Rome's power, and wars with the Celts as well as Carthage and Tarentum; described the unification of economic matters and the origin of the Delian League; compared Draco's Code and the Solonian Constitution; and analyzed the evolution of Athens' political system from aristocracy through tyranny to democracy). Information recorded in experimental group students' conceptual maps were quantifiably linked to other teaching subjects, including geography (natural conditions), civics (the Laws of the Twelve Tables, classes of citizenship, democracy), literature (Marcus Aurelius – Meditations) and art (sculptures). For us (as instructor and research initiator) it was especially interesting and decisive to find that, notwithstanding our working predominantly with one type of conceptual map with students in the lessons (although their instructions included all types and means of mapping), the experimental group students' output was diverse. We conclude that the students themselves chose ways of mapping that best suited them and that enabled them to record their mental representations in as much detail as possible. The hypothesis was thus supported.

### 3. Conclusion

The educational content of the subject of history is immensely interesting, and need not be the boring drill of many facts. Of primary importance however is for teachers to understand they are

teaching students rather than a subject. Therefore the strategies of conveying material should be modified so as to function optimally. The basic requirement is for students simply to learn, comprehend and remember material. Students must be presented with diverse strategies that can help them develop their thinking, and code and decode the information taken in. It is essential for educators to realize that in educational practice students should be taught within contexts, not drilled on isolated facts. It is here we see the benefit of this study. This research verified that changing the teaching process by introducing non-linear structured teaching material – by way of conceptual mapping in conveying information to students – has many benefits, leads to deeper comprehension, aids in systematizing educational content, and develops students' self-regulation of their thinking processes.

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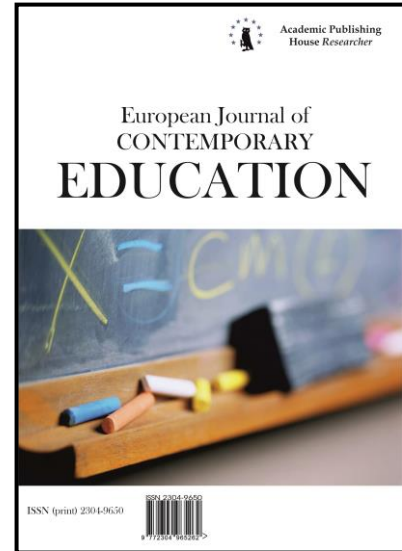
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## Gender Differentiation in Perceiving and Evaluating the Interactive Methods of Education by the Engineering Students

Andrii E. Lebid <sup>a, b, \*</sup>, Natal'ya A. Shevchenko <sup>b, c</sup>

<sup>a</sup> Sumy State University, Ukraine

<sup>b</sup> International Network Center for Fundamental and Applied Research, Washington, USA

<sup>c</sup> Volgograd State University, Volgograd, Russian Federation

### Abstract

The article gives an overview of the basic principles and approaches to the matter of cooperative learning based on the use of interactive forms and methods of education. It is argued that in the conditions of the changing labor market, there will be a demand for such skills, abilities and competencies that are most effectively formed and developed through interactive practices such as leadership, thinking skills, communication, decision making, project work, etc.

Interactive education methods are a synthesis of two components, pedagogical and technological. It is justified to combine these two components to achieve the best learning outcomes.

On the basis of the analysis of the data obtained as a result of the survey, as well as via its verification using the mathematical statistics methods, a hypothesis was proposed on the difference in the level of expectations, perception and evaluation of interactive forms and methods of education in gender-differentiated groups of engineering students. The results of data analysis showed a more skeptical attitude of the male student audience with regard to both the effectiveness and appropriateness of interactive methods of education. It was found that this part of respondents tends to be more instrumental and pragmatic in choosing the means and methods of learning.

**Keywords:** cooperative education, interactive forms and methods, cooperative pedagogy, gender differentiation, educational innovations, gaming methods, competences.

### 1. Introduction

Changes in the way of life, and sociality as such, transformation and challenges of the modern world require appropriate changes in the goals, means and methods of modern education, both primary and higher. In this regard, the so-called *conventional pedagogy* has definitely lost its

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\* Corresponding author

E-mail addresses: [a.lebid@socio.sumdu.edu.ua](mailto:a.lebid@socio.sumdu.edu.ua) (A. Lebid)

functionality as a form of the teaching process organization that was characterized by a one-way transmission of *ready* knowledge from teacher to student, when the latter was not considered a full subject of the educational process, but only an object of mentoring, a passive consumer of information.

The circumstances are such that the modern education should rather focus not as much on academic subjects but on how students think and act, on critical thinking, solving complex problems, analyzing facts and verifying them, having leadership skills, communication skills, etc. In this regard, the issue of using effective methods and instruments in the educational process, the use of which would form and develop all these qualities, becomes relevant. It seems, the methodology of interactive forms of education, that is widely used in innovative pedagogy, cooperative pedagogy, could definitely be called such an instrument.

In this context, we have set a task to study the features of perception and evaluation of proactive and interactive forms of education by engineering students, taking into account their gender differences.

## 2. Materials and methods

The results of a survey of the Sumy State University engineering students, carried out using Google Forms of online surveys and polls, were used for preparation of the article. The study was based on the principle of gender differentiation and Pearson's  $\chi^2$  criterion as non-parametric methods of assessing the significance of differences between actually observed and expected results.

## 3. Discussion

Methods and ways of education play an essential role not only in the training of specialists-to-be, but also in the process of preparing the active, erudite, fully developed individuals, polymaths, as it is common to call such people nowadays, i.e. people who have versatile intellectual abilities, who are all-round scholars, whose interests and activities are not limited to a single field of knowledge and the only area of their application.

That is why the issues of education require special attention today, including the context of ever-growing workflow automation and the real competitive advantage of humans that can never be appropriated by a machine. We can confidently declare the end of *specialization era*, when being polymaths responds to the challenges of time and becomes a consequence of confrontation between androrithms and algorithms. We live in the era of digital technology, and our everyday life, as well as our education system, directly depend on the content and context of today's realities, which is reflected, in particular, in the approaches and methods of education.

Interactive methods of education are not a tribute to fashion, but a challenge of time, characterizing various discourses of the educational system such as pedagogical (methods, techniques, instruments and methods of education) and technological (use of results of the latest research in science and technology for educational purposes). Conventional (classic) pedagogy has long become obsolete. Interactive, innovative cooperative pedagogy is the key to effective learning and teaching.

It is these and other aspects of interactive forms of education that researchers are drawing attention to, arguing for the need, feasibility and timeliness of "a new approach to teaching and learning that improves visual spatial skills, memory and multitasking skills." (Pradono et al., 2013).

The communication component of interactive education is no less important, at least as important as the minimum required set of skills, competencies and abilities of a modern university graduate. Interactivity in this context is understood as learning through communication, through the confrontation of ideas, opinions and arguments, through cooperation and mutual influence in the study and research groups. Interactive learning is a new way and style of life for both teachers and students. (Palaniyammal, Lakshmi Shanmugam, 2018).

Certain scientific works consider the interactive form of education in the context of skills and competence development in the system of dual, practice-oriented, project-based training using training models, simulators, cases, etc (Riemer, Schrader, 2020; Lebid, Shevchenko, 2020a; Lebid, Shevchenko, 2020b; Prosekov et al., 2020) and other.

Certain educational researchers have raised concerns that the involvement of stakeholders in the educational process is not fully used by the educational institutions, while such cooperation, on the contrary, improves university education. The authors identified five categories of interactive

practices that generally reflect the peculiarities of this approach to education: 1) interaction with peers for personal development; 2) exchange of innovative teaching methods; 3) cooperative learning; 4) creation of educational artifacts; and 5) systematic development of education. It is stated that there is a need to develop formal educational communities in order to promote more comprehensive cooperation and develop a sense of personal commitment and responsibility (Katajavuori et al., 2019).

Issues related to the study of individual and group interactive learning were discussed in the works of H. Li. As a result of cognitive diagnostic analysis, when most of the students were performing the tasks individually, and only a small part of them were doing it in groups using the methods of interactive learning, it was found that the students of the second group were more successful in the matter of passing the exam after the end of the course (Li et al., 2020).

The urgency of the interactive education issue in connection with the need to develop a special way of thinking based on the problem cognitive activities, learning in a personalized environment, the introduction of innovations and tasks of automation, globalization and competitiveness, was studied by E. Soboleva and N. Karavaev in their works (Soboleva, Karavaev, 2020). The authors conclude that there is a need for interdisciplinary constructive forms of interactive activity supported by appropriate learning instruments and methods.

A number of researchers have worked to develop the concept of collaborative learning as a joint non-hierarchical creative practice based on partnership and collaboration, student agency, joint creation of values (Kaminskienė et al., 2020).

Technological aspects of interactive learning are also of great interest to researchers. In particular, they studied the peculiarities of interaction in the student-student, student-teacher and student-content systems using Facebook, Twitter, WeChat (Quadir et al., 2019); the Quizlet educational platform (Valeeva et al., 2019); elements of online education and visual literacy in teaching and learning (Hayden, 2019), and there are other works focusing on modern technology and its ability to shape a personalized learning environment.

#### 4. Deliverables

Today, the theory of education can distinguish three main models of education determined by the methodological principles and approaches used in the learning process. These are:

- passive model of education;
- pro-active model of education;
- interactive model of education (Table 1).

**Table 1.** Basic Learning Models (Methods) and Their Features

Learning methods	Main participant of educational process	Style of education	Position of students in the educational process	Form of interaction
passive	teacher	authoritative	passive participation	students are passive listeners
pro-active	teacher, student	democratic	pro-active participation	interaction of teacher with students
interactive	students	democratic	pro-active participation	interaction of teacher with students; interaction of students

As many years of personal experience in scientific and pedagogical work showed, it is the use of interactive teaching methods that increases the overall level of students' education, contributes to the development of necessary skills and abilities, including those related to the resolving of creative, non-standard problems, identification and analysis of complex research matters and others.

In a general sense, the main principle of the interactive model of education is the principle of direct communication, interaction and mutual influence of the educational process subjects, that is,

students, teachers, stakeholders and employers. It is the synergy of all of them that determines the essence of the interactive method of education, the ultimate goal of which is to train highly qualified specialists with a developed system of general competencies such as leadership, thinking skills, the ability to make decisions and other.

In this context, the thesis statement on the effective use of interactive teaching and learning methods for groups of students of different ages is confirmed. Its aim is to create a comfortable learning environment where everyone can unlock their potential of intellectual and emotional intelligence.

In this regard, it seems necessary to define the principles of interactive learning. We consider an activity to be such, understanding it as involvement of all students in joint work to achieve a common, team result. This principle directly defines the following, no less important part of interactive learning, that is, the principle of feedback that is demonstrated in pro-active forms of group work such as discussions, debates, brainstorming, etc.

The next principle is the experimentation of learning that implies a pro-active search for non-standard ideas and ways to solve problems and tasks. The case-study method and the project method are especially effective in this context.

The peculiarity of interactive forms of learning is that they are possible only in the context of cooperative education when there is a real opportunity for the student to act as a co-organizer, a co-participant of the educational process, expressing their vision and opinion on an equal basis with other participants of the educational process, to influence the decisions made. It takes place, in particular, at working out the curricula of educational and professional programs, shaping of the purposes and program training results when applicants for higher education (through bodies of student's self-government), stakeholders, degree-field graduates and teachers are involved in the process.

Unlike pro-active and passive models of education, where the teacher acts as a *source of knowledge*, an organizer, a supervisor, the interactive model teacher acts as a mentor, a facilitator. In this inherently democratic learning process, the student's role is most pro-active, combining different activities, making joint decisions, and sharing responsibility for them.

With this approach, the motivation system also changes. Its source is not as much a quantitative component (evaluation) as a qualitative one, expressed in the desire not only to obtain knowledge, but also to test it in practice in the real-life or simulated conditions. This is where such a factor as practice-oriented training is important, the training that takes into account trends and requirements of the labor market, and specific needs of stakeholders and employers.

The whole diversity of interactive learning methods can be classified in the following groups:

- group training methods (Joint Project, Information Search and Analysis, Gallery Walk, etc.);
- teamwork methods (Brainstorming, Situation Analysis, etc.);
- game methods (Public Hearings, Court Hearing and other role-playing games);
- training in discussion (debates, discussions).

Students discuss new material in the process of group training which allows them to comprehend and consolidate it in the memory more effectively. With this organization of work, students develop the skills of communication in groups, the ability to argue their opinion. They also develop skills of critical thinking, persuasion, and of defending their position. The skill of positive perception of criticism is equally important.

The teamwork method assumes simultaneous, joint, collective solution to the set task, excluding passive inactivity of some at the expense of the others' activity. Communicating in this mode, students do not only learn by contemplating the information, but they also teach others. The effectiveness of this method does not stop there, it is good in those situations when it is necessary to absorb quite a lot of information.

For this purpose, it is appropriate to use the game methods of learning through simulating the situations, which gives the opportunity to self-expression, develops the emotional intelligence of students.

Training in discussion shapes the skills of cooperation, respect for the opinion of others, the ability not only to talk, but also to listen. It also develops the quality of tolerance.

It is important to note that interactive learning complements a range of other teaching methods. It is one of the instruments to introduce innovation and diversity into the learning

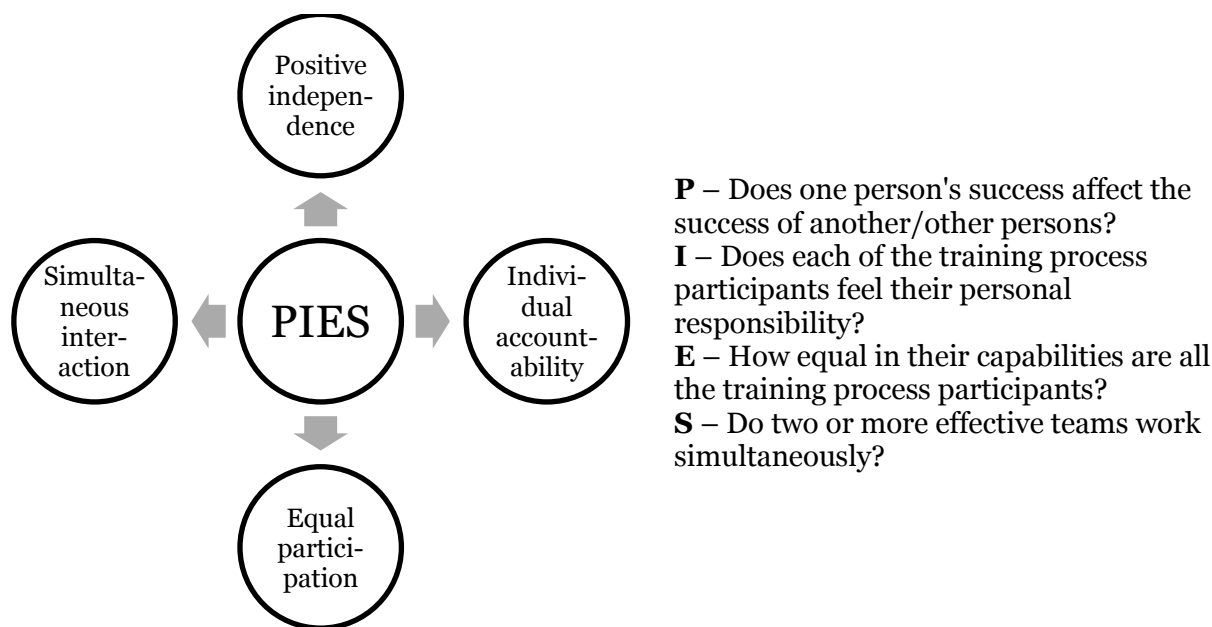
process. Practice shows that such learning brings good results not only in terms of acquisition of knowledge, but also in their practical use.

In order to use interactive methods effectively, the work of both the teacher and students should be systematically planned, in particular:

- use the methods appropriate to the age of students and their experience with interactive methods;
- select the tasks for preliminary preparation and subsequent independent performance;
- prepare ad hoc tasks, specific interactive exercises on specific topics;
- analyze and self-reflect both the tasks and exercises per se, as well as the methods of their resolving, and the results obtained.

It should be noted that the use of interactive learning methods can in no way be a goal in itself. It is only a means of building an atmosphere of cooperation, understanding and trust among the participants of the learning process. It is not worth looking for universal methods that are effective for all types of work, because no method is universal, its effectiveness determines its relevance, appropriateness of use, as well as functionality.

Based on that, we can build the PIES Matrix of Interaction for the cooperative learning (Figure 1).



**Fig. 1.** Matrix of Interaction

In the context of the above, we have performed a study devoted to the problem of perception and assessment of corporate education and its interactive forms among the Sumy State University engineering students. Our task was to establish these differences, based on gender differentiation of students.

We used the results of an online survey carried out with the participation of the Sumy State University students in the Google Forms platform. The total of 85 students took part in the survey, 48 males (56.5 %) and 37 females (43.5 %). The questionnaire contained questions concerning the students' general knowledge of the interactive forms of education, as well as specialized questions on specific methods.

In particular, 83.8 % of females and 70.8 % of males answered positively to the question whether students know the differences between pro-active and interactive learning. At the same time, 22.9 % of males and 35.1 % of females spoke about the high effectiveness of interactive methods in the learning process; 62.5 % and 59.5 % respectively mentioned their relative effectiveness. The number of negative evaluations for these groups was equal in quantitative terms,



within 2% of the total number of respondents, while 12.5% of respondents also found it difficult to answer this question, males exclusively.

Answers to the question on the benefits of using interactive learning methods look interesting (Table 2).

**Table 2.** Benefits of Interactive Forms and Methods of Learning

	Promotes learning pro-activeness, %	Promotes communication, discussions and the use of practical skills, %	Improves working climate, %	Acquisition of skills related to identifying a problem and finding a solution strategy, %	Control of educational process, identification of the strategic resources in learning, %
Females	16.2	70.3	2.7	8.1	2.7
Males	18.8	39.6	14.6	14.6	12.5

As we can see, the largest number of answers in both groups went to the first two positions that are most of all related to the communication component. Especially among females, for whom the interactive form of learning is directly related to the possibility of discussing problematic issues, and discussions. These results are also confirmed by the answers to another question on the questionnaire, which implied a choice from the list of methods that, in the opinion of respondents, could be classified as interactive. In their response to this question, 81.1 % of females considered group discussions to be such, while the majority of males (72.9 %) considered game-based learning methods to be such.

In some ways, this difference in attitude has also determined a more skeptical opinion among male respondents toward the methods of teaching in their groups. 70.8 % of respondents believe that interactive teaching methods account for only 1/3 of all courses read, while just over a half of the female audience has a similar view, and this was while all respondents were in the same department and class where the same teachers were teaching the same subjects.

In particular, among the reasons that, to a certain extent, prevent the introduction of interactive forms in the educational process, males named two main reasons among the other: mutual unpreparedness of students and teachers to the use of interactive technology of teaching, as well as the impact of the pandemic and the online teaching mode.

At the same time, answering the same question, the majority of females also pointed to the peculiarities of conducting classes under quarantine restrictions, but as opposed to males, to a greater extent, the ineffectiveness of interactive teaching methods was associated not with the personality of the teacher as such, but directly with the students themselves, their motivation, expectations, view of life, individual characteristics.

In this regard, we have set a goal to prove, using methods of mathematical statistics, that gender differences do not affect the level of perception and evaluation of the interactive education forms. In this context, we defined the observed and expected results of the students' sociological survey (Table 3, Table 4).

**Table 3.** Observed Results

	Females		Males	
	number of people	%	number of people	%
They know the core of the interactive learning	31	83,8	34	70,8
They consider it effective to use the interactive methods in education	35	94,6	41	85,4

**Table 4.** Expected Results

	Females		Males	
	observed results, number of people	expected results, number of people	observed results, number of people	expected results, number of people
They know the core of the interactive learning	31	30	34	34
They consider it effective to use the interactive methods in education	35	35	41	40

Based on the observed and expected results identified by us, an  $H_0$  null hypothesis was formulated where gender differences do not affect the overall level of perception and evaluation of interactive forms of learning.

Using the formula to calculate  $\chi^2$ ,

$$\chi_n^2 = \sum_{i=1}^n \frac{(O_i - E_i)^2}{E_i}$$

we obtained the following results: the  $\chi^2$  criterion value is 0.033; p-value=0.8558. The significance level of  $p > 0.05$ , and therefore, we can confirm the formulated null hypothesis where there is no dependence between belonging to a particular gender group and the attitude to interactive forms of learning, which is confirmed by our survey that showed a fairly high level of their support and confidence in their effectiveness in both groups (94.6% of females and 85.4% of males).

## 5. Conclusion

In general, noting the independence of gender differentiation and the overall level of perception and evaluation of interactive forms of learning, we can still state the fact of certain minor differences. Thus, for example, if we take those who do not distinguish between pro-active and interactive forms of learning, this indicator among females is twice lower than among males.

The male audience appeared to be more differentiated with respect to the effectiveness assessment of interactive forms of learning, where opinions were more or less evenly distributed across all the proposed response options, while the female audience in its absolute majority (70.3%) understands interactivity as formation and development of practical communication skills.

It is also important to note that the male part of respondents was more skeptical about the factors affecting the effectiveness of interactive forms of learning. They included both objective (conditions of learning, the teacher's personality, the availability of technical means, etc.) and subjective factors such as unwillingness to participate in the interactive activities, lack of motivation, passivity and other. While the female audience is more inclined to subjectify these factors, only occasionally naming the ineffectiveness of interactive forms of learning among other objective reasons.

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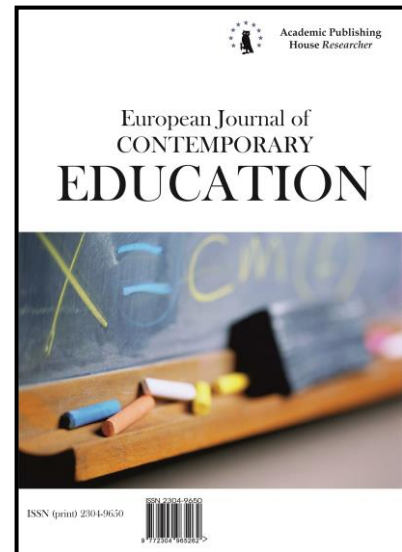
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## Information Technologies in Foreign Language Education

Anna L. Morozova <sup>a, \*</sup>, Yulia N. Byzina <sup>b</sup>, Kira V. Trostina <sup>b</sup>, Dzhamilya Kh. Godina <sup>b</sup>

<sup>a</sup> MGIMO University, Moscow, Russian Federation

<sup>b</sup> Plekhanov University of Economics, Moscow, Russian Federation

### Abstract

The authors consider the specifics and possibilities of applying information technologies during foreign language training in non-linguistic universities of Russia, especially in conditions of preventing the spread of a new coronavirus infection (Covid-19) in the Russian Federation at Moscow State Institute of International Relations University of the Ministry of Foreign Affairs of the Russian Federation and REU named after G.V. Plekhanov (Moscow) in 2018–2020 years (undergraduate and graduate levels). The foreign language e-learning practice is analyzed. The authors view: educational platforms (Google class, Moodle, MS Teams, Edmodo) that allow to organize off-line classes; conducting on-line classes by means of on-line conferences (Zoom, MS Teams, Google handout); usage of educational sites and applications, as well as sites (with duplicate applications) for assessment and creating tests and handouts that allow lectures to prepare for lessons, and students to improve their level of language proficiency. Authors present the experience of MGIMO and REU named after G.V. Plekhanov, where the professors of Foreign Languages Department No. 1 conduct a number of courses on their platforms on an ongoing basis using pedagogical and information technologies.

We briefly discuss the specifics of project method applying through the mentioned technologies and provide examples from the educational practice of MGIMO, for example, the "Readers' Conference", a teleconference, reports and other on-line video projects, which undoubtedly contribute to the development of educational motivation of students in studying English. It is proved that the use of information technology meets the requirements of the higher education standard and is aimed at achieving the stated results of training in the subject "Foreign Language".

**Keywords:** foreign language, foreign language e-learning, teaching, students, University, information technology, educational platforms, on-line conferences, educational sites and applications for free language learning.

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\* Corresponding author

E-mail addresses: [llgo4@yandex.ru](mailto:llgo4@yandex.ru) (A.L. Morozova), [buzinajulia@mail.ru](mailto:buzinajulia@mail.ru) (Yu.N. Byzina), [kiratrostina@mail.ru](mailto:kiratrostina@mail.ru) (K.V. Trostina), [dzhamilagodina@mail.ru](mailto:dzhamilagodina@mail.ru) (D.Kh. Godina)

## 1. Introduction

Creating of the informative and educational environment today is a prerequisite for the successful implementation of the current Federal State Standard for Higher Education (hereinafter – the Standard) and of accreditation requirements of the educational organization and the provisions of the Order of the Ministry of Education and Science of the Russian Federation of April 5, 2017 № 301 "On approval of the organization and implementation of educational activities on educational programs of higher education – bachelor's degree programs, specialist programs". It should be mentioned that several Russian scientists and scholars have paid special attention to that problem in their works (Krasnoryadtseva i dr., 2017; Sisoeva, 2006; Prishepa, 2016). Unfortunately, the number of scientific and pedagogical research and works on the use of information technologies in the implementation of foreign language education in non-linguistic universities are still insufficient (Blokhovtseva et al., 2016; Polat, 2005; Pyanzina, 2013). All this makes it necessary to introduce and use information technologies (Mamed, 2017) in the educational process of the higher education institution (Gromova, 2017; Yamenko, 2013), in particular, in the field of foreign language education (Legan, Yatsevich, 2014; Korenkova, 2017). Hereafter we analyze the practice of foreign language e-learning under Order No. 398 of the Ministry of Science and Higher Education of the Russian Federation dated March 14, 2020 "On the activities of organizations under the jurisdiction of the Ministry of Science and Higher Education of the Russian Federation in preventing the spread of a new coronavirus infection on the territory of the Russian Federation" at MGIMO and REU named after G.V. Plekhanov, Moscow and Moscow region, Russia.

The aim of the research is to study modern and actual tendencies and possibilities of application of information technologies in realization of foreign language education in the conditions of non-linguistic universities of Russia (at MGIMO and Plekhanov Russian State University of Economics, Russia).

## 2. Materials and methods

We used methods of statistical analysis while organizing piloting study where a total of 45 teachers and 275 students of 1-4 courses from MGIMO University and Plekhanov University of Economics (Russia) took part in 2018–2020 time period when our study was conducted. Students were divided into two groups: control (those whose studying was based on regular programs and they were not engaged into the pilot study) and pilot (those whose studying involved applying of information technologies in the presented way). To obtain experimental (pilot) results we used a modified methodology proposed by V.F. Soroka and G.V. Rubina.

While assessing the change in language proficiency (Table 2), we identified the efficiency coefficient ( $\eta$ ), fixed by the ratio of the number of correctly completed training tests in pilot groups to the arithmetic mean of the same tasks in control groups, i.e., the number of tasks in control groups (1):

$$\eta = \frac{x_p}{x_c}; \eta_p = \frac{\sum_{i=1}^m P_i}{N_p}; \eta_c = \frac{\sum_{i=1}^m P_i}{N_c} \quad (1)$$

(1) where: N – total number of students = N1 (Advanced) + N2 (Intermediate) + N3 (Pre-intermediate); Pi – number of correctly completed tests; p – maximum number of questions/training tasks.

Comparison the of the efficiency coefficient of changes in English level development ( $\eta$ ) in pilot and control groups allows to judge the success of the study.

To prove the statistical reliability of the obtained experimental results, we used the Khi-square  $\chi^2$  criterion (the total received data of the pilot study for critical values for 5 % (that is freedom degree 0.05), defined by the following formula (2):

$$x^2 = \sum_{i=1}^m \frac{(E - T)^2}{T},$$

where E – is the empirical frequency.

frequency; T – is the theoretical



The materials of the research are educational sites, educational platforms of “University of the Ministry of Foreign Affairs of the Russian Federation”, Odintsovo branch and FGBOU VO REU named after G.V. Plekhanov, free applications (Google classroom, etc.) and platforms (Moodle, MS Teams, Edmodo.com, etc.) for the distance foreign language learning implementation.

The study required the applying of a number of methods, in particular: integrated analysis of the reserved data to prove the effectiveness of applying of information technologies, the analysis of theoretical sources on the problem and multi-factor analysis, the study with subsequent generalization of the actual pedagogical experience were used to show the importance and current state of the problem of the application of information technologies in the process of teaching a foreign language; the analysis of educational and working programs in the discipline of "Foreign language" training direction: 38.03.01 Economics, 40.03.01 Jurisprudence, 45.03.02 Linguistics, 38.03.04 State Municipal Administration, 42.03.01 Advertising and public relations helped us to find out the ways of effective applying the technologies.

### **3. Discussion**

Nowadays the study of a foreign language with the use of information technologies seems to be relevant. Mastering a foreign language as a means of international communication, students of non-linguistic universities, as the developers of Federal State Educational Standards rightly believe, will contribute to their professional and personal development not only in the course of training in educational institutions of higher education, but also in the subsequent professional activity. However, experience shows that this is not fully implemented in the modern practice of language training of students of non-linguistic institutes/departments. The use of information technologies is aimed at covering this gap.

At present, pedagogical researchers and scholars have accumulated certain experience in the use of information and communication technologies and the Internet resources in teaching non-native languages, which proves the scientific significance of the proposed research. The methodological and theoretical basis of the proposed research was formed in the works of O.M. Krasnoryadtseva, L.A. Sysoeva, T.A. Prishepa et al., who considered the issues of theory and practice of using information technologies in modern education (Krasnoryadtseva et al., 2017; Sysoeva, 2019; Prishepa, 2016). O.M. Krasnoryadtseva studied digital problems of educational interaction (Krasnoryadtseva i dr., 2017). L.A. Sysoeva constructed the architectural model for electronic information-educational environment of the university to implement the requirements of federal state educational standards of higher education (Sysoeva, 2019). While T.A. Prishepa viewed the contextual learning for the development of jobs in the information-educational environments (Prishepa, 2016). Besides, we consider prospects of distance learning development in Russia (Blokhovtseva et al., 2016).

These authors rightly raised the problem of the importance of modern distance e-learning and information security of the involved students. Actually the methodological peculiarities of building learning tools using the components of the teaching material in electronic form were studied by E.S. Polat, E.P. Pyanzina, M.A. Mamed who devoted their works to a more detailed study of these problems of distance learning and lecturers' competence in this field (Polat, 2005; Pyanzina, 2013; Mamed, 2017). There is also a problem of the design engagement of distance learning models and electronic textbooks (Gromova, 2017; Yamenko, 2013; Legan, Yatsevich, 2014). Information technologies applying in the foreign language education on regular basis demands various software systems implementing (Korenkova, 2017; Sazonova, 2017; Ter-Minasova, 2002). Thus, domestic scholars are concerned not only about the prospects of the distance learning development in general but also about a number of methodological aspects of its implementation (i.e. the tasks, used models of learning and their effectiveness, the creation of adequate electronic textbooks and courses, funds of evaluation tools, etc.) which was taken into account by us while organizing the study.

In this study, we also rely on the practical experience of foreign scientists and scholars on the problem. A more subject-oriented study of the potential of the personality-centered approach in the use of information technologies in education is revealed in the works of N. AlKirima, N. Ruibach, M.A. Serhani, K. Tarkhini, Farfan, J.M. Fernandez-Caballero, A. Hallermo and others (Al-Qirimet et al., 2018; Gascueña, Fernández-Caballero, 2005; Guillermo, 2013). We support A. Casper, A.G. Thompson, A.H. Weasley, J.M. Fernandez-Caballero, who analyzed private

questions of information technologies usage when working with the audience (Kasper, 2012; Thompson et al., 2014; Xiaojing et al., 2011). A. Bosedé, M.A. Gaschuena, Neli, V.R. Rivas, A.R. Yamahi discussed the specifics and prospects of educational platforms and sites usage, as well as the ways of students' knowledge evaluating by IT means (Yun-Jo et al., 2009; Bambang et al., 2011; Rivas, 2002).

However, while applying of information technologies in the foreign language education and evaluating the obtained results we should consider the following limitations: time consumption, quantitative and spatial limitations, as well as other terms of educational programs covering. This research is believed to be an attempt to reveal the basic scientific approaches to solving the problem under study and, based on the results of theoretical analysis and experimental work, to outline ways to its further solvation.

#### 4. Results

Today a special attention is paid by teachers and scholars to the following possibilities of Internet resources usage while teaching a foreign language to students of non-linguistic areas of training. Moreover, the use of the methodological potential of the information and materials presented on educational websites and platforms allows teachers to achieve the goal of teaching a foreign language in the university, stated in the Standard and program of the academic discipline, namely, the development of the foreign language communication competence of students. The results of distance learning during COVID-19 at MGIMO and in conditions of implementation of the above-mentioned Order of the Ministry of Science and Higher Education of the Russian Federation dated March 14, 2020 № 398 can be found at <https://odin.mgimo.ru/news/3200-lingvisty-izuchayut-mezhkulturnuyu-kommunikatsiyu>

The practical value of the study lies in the development, implementation and piloting of scientific and methodological recommendations on foreign language e-learning and using of other information technologies that include the creation of Internet classes, online English-level assessment, etc. aimed at improving language skills. The presented materials could be used by lecturers in other higher education institutions at different stages of foreign language learning, including specialized faculties, in the following areas: philologist, linguist, translator, foreign language teacher, as well as at advanced training courses for lecturers of schools and university lecturers.

Teaching practice shows that today, especially with the introduction of generalized temporary quarantine due to the spread of a new coronavirus infection, it is possible to use information technologies in the following four directions (see Table 1), including distance language learning, which contributes to the above stated goal of language learning.

**Table 1.** Information technologies in foreign language education

Information technologies in foreign language education. directions of implementation			
1. Educational platforms	2. On-line conferences	3. Educational sites and applications for free language learning	4. Sites (with duplicate applications) for test creation; assessment and evaluation
The purpose of the e-resource is to achieve learning outcomes according to the Standard and program = development of foreign language communication competences.			
Specifics of training process implementation			
1. Off-line e-training: organizing independent work, working in remote classes,	2. Live language communication with students (frontal and group/pair work), organize	3. Organization of independent work, finding additional material on the studied topic	4. Assessment with the possibility of viewing and analyzing the results (feedback).

etc.	discussions, dialogues, etc.		
Outcome: Reaching the teaching goal according to the Standard and program of the discipline "Foreign language"			

Further, it seems logical to study the current practice and experience in the application of information technologies in language education in the framework of the pilot study at MGIMO and Plekhanov Russian State University of Economics in detail. Further we are going to consider the directions of application of information technologies declared in the Table1 in more details:

1. Educational platforms Moodle, Edmodo, MS Teams, Google classroom, etc., allow lecturers to create and conduct remote lessons in off-line e-learning mode. MGIMO organized a number of Google and Edmodo classes according to the number of study groups in the department during COVID-19. The Plekhanov Russian State University of Economics conducts a number of courses on its platforms, also on a permanent basis and during COVID-19.

Turning to the experience of using of the following educational platforms Moodle, Edmodo, MS Teams, Google classroom in the process of foreign language e-learning during COVID-19, we should mention that the English Department of MGIMO has organized a number of Google classes (according to the number of study groups and the directions of training), for example, the access code (from corporate mail) 6hcdyrh, bk74rx, hferter, etc. and on the site Edmodo.com (access by invitation, no corporate mail required): ryyrpd, dp5uhh, 8rqs6e and others. Lecturers have created e-classes with tasks for students to perform on these platforms. The tasks include not only reading and evaluation (with feedback), but also discussion of topics through writing comments and attaching files. In other words, the use of these platforms allows to improve all types of speech, except speaking on the spot, within the framework of the realization of program requirements and the achievement of the goal of language learning. In addition, MGIMO students had the opportunity, as part of the on-line "Reader's Conference", to put a video in the classroom, where they presented, according to a predetermined plan, a story (monological speech) about the book they have read (link: <https://classroom.google.com/u/3/c/NTQxMDkzNTk2ODZa/a/NTQxMDkzNTk2OTRa/submissions/by-status/and-sort-name/done> access by invitation). After that, the whole class had an opportunity to discuss all the books by adding comments, and later there was an on-line zoom conference in this direction.

In this vein, it is also important to note the current teaching experience of the Plekhanov Russian Economic University, where the Department of Foreign Language No. 1 conducts a number of courses on its platforms on a permanent basis and during COVID-19 as well. In 2019, an experimental educational platform with the use of pedagogical and information technologies was introduced (Link <https://www.rea.ru/ru/org/cathedries/in-yaz1kaf/Pages/studymaterials.aspx> access by invitation). The staff of the Chair allocated architectural and structural solutions, which were provided with the application of existing open (patent free) standards for interfaces, formats and protocols of information exchange in order to ensure mobility, interoperability, stability, efficiency and ease of use. The purpose of the research conducted by the Department of Foreign Language No. 1 is to improve the language training of students through e-learning in the framework of the working program and the current standards. The e-class was attended by students of the first (50 people) and second (70 students) courses of the Marketing Faculty of REU named after G. V. Plekhanov (direction of training 42.03.01 Advertising and Public Relations, bachelor's level), who were trained in remote mode on the platform of the Institute. It should be mentioned that the organization of distance courses at this Institute includes the following stages: identification of students' readiness, definition of a set of educational programs of different levels in one professional field; integration of information into student groups and organization of students' independent work. The pedagogical scenario of the course at REU named after G.V. Plekhanov includes theoretical (video lectures) and practical (forum, tests) parts.

2. In order to implement the on-line lessons and develop the foreign language communication competence of the students, Zoom conferences, Google hangouts meet, <https://meet.jit.si/>, Skype, MS Teams, etc. are also used (Al-Qirimet et al., 2018; Gascueña, Fernández-Caballero, 2005; Korenkova, 2017; Gromova, 2017). Online conferences are primarily aimed at improving speaking and listening skills. Practice shows that the majority of students

(about 75 %) are actively interested in such on-line classes, but at the same time about 25 % of students have some emotional difficulties due to shyness. Moreover, Zoom allows putting conference participants into session halls, which help teachers to organize classes not only in the front, but also in a group mode. Thus on 26.03.20 the MGIMO Department of Linguistics organized an on-line zoom conference with a professor from the Monterey Institute (California, USA, Conference ID zoom: 174 283 050), when MGIMO students and lecturers had a chance to discuss the current topical and global problem of coronavirus distribution, which caused a lively response among students. Such conferences are sure to be held in future.

3. Proceeding to free foreign language e-learning educational websites and applications we should admit that they help to improve the students' English level, as they are rich in teaching materials/handouts for their self-study and for the teaching staff when preparing for classes. Many educational sites provide free opportunity to download, evaluate and discuss materials and handouts. Also, a number of sites and applications involve live and remote communication with native speakers, etc., which creates a natural language environment and improves language skills.

Also teachers can pre-select some free authentic materials/handouts to work on the topic under study as follows: download audio recording and develop or use the various tasks available on the site for listening; organize an oral discussion of a problem using authentic materials (discussion, conversation, etc.); conduct linguistic analysis of messages, statements of native speakers, containing phrases, linguistic and culturological rhetoric.

We support S.G. Ter-Minasova (Ter-Minasova, 2002) and believe that the information, presented on these sites, can be adapted to various innovative methods of teaching, for instance: case method, project, etc. We would like to highlight the project method and possibilities of its application during foreign language teaching by means of information technologies at MGIMO. This problem has been studied in detail by such professors as E.S. Polat, T.A. Prishepa, A.S. Sidenko, E.U. Collings, I.D. Chechel and others (Prishepa, 2016; Polat, 2005). However, due to objective circumstances (including the reality of time and COVID-19) they did not consider the possibility of usage of information technologies when applying project method in foreign language teaching of students of non-linguistic areas of training.

Today the project activity of the students is an obligatory component of the educational process in the conditions of the Federal standard of higher education implementation, that is why it is possible to point out that the use of the studied technologies in the process of e-teaching of the subject "Foreign language" allows to outline the following types of projects:

- by the dominant type of activity, there can be research, creative projects (reflecting the main aspects studied in the lessons), information projects (for example, analysis of literature on a problem and making power point presentations), applied projects, etc. Thus, in 2019 the English Department of MGIMO successfully organized the projects competition "MGIMO-Project Day" (link to the event: <https://odin.mgimo.ru/news/2788-mgimo-project-day>), when second year students presented their projects in a foreign language (ESP aspect);

- monoprojects and interprojects are distinguished by their subject content. Inter-subject projects seem to have great educational value because they are aimed at solving a variety of different learning problems, which contribute to the learning motivation development;

- by the number of participants (organizers) of a project. There are individual, paired and group projects. Such projects are very valuable because they teach students to communicate, negotiate and overcome difficulties. Moreover, in case of contradictions between the project participants, students have an excellent opportunity to improve their mediation skills in a foreign language.

Thus, the accumulated pedagogical experience convincingly proves that the project activities carried out by e-learning means appear to be the optimal environment for achieving the results in the subject indicated in the federal standard.

4. Assessment with the possibility of getting feedback (Bambang et al., 2011; Rivas, 2002). Websites (with applications) for creating tests, for example: Google forms, Quizlet.com (link: <https://quizlet.com/class/13669050/>), kahoot.com (link: [https://kahoot.it/challenge/0985119?challenge-id=fd4b721e-76a0-469a-9ba4-a8ba9f19826b\\_1584476985868](https://kahoot.it/challenge/0985119?challenge-id=fd4b721e-76a0-469a-9ba4-a8ba9f19826b_1584476985868)), etc. play an important role in e-assessment and evaluation of the current English level. We admit that the use of IT as part of assessment tools is an important and relevant aspect of implementing educational standards. MGIMO regularly organizes current and interim assessments through the use of information technology,



when rating tests as part of a credit or examination are conducted on-line (see link: <http://ed.odin.mgimo.ru/sdo.php> password access).

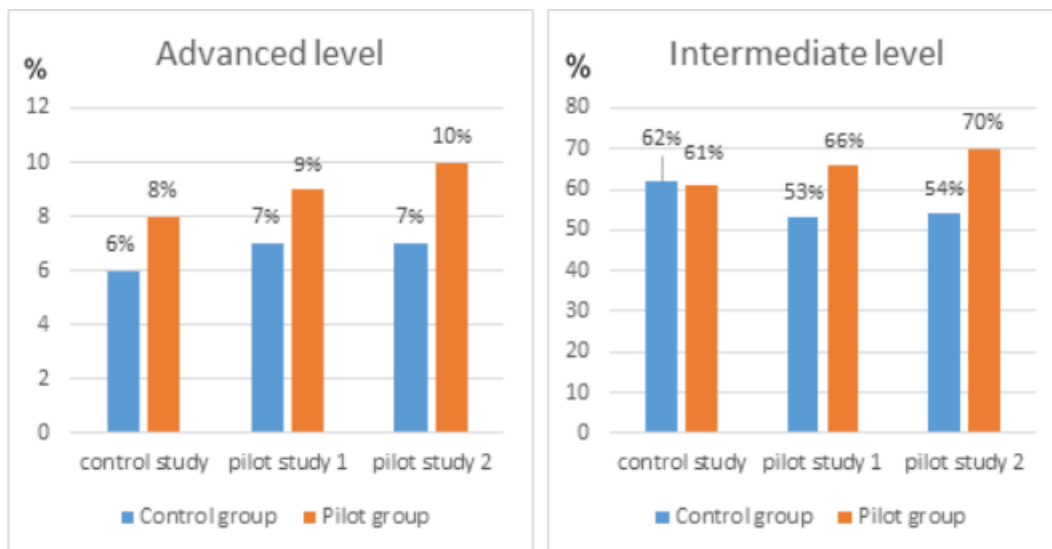
Therefore, the use of information presented on the Internet resources allows the teachers not only to improve students' foreign language communication competence but also to develop their motivation to learn a foreign language. Finally, the material presented on the websites can be selected according to the training direction and adapted to a variety of innovative teaching methods and current needs of learners.

However, the e-learning is not free from some drawbacks, which we'll describe briefly further. As teaching practice and experience has shown, lecturers and students may face the following problems: the presence of a number of technical problems with both technology and Internet access; there are certain difficulties and misunderstandings with the rules/specifics of the use of information technology, when not all participants of the educational process have sufficient experience in using educational sites, in conducting and organizing online conferences, offline pairs and in creating tasks, etc.

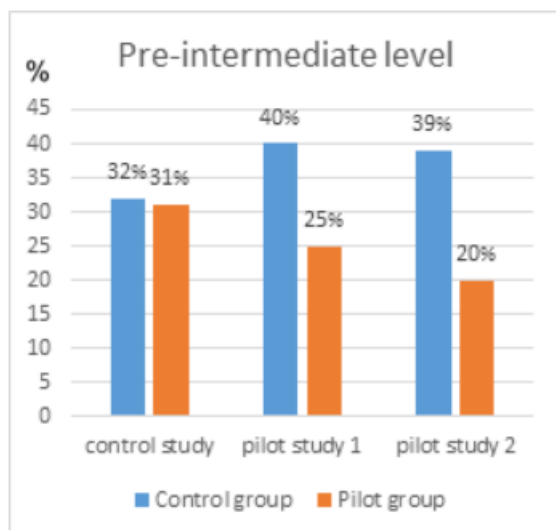
Hence, here are the results of applying of information technologies in the foreign language education on regular basis and during pandemic COVID-19 at MGIMO and Plekhanov University of Economics, Russia.

In order to differentiate students by the level of language proficiency during e-learning, we have compiled an appropriate grading scale including advanced, intermediate and pre-intermediate levels. The dynamics of changes in these levels is shown in the [Figure 1](#) below.

The data presented in the figure proves that systematic work with the students of the pilot groups improved the level of language proficiency during e-learning. We fixed an increase in the advanced level of language proficiency – from 6 % (according to the results of the control study) to 10 % (according to the results of the 2nd stage of the pilot study) and the corresponding increase in the intermediate level – from 61 % to 70 %; moreover, a decrease in the pre-intermediate level – from 32 % to 20 % according to the results of the II stage of the pilot study at MGIMO and REU named after G.V. Plekhanov, Moscow and Moscow region, Russia.







**Fig. 1.** Dynamics of advanced, intermediate and pre- intermediate of language proficiency in the course of e-learning at different stages of pilot study

In order to identify the coefficient of change in the English level of the students of the Plekhanov Russian Economic University and MGIMO in the course of implementation of the Table “Information technologies in the implementation of language education” developed by us, we used a modified methodology proposed by V.F. Soroka and G.V. Rubina in "Information technologies in professional training of University students" (see [Table 2](#)).

**Table 2.** Changes in the English level of students of the Plekhanov Russian Economic University and Moscow State Institute of International Relations during the implementation of information technology in the implementation of language education

№	Language levels	Summative study				Pilot study			
		G.V. Plekhanov		Moscow State Institute of International Relations		G.V. Plekhanov		Moscow State Institute of International Relations	
		C*	P*	C*	P*	C*	P*	C*	P*
1	Pre-intermediate	0,7	0,9	0,7	0,7	1,1	1,9	1,0	1,7
2	Intermediate	0.9	0.8	0.9	0.8	1.0	1.7	1.0	1.8
3	Advanced	1.0	0.7	0.8	0.9	1.0	1.8	1.1	1.8

\* C – control group P – pilot group \*

To assess the change in language proficiency ([Table 2](#)), we identified the efficiency coefficient ( $\eta$ , formula 1), fixed by the ratio of the number of correctly completed training tests in pilot groups to the arithmetic mean of the same tasks in control groups, i.e., the number of tasks in control groups (formula 1). According to the calculations of the sample (see [Table 2](#)) we got the following the results of the study. So, we obtained a value of  $\eta = 1.7$  in the pilot groups, compared with  $\eta = 1.0$  in the control groups, while at the starting stage, both groups recorded  $\eta = 0.9$ . Characteristic of the efficiency coefficient of changes in the English level development ( $\eta > 1$ ) allows us to admit the effectiveness of the information technologies in the foreign language teaching.

To prove the statistical reliability of the obtained experimental results, we used the Chi-square  $\chi^2$  criterion, defined by the formula (2). The proposed method is to evaluate the difference in distributions of empirical and theoretical frequencies in order to compare the number of students who have improved their level of language proficiency with those who have remained

unchanged (Tables 3, 4, 5). Table 3 shows that the level of empirical frequencies in the experimental group is higher than in the control group.

**Table 3.** Empirical frequencies

Groups	Findings (students)		Total
	language proficiency has improved	language proficiency has not improved	
Pilot	19	8	27
Control	6	21	27
Total	25	29	54

Table 4 shows calculations of theoretical frequencies using this method.

**Table 4** Theoretical frequencies

Groups	Findings (students)		Total
	language proficiency has improved	language proficiency has not improved	
Pilot	$\frac{25 \times 27}{54} = 12,5$	$\frac{29 \times 27}{54} = 14,5$	27
Control	$\frac{25 \times 27}{54} = 12,5$	$\frac{29 \times 27}{54} = 14,5$	27
Total	25	29	54

Comparison and conversion of empirical and theoretical frequencies allowed us to obtain the following data (Table 5).

**Table 5.** Calculation table  $\chi^2$

Groups	E	T	(E-T)	(E-T) <sup>2</sup>	$\frac{(E-T)^2}{T}$
Pilot (language proficiency has improved)	19	12,5	6,5	42,25	3,67
Pilot (language proficiency has not improved)	8	14,5	- 6,5	42,25	3,13
Control (language proficiency has improved)	6	12,5	- 6,5	42,25	3,67
Pilot (language proficiency has not improved)	21	14,5	6,5	42,25	3,13
					$\sum_{i=1}^m$ 13,6

Thus, we got  $t = 13.6 > = 12.6$  (see Table 4), so the null hypothesis is disproved at a high level of significance ( $P < 0.05$ , number of degrees of freedom 6). This allows us to admit that the difference in the frequency of the pilot and control series is the result of purposeful activity.

To study students' readiness and intention to use the opportunities of a foreign language knowledge, including after e-learning, we conducted a survey, the results of which are presented in Table 3.

**Table 3.** Students' readiness and intention to use the opportunities of a foreign language knowledge, in % ratio

Future opportunities of foreign language usage	Pilot groups		Control groups	
	Moscow State Institute of International Relations	G.V. Plekhanov	Moscow State Institute of International Relations	G.V. Plekhanov
Reading/browsing professional literature in a foreign language	51	46	12	5
Reading professionally oriented literature/Internet sites in a foreign language	36	29	7	-
Learning a language through distance education	17	12	4	2
Independent study of a foreign language	38	27	6	13
Participation in professional Internet forums	41	34	7	5
Establishing/maintaining contacts with foreign students abroad	53	46	10	11
Travelling abroad for study purposes	35	35	10	9
Participating in scientific events in remote format in language	37	39	15	12
Organizing of online meetings in a language of interest	16	19	-	-

\* The data in cells of Table 2 are presented in % ratio of the total number of students who participated in the pilot study.

The data of Table 2 prove the fact that systematic work with students allowed us to state the efficiency of information technologies used by us in the implementation of language education, as they contribute to the formation of readiness to use the opportunities of a foreign language in their future life, including in the conditions of expected professional activity.

### 5. Conclusion

Nowadays information technologies are being actively introduced in the educational process of modern universities as well as in foreign language education. Practice of MGIMO and REU named after G.V. Plekhanov proves that today, especially during the pandemic, it is possible to use information technologies at training as following: educational platforms allow to organize off-line e-classes; conducting classes in a real mode by means of on-line conferences; free educational sites and applications where teachers can create tests, handouts and use them for assessment and evaluation.

The use of information technology undoubtedly generates a lively response among students and increases their learning motivation. The use of information technology can help to improve students' language skills. However, with the forced 100 % shifting to distance learning due to the pandemic mentioned above, all students have expressed the desire to return to traditional face-to-face education with the partial use of information technologies, which cannot but please the lecturers. Thus, information technologies have quite a rich potential in foreign language learning, and its usage is aimed at achieving the goal of language teaching in general.

The authors do not claim to provide an exhaustive solution to the issues identified in the paper. This research is considered by us as an attempt to reveal the main scientific approaches to solving of the problem of improving language training, based on the results of theoretical analysis and pilot study, to outline ways to further solution of this problem in higher professional education.

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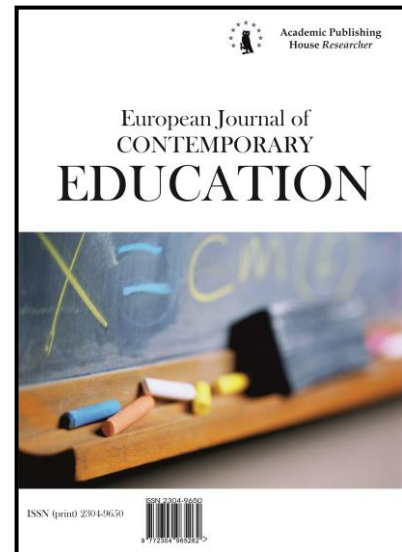
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## Manifestations of Giftedness in Senior Preschoolers and Their Interest in Professions

Irina A. Mushkina <sup>a,\*</sup>, Ol'ga A. Mikhal'kova <sup>a</sup>, Oksana P. Sadilova <sup>a</sup>, Anna L. Khovyakova <sup>a</sup>

<sup>a</sup> Sochi State University, Russian Federation

### Abstract

This paper outlines the findings from an integrated diagnostic assessment of manifestations of giftedness in senior preschoolers and their interest in professions. The authors investigated the relationship between manifestations of a certain type of giftedness in children and their interest in a certain group of professions. The assessment of manifestations of giftedness was conducted based on a methodology developed by A.I. Savenkov. This methodology helps assess the presence of traits of the following 10 major types of giftedness: intellectual, creative, academic, pictorial, musical, literary, performing, technical, leadership, and sporting. The study of interest in professions was conducted based on E.A. Klimov's Differential-Diagnostic Questionnaire, which had been adapted for preschoolers. The study helped draw the following conclusions: (1) based on pedagogue and parent reports, the type of giftedness that is detected most often in senior preschoolers is the pictorial type, followed by sporting giftedness, and then leadership giftedness; (2) parent assessments of manifestations of giftedness in their children tend to be significantly higher than teacher assessments when it comes to pictorial, musical, literary, leadership, and sporting giftedness; (3) the number of preschoolers with multiple manifestations of giftedness (a high level on three or more types) is significantly larger than the number of preschoolers with manifestations of one-to-two types of giftedness; (4) gifted children tend to have a clear-cut interest in a certain group of professions; (5) there is a significant correlation (at the 0.01 level based on the Pearson correlation coefficient) between leadership giftedness (teacher assessments) and interest in professions within the 'Man – Man' group, between academic giftedness (teacher assessments) and interest in the 'Man – Technology' group of professions, and between creative giftedness (parent assessments) and interest in the 'Man – Technology' group of professions. The results could be utilized in implementing efforts to provide pedagogical support for and early vocational guidance to gifted children in kindergartens and institutions of supplementary learning for preschoolers.

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\* Corresponding author

E-mail addresses: [mia-1609@mail.ru](mailto:mia-1609@mail.ru) (I.A. Mushkina), [mihalkova\\_olga67@mail.ru](mailto:mihalkova_olga67@mail.ru) (O.A. Mikhal'kova), [sadilova.op@yandex.ru](mailto:sadilova.op@yandex.ru) (O.P. Sadilova), [khovyakova@yandex.ru](mailto:khovyakova@yandex.ru) (A.L. Khovyakova)

**Keywords:** senior preschoolers, manifestations of giftedness in preschoolers, preschoolers' interest in groups of professions, diagnostic assessment of manifestations of giftedness and interest in professions, relationship between a certain type of giftedness and one's interest in a group of professions.

### 1. Introduction

A strategic objective that is helping ensure the development of Russia's intellectual potential is identifying and supporting gifted and talented children. This goal has found reflection in the national project 'Education', more specifically the following objective set out by the federal project 'The Success of Each Child' – "building an effective system for identifying, supporting, and developing the abilities and talents of children and youth that is founded on principles of fairness and universality and is aimed at the self-determination and vocational orientation of all students" (Pasport..., 2019).

Gifted and talented children are the object of special care in most regional education systems – in particular, that of Krasnodar Krai (Zakon..., 2006).

Gifted children ought to be identified and vocational guidance and psychological-pedagogical support ought to be provided for them starting from preschool age, which has to do with a child's creative and cognitive activity peaking at senior preschool age and diminishing to a degree by school age. When children enter school, their activity tends to be increasingly regularized and adjusted to common norms, rules, and templates, which may very well cancel out manifestations of giftedness in them. It is also already late to begin providing the child with early vocational guidance at school, as during the period of preschool childhood a lack in the preschool educational institution and the family of pedagogical conditions required for successful early vocational guidance may result in the development in many children of unconstructive beliefs about the importance of work ("it's just a way to earn some money"), a negative attitude toward certain professions (mostly blue-collar jobs, many of which are always in demand in the region) and toward work in general (as something boring), unproductive models of participation in labor activity (inability to get satisfaction from work, work in an industrious and passionate manner, achieve the desired results patiently, take responsibility for the results, and work as part of a team), and a lack of confidence in their ability to perform various job tasks.

Identifying and supporting giftedness is, above all, necessary because it will enable a gifted child to employ their giftedness as much as possible in professional activity, with maximum benefit for society and with maximum personal satisfaction. However, at present the practice of preschool education is characterized by a number of issues in the areas of identifying gifted children, supporting them, and providing them with vocational guidance early on, which include the following:

- based on the findings from the authors' survey, 71.4 % of all kindergartens are not conducting any purposeful work on identifying and supporting gifted preschoolers, with this type of work mainly conducted by institutions of supplementary learning for children, which, obviously, cannot reach as many gifted children as kindergartens possibly could;

- most preschool institutions (66 %) identify giftedness without the use of psychodiagnostic methodologies that have been tested by researchers – mainly through observation by pedagogues during the process of interacting with children and through analysis of the outcomes of their activity, which does not make it possible to identify many hidden attributes and types of giftedness and increases the risk of non-objective results from diagnostic assessments;

- most preschool institutions do not differentiate the types of giftedness in children, maintaining that at preschool age only signs of general giftedness can be detected. This kind of approach increases the risk that a child will be left out of the circle of gifted children who are head and shoulders above their peers in practical types of activity (crafts, culinary arts, and other types of physical labor), in spiritual-moral development (being deeply sensitive to others' emotions and moods; being more empathic and compassionate than others), in sports, and in business (i.e. children with practical, sporting, leadership, social, and spiritual-moral giftedness);

- pedagogues and parents do not always link the development of giftedness in preschoolers with the child's interest in a certain group of professions. As a result, there may ensue the following two outcomes: (1) the parents may impose on the child a giftedness development scenario of their own, which may not match the child's interests; (2) giftedness may manifest in asocial forms

(e.g., stealing as an adolescent) if it is not channeled into an activity that the child enjoys, something that may potentially be associated with a future profession;

– in certain cases, the development of giftedness is not combined with the moral nurturing of the child, with giftedness being all the child's parents care about, which may result in the child turning into a selfish person;

– pedagogues and parents are not providing gifted children with assistance in resolving communication, socialization, and school adaptation issues that often face such children (Ratner, Gubaidullina, 2014; Wright-Scott, 2018); such issues may get worse and hinder self-actualization.

To help resolve the above issues in a more productive manner, the authors conducted a study of manifestations of giftedness and interest in professions in senior preschoolers and, based on the findings, formulated a set of practical recommendations on working with gifted and talented children for pedagogues in institutions of preschool learning. This paper shares the results from the authors' study and outlines the proposed practical recommendations.

## **2. Discussion**

Identifying gifted children and providing them with psychological, pedagogical, and social support may be viewed as a topical subject of domestic (Belova, 2016; Bogoyavlenskaya, Bogoyavlenskaya, 2013; Il'in, 2009; Shadrikov, 1986; Shcheblanova, 2016; Yurkevich, 1996 et al.) and foreign (Dullaghan, 2012; Harrison, 2004; Jackson, 2003 et al.) pedagogical and psychological research, comparable in significance with resolving environmental issues and issues related to the implementation of cutting-edge digital and information technology. Researchers have explored preconditions for and signs of giftedness, its types, ways to identify and develop it, and ways to support gifted children and have developed various models and programs for identifying and supporting gifted children.

At present, psychology and pedagogy offer numerous theories of giftedness and over 130 definitions of the term, which leaves the phenomenon open to a wide range of possible interpretations. Scholar J. Smedsrud has suggested that the concept of giftedness is too multifaceted to try and provide insight into just using a couple of definitions (Smedsrud, 2020).

The authors' analysis helped identify the following three key characteristics of giftedness:

– one or several abilities in a child being distinguished by increased levels of development or one or several spheres of personality in a child being distinguished by considerable advancement when matched against generally accepted norms and compared with the child's peers (Cukierkorn et al., 2008; Panov, 2001; Teplov, 2009). For instance, researcher V.I. Panov views as the kernel of the phenomenon of giftedness in children high levels of development of one or several abilities in them based on which they develop the ability to achieve high results in socially significant types of activity (Panov, 2001);

– there being a link with activity, which suggests the possibility of fostering giftedness through engaging the child in the various socially significant types of activity that are aligned with the child's type of giftedness, including vocationally-oriented activity. For instance, B.M. Teplov describes this concept as “a fundamentally original combination of abilities that the possibility of achieving success in performing the various types of activity is dependent on” (Teplov, 2009);

– there being early manifestations, which is testimony to the need to identify and support giftedness starting from preschool age: “Gifted children are individuals whose capacity and proclivity for a certain type of activity are discovered early on in life” (Pedagogicheskaya entsiklopediya, 1991).

To various scholars, giftedness can be reduced to academic giftedness (advanced development of the cognitive sphere of personality and intellect, high IQ test results, and high academic progress) (Browder, 2010) or to general giftedness (high levels of creative ability, which determine the person's high achievements in various types of activity). The American Association for Gifted Children (AAGC) provides the following definition of giftedness: “Gifted children are those who show extraordinary abilities in one or more of the following fields: intelligence, academic performance, creative and productive thinking, communication, and leadership ability”. There are foreign researchers (Laurie, Sharp, 2015; Olszewski-Kubilius, 2003; Nakano et al, 2016; Perleth et al., 2000; Sharp, Clemmer, 2015 et al.) who differentiate between gifted and talented children. Children with advanced artistic and motor abilities are not subsumed under gifted children and are included in the category of talented children instead.

The authors follow a broader understanding of giftedness, including in this category children with advanced abilities in various types of activity – both intellectual and creative (pictorial, musical, literary, performing, and constructing giftedness), sporting (sporting giftedness), practical (giftedness in crafts and physical types of labor), social (emotional, social, and spiritual-practical giftedness, when the person is distinguished by increased emotional responsiveness and advanced development of the spiritual-moral sphere), administrative (leadership giftedness), and business (entrepreneurial giftedness). This view is shared by scholars F.N. Kozyrev (Kozyrev, 2013), M.M. Piechowski (Piechowski, 1992), A.I. Savenkov (Savenkov, 2016), and others. This kind of approach makes it possible to fulfill the concept of humanistic treatment of a person, without focusing attention only on academic abilities and, accordingly, intellectual giftedness, which is in alignment with the latest standards, predicated on the competency-based approach (Federal'nyi..., 2013).

Some researchers are of the view that it is possible to identify and develop giftedness via engaging children in the types of activity that are related to the type of their giftedness. Other scholars (Gilford, 1995; Teplov, 2009; Thurstone, Thurstone, 1941 et al.) believe that it is possible to identify and develop giftedness via engaging children in creative activity that is not related to their abilities and type of giftedness. This idea is what J.P. Guilford's test is based on (Gilford, 1995). The position is expressed in L.L. Thurstone's multifactor theory of intelligence (Thurstone, Thurstone, 1941).

The authors are of the view that, taking into account the asynchronous nature of the development of the various spheres of personality at preschool age (Silverman, 2012), it is important to not just identify manifestations of general giftedness in a preschooler but also determine which sphere of personality and which abilities in them are characterized by increased, advanced development and try to engage them in the types of activity that match those abilities and the corresponding type of giftedness.

### **3. Materials and methods**

The authors surveyed pedagogues and content specialists in preschool institutions in the city of Sochi (Russia) and conducted an integrated study of manifestations of the various types of giftedness in senior preschoolers and their relationships with one's interest in a certain group of professions.

The survey engaged pedagogues and content specialists in 10 preschool educational institutions in the city of Sochi: five kindergartens (Kindergarten No. 50, Kindergarten No. 84, Kindergarten No. 106, Kindergarten No. 109, and Sochi Kindergarten) and five centers of supplementary learning for preschoolers. The questionnaire included 12 questions aimed at establishing whether the facilities practice identifying and supporting gifted children; what methods they use to identify manifestations of giftedness in preschoolers; what types of giftedness they identify and develop in their educatees; what problems they face in identifying and supporting gifted children; whether they are interested in working with universities in this context.

The study of manifestations of the various types of giftedness in senior preschoolers and their relationship with one's interest in a certain group of professions engaged 80 children (ages 6-7) attending a preschool program and 80 parents of those children. The choice of this particular age group of preschoolers was associated with that, based on the findings from research studies conducted by several prominent psychologists (D.B. El'konin, L.S. Vygotsky, S.I. Rubinstein, V.S. Mukhina, N.A. Gordeeva, L.V. Kashcheeva, and J. Piaget), preschool age is characterized as an especially significant period for the formation of personality traits in a person and the emergence of a child's individuality. At 2.5-3 years of age, children begin to gain self-awareness and make their first steps in terms of vocational self-determination. By senior preschool age (6-7 years), children's interest in professions becomes more sustainable and deliberate. At 6-7 years of age, children take an active part in the various types of activity (e.g., pictorial, musical, acting, learning-and-cognitive, sporting, and labor), which helps detect manifestations of the various types of giftedness. While signs of giftedness can be identified at any stage in the preschool age period, many researchers view as ideal for testing the age of 5 to 8 years (Silverman, 2012).

As a basis for the study, the authors chose three kindergartens in the city of Sochi (Kindergarten No. 50, Kindergarten No. 109, and Sochi Kindergarten). The sample consisted of the following two major types of kindergartens working with neurotypical children (individuals with no



intellectual disabilities): general-development-type (Kindergarten No. 109 and Sochi Kindergarten) and combined-type (Kindergarten No. 50).

The sample consisted of roughly equal numbers of males (38 children – 47.5 %) and females (42 children – 52.5 %).

The group of participants was diverse in its ethnic makeup. The largest ethnic segment was represented by ethnic Russians (70.1 %), followed by Armenians (17.5 %), Ukrainians (7.5 %), Georgians (1.3 %), Kazakhs (2.4 %), and Serbs (1.2 %).

The participants belonged to various social groups (industrial workers, office workers, intellectuals, and housewives).

The participating children were selected at random.

The choice of diagnostic methodology was not accidental – it was governed by the objective of early identification of preschoolers with signs of giftedness. Therefore, the authors employed R.G. DeHaan and J. Kough' Talent Map in a version adapted for preschoolers and junior schoolchildren (ages 5-10) by A.I. Savenkov (Savenkov, 2000). The methodology makes it possible to assess the degree to which a preschooler is endowed with each of the following 10 types of giftedness: intellectual (intellectual operations), creative (outside-the-box, original thinking), academic (curiosity, broad-mindedness, being a good student), pictorial, musical, literary, performing, technical, leadership, and sporting.

A promising area in this context is the development of a program of psychological-pedagogical support for identified children. A program of this kind will include diagnostic procedures that will make it possible to monitor and adjust the pedagogical and psychological objectives of support for gifted preschoolers.

The questionnaire included 80 questions systematized across 10 relatively independent areas of children's behavior and activity. Each question was associated with a certain type of giftedness. The questionnaire was filled out by the child's educator and parent. They were to give an assessment of manifestations of signs of giftedness in the child on a scale of 2 (the trait assessed is well-developed, well-defined, and manifested often) to -1 points (more often there is manifested a trait that is opposite to the one assessed). The method involved tallying the points scored by the children based on pedagogue assessments and on parent assessments.

Depending on the number of points scored, each child was assigned one of the following levels of giftedness on each type:

- very high: 15-16 points;
- high: 13-14 points;
- medium: 8-12 points;
- below medium: 5-7 points;
- low: 0-4 points;
- absence of manifestations of giftedness: -1 – -8 points.

To assess interest in a group of professions, use was made of E.A. Klimov's Differential-Diagnostic Questionnaire (Klimov, 2014) in a version adapted for preschool age by N.A. Gordeeva and L.V. Kashcheeva (Gordeeva, Kashcheeva, 2017). The diagnostic assessment was conducted by students from Sochi State University pursuing a Master's degree in Psychological and Pedagogical Education as part of practical training. Each child had a student assigned to them whose job was to have an individual conversation with them. The child was asked to select from two statements (e.g., 'I like to look after pets' vs 'I like to play with toys'; 'I like to help sick people' vs 'I like to construct things to a layout or template'; 'I like to look at images in a book (postcards)' vs 'I like to look after plants').

The child's responses were entered by the student in a form and were classified under a certain group of professions. Next, for each child there was created a table listing the number of their choices on each group of professions. The objective was to establish which groups of professions the child had a high interest in (7-8 responses), a medium interest in (3-6 responses), and no interest in (0-2 responses).

To identify the correlations between pedagogue and parent assessments and between manifestations of giftedness and interest in a certain group of professions in a child, the data were processed using methods of mathematical statistics in IBM SPSS v.20. To process the data, use was made of the Pearson correlation coefficient.

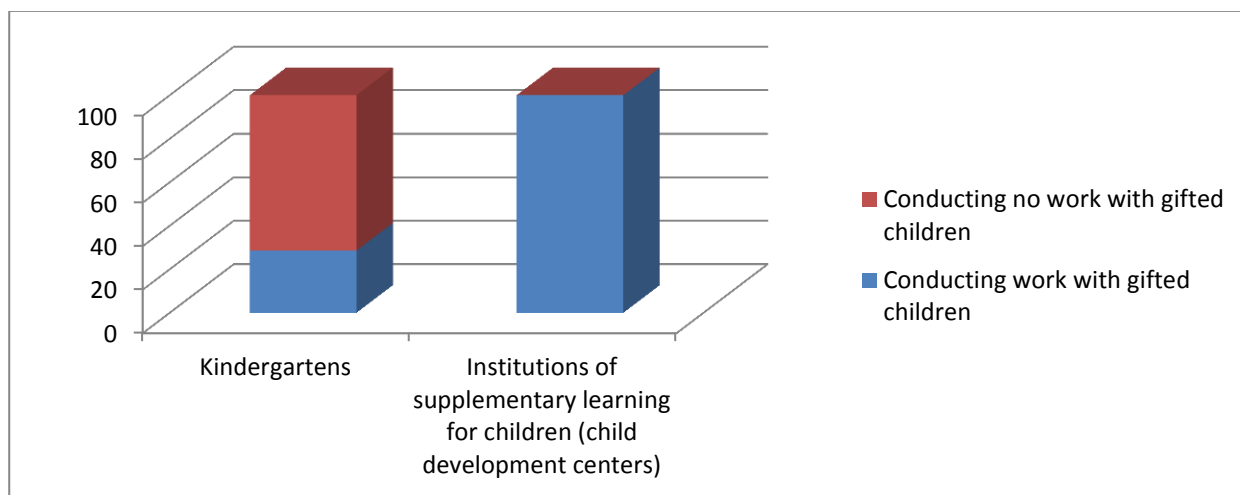


## 4. Results

### 4.1. Results from the survey of pedagogues and content specialists in Sochi's preschool institutions

The respondents' answers indicated that purposeful work on identifying and supporting preschoolers with signs of giftedness is conducted mainly in the city's institutions of supplementary learning for preschoolers (linguistic and creative child development centers) (Figure 1).

Precisely half of the 28.6 % of kindergartens conducting work with gifted children are general-development-type kindergartens, and the other half are combined-type kindergartens. All of the 71.4 % of kindergartens not conducting work with gifted children are general-development-type kindergartens.



**Fig. 1.** Degree to which Sochi's preschool educational organizations are engaged in work with gifted children

The main objective behind this kind of work for the majority of preschool organizations (66 %) is to identify gifted children and create the conditions for the development of their giftedness, in 33 % – to meet the needs of the parents, and in 8 % – to get their educatees to win various municipal and regional contests.

For the most part, giftedness is identified as part of the educators' direct work with the children (observation, analysis of the outcomes of a child's creative work, and conversations with the parents). Just 33 % of the respondents were found to identify giftedness using special psychodiagnostic methodologies and tests.

50 % of the respondents said that gifted children are identified in the kindergarten by the educators, 58 % – by the psychologist (pedagogue psychologist), and 16 % – by other specialists.

All organizations conduct monitoring of child giftedness no more often than 1-2 times in a year.

For the most part, signs of giftedness are identified in children aged 5-6 years (66 %).

Half of the respondents engage in identifying and supporting giftedness the children's parents.

Pictorial giftedness was found to be the type identified in children by the respondents the most (75 %), followed by sporting giftedness (66 %), creative and musical giftedness (50 % each), and performing and intellectual giftedness (42 %). Identified the least often are signs of academic, literary, and technical giftedness (16 %).

Twenty-five percent of the respondents confessed to having experienced issues with the education and development of gifted children (a lack of interest in frontal and group classes; difficulties in communication).

Just one of the 12 participating preschool institutions was found to employ a proprietary program for the development of giftedness.

All of the participating preschool institutions were found to be interested in working with a university and a backbone college in the area of development of giftedness in children.

The survey helped identify the following issues in identification and development of giftedness:

- pedagogues in preschool organizations denying the possibility of identifying signs of giftedness in preschool childhood; hence, a lack of work in the area of supporting such children;
- work with gifted children being conducted in certain cases not for the sake of the children themselves but for the sake of upholding the kindergarten’s prestige (e.g., through gifted children’s victories in contests);
- two-thirds of the kindergartens using no experimentally tested psychodiagnostic methodologies for identifying child giftedness, a result of which certain children in whom these signs are not manifested distinctly end up not getting the special pedagogical support they need;
- diagnostic assessments being conducted by an educator – not a psychologist who has a command of special psychodiagnostic methodologies;
- in certain cases, there is no cooperation between the kindergarten and the parents in the area of identifying and supporting giftedness;
- too much focus on identifying and developing pictorial giftedness to the detriment of other types thereof (academic, intellectual, practical, and social (spiritual-moral and emotional));
- most educators not seeing gifted children’s problems in the area of communication and socialization and not helping them resolve those problems;
- the kindergartens not being engaged in any innovative activity in the area of identifying and supporting gifted children, with no efforts made to develop or implement proprietary programs.

**4.2. Results from the diagnostic assessment of giftedness in preschoolers (carried out using A.I. Savenkov’s methodology)**

Computing the average score of assessments on each type of giftedness made it possible to rank-order pedagogue and parent assessments of the various types of giftedness in the children (Table 1) and compare the average assessments of the pedagogues and parents (Table 2).

**Table 1.** Average Scores of Pedagogue and Parent Assessments of Manifestations of Giftedness in the Children (based on the types of giftedness proposed by A.I. Klimov)

Type of giftedness	Average score of assessments by	
	pedagogues	parents
Pictorial	7.75	8.3
Sporting	6.94	7.84
Intellectual	6.15	6.4
Leadership	6.1	6.56
Creative	5.9	5.86
Performing	5.85	5.88
Literary	5.3	5.86
Musical	5.19	5.61
Academic	5.06	5.15
Technical	4.59	4.81

As evidenced in Table 1, the most prominent type of giftedness is pictorial giftedness, which reflects a high degree of interest in senior preschoolers in drawing and may be attributed to the significant amount of attention devoted in the kindergartens to drawing, model construction, and molding. Placed second is sporting giftedness, which deals with preschoolers’ high motor activity and flexibility. Placed third is intellectual giftedness.

Technical giftedness is manifested at preschool age the least, which is associated both with the characteristics of one’s age-related development and with the insufficient amount of time devoted in the kindergartens to the development of children’s technical creativity.

The findings indicate that the development of giftedness in senior preschoolers in kindergartens ought to involve engaging them in pictorial and creative activity. At the same time, both at and outside school it will pay to offer the children assignments and didactic games that help

develop critical and creative thinking (TIPS pedagogy), gradually making more complex the level of creativity and novelty.

**Table 2.** Significance of Differences between Pedagogue and Parent Assessments of Manifestations of the Various Types of Giftedness in Children

Types of giftedness	Paired differences		Standard error of the mean	95 % confidence interval for the difference between the means				
	Mean	Standard deviation		Lower limit	Upper limit	t	df	Significance (two-tailed)
Intellectual	-0.25	2.065	0.231	-0.71	0.21	-1.083	79	0.282
Creative	0.375	4.596	0.514	-0.648	1.398	0.73	79	0.468
Academic	-0.088	2.382	0.266	-0.618	0.443	-0.329	79	0.743
Pictorial	-0.55	1.59	0.178	-0.904	-0.196	-3.093	79	<b>0.003</b>
Musical	-0.425	1.412	0.158	-0.739	-0.111	-2.692	79	<b>0.009</b>
Literary	-0.563	1.683	0.188	-0.937	-0.188	-2.99	79	<b>0.004</b>
Performing	-0.025	1.981	0.221	-0.466	0.416	-0.113	79	0.91
Technical	-0.225	2.267	0.253	-0.729	0.279	0.888	79	0.377
Leadership	-0.463	1.786	0.2	-0.86	-0.065	-2.317	79	<b>0.023</b>
Sporting	-0.9	2.202	0.246	-1.39	-0.41	-3.655	79	<b>0</b>

As evidenced in Table 1, on all types of giftedness the average score of parent assessments is higher than that of pedagogue assessments. This is associated with the fact that parent assessments tend to be more subjective, as parents, naturally, tend to consider their child to be the best and most talented of all children. The authors compared the significance of differences using the pairwise comparison t-test. The statistical assessment indicated parent assessments to be significantly higher than pedagogue assessments on pictorial, musical, literary, leadership, and sporting giftedness. Across the remaining types of giftedness (intellectual, creative, academic, performing, and technical), the differences were not significant. Pedagogues in preschool educational institutions ought to work with parents who clearly inflate their assessments of their child’s abilities and tend to see giftedness where it is not, sharing with them the results from the implementation of psychodiagnostic methodologies, which should facilitate the development of an adequate self-concept in the children.

Based on the points scored by the children on each type of giftedness based on pedagogue assessments, the authors distributed the children by degree of manifestations of giftedness (Table 3).

**Table 3.** Distribution of the Children by Degree of Manifestation of Giftedness (based on pedagogue assessments)

Type of giftedness	Degree of manifestation of giftedness in the participating preschoolers (based on pedagogue assessments), % of the children					
	Very high	High	Medium	Lower than medium	Low	Absence of manifestations of giftedness
Sporting	5	12.5	26.3	13.8	42.5	0
Intellectual	3.8	11	25	8.8	48.8	2.5
Pictorial	2.5	10	40	20	27.5	0

Leadership	2.5	10	31.3	10	43.8	2.5
Performing	2.5	10	25	18.5	42.5	1.3
Creative	2.5	10	22.5	13.8	51.3	0
Academic	0	11.8	21.3	6.3	58.8	0
Literary	2.5	7.5	26.3	10	53.8	0
Technical	1.3	7.5	21.3	7.5	62.5	0
Musical	2.5	2.5	27.5	12.5	55	0

In [Table 3](#), the types of giftedness are ranked based on the share of children with very high and high degrees of manifestation of giftedness in descending order. As evidenced in [Table 3](#), in number of children with high and very levels of giftedness the way is led by the same three types of giftedness as in average score of pedagogues and parent assessments ([Table 1](#)): pictorial, sporting, and intellectual. However, their rankings appear to have changed. Placed first in very high and high levels is sporting giftedness, which ranks second in average score. Placed second in very high and high levels is intellectual giftedness, which ranks third in average score. Placed third in very high and high levels is pictorial giftedness, which ranks first in average score.

Comparing these results with the results from the survey where the prevalent types of giftedness were assessed by the pedagogues based on their personal experience as opposed to diagnostic methodologies (placed first was pictorial giftedness (75 %), second – sporting giftedness (66 %), and third – creative and musical giftedness (50 % each)), it can be seen that the pedagogues underestimated intellectual giftedness in the children and overestimated creative and musical giftedness in them. This is testimony that pedagogues' empirical assessments of giftedness in preschoolers ought to be combined with the use of psychodiagnostic methodologies, which should help obtain results that are more objective and detect in children hidden giftedness, which is not manifested in most specific types and outcomes of children's activity.

The next question that was of interest to the authors was the following one: 'Preschoolers are more characterized by a high degree of manifestation of just one type of giftedness or concurrently several types thereof?' To answer this question, the authors identified preschoolers with a very high level of giftedness on at least one type of giftedness. There were 12 such children among the 80 participants. Among those 12 children, 10 had high and very high levels on three or more types of giftedness. The largest number of types of giftedness at a very high level was registered in Eduard K. (seven types: pictorial, musical, literary, performing, leadership, sporting, and technical). The rest of the children combined the following types of giftedness at a very high level:

- Zlata P.: creative and literary;
- Feliks A.: leadership and sporting.

Among the 12 children with high and very high levels, one had high and very high levels in two types of giftedness (leadership and sporting) and one – one in type (musical).

A comparison of the distributions using the 2-sample Z-test for two population proportions showed that the number of children with several types of giftedness at high and very high levels is significantly higher than the number of children with 1-2 types of giftedness ( $z = 3.266$ ,  $p = 0.00108$  at the 0.05 probability level). This helps conclude that preschoolers tend to have concurrently several types of giftedness (three and more) at a high level. This means that pedagogues ought to engage such children in various types of activity in order to develop in them various types of giftedness.

#### **4.3. Results from the diagnostic assessment of interest in professions in preschoolers**

The authors computed the average scores of the participating children's assessments of the groups of professions and ranked them in descending order ([Table 4](#)). They also computed the number of children with a dominant choice of a certain group of professions (7-8 points), which helped identify the group of professions that is most popular with the preschoolers and the number of children with a firm interest in a certain group of professions.

**Table 4.** The Average Scores of the Children’s Average Assessments of the Groups of Professions and the Number of Children with a Dominant Interest in a Certain Group of Professions

Group of professions	Average score of assessments	Number of children with a dominant interest in a group of professions
Man – Imagery	4.58	18
Man – Nature	4.46	3
Man – Sign System	3.8	5
Man – Man	3.7	2
Man – Technology	3.45	6

As evidenced in Table 4, preschoolers have the greatest interest in professions within the ‘Man – Imagery’ group, which matches the dominant type of giftedness (pictorial). Placed second by dominant choice are professions within the ‘Man – Technology’ group, but the average assessments on this group are the lowest. Placed third are professions within the ‘Man – Sign System’ group. Placed fourth are professions within the ‘Man – Nature’ group, with ‘Man – Man’ bringing up the rear.

Of interest is the fact that professions in the groups ‘Man – Man’ (commerce and the services sector) and ‘Man – Nature’ (agriculture), which are the most topical for the region (Krasnodar Krai), are not popular with the children. This is testimony to the need to boost early vocational guidance on these professions through conversations, tours, and job trials.

#### 4.4. The types of giftedness and interest in professions in preschoolers

The authors traced the correlation between pedagogue and parent assessments of the types of giftedness in the children and child assessments of the groups of professions using the Pearson correlation coefficient. The results are provided in Tables 5 and 6.

**Table 5.** Correlation between Pedagogue Assessments of Manifestations of the Various Types of Giftedness in Children and Preschooler Interest in the Groups of Professions

Type of giftedness		Man – Nature	Man – Technology	Man – Man	Man – Sign System	Man – Imagery
Intellectual	Correlation	<b>-0.272*</b>	0.189	0.18	0.08	-0.168
	Value	0.015	0.093	0.111	0.478	0.137
Creative	Correlation	<b>-0.290**</b>	0.159	0.104	0.028	-0.037
	Value	0.009	0.158	0.359	0.808	0.747
Academic	Correlation	<b>-0.314**</b>	<b>0.288**</b>	0.119	0.089	-0.192
	Value	0.005	0.01	0.293	0.43	0.088
Pictorial	Correlation	-0.082	0.01	0.086	-0.126	0.088
	Value	0.468	0.931	0.447	0.267	0.44
Musical	Correlation	-0.107	0.12	0.092	-0.011	-0.087
	Value	0.346	0.288	0.415	0.923	0.443
Literary	Correlation	-0.206	0.151	0.103	0.004	-0.065
	Value	0.066	0.182	0.365	0.974	0.565
Performing	Correlation	-0.213	0.18	0.038	-0.048	-0.003
	Value	0.058	0.109	0.737	0.675	0.982
Technical	Correlation	<b>-0.274*</b>	0.219	0.19	0.096	-0.212
	Value	<b>0.014</b>	0.051	0.092	0.397	0.059
Leadership	Correlation	<b>-0.257*</b>	0.133	<b>0.228*</b>	0.025	-0.117
	Value	<b>0.021</b>	0.239	<b>0.042</b>	0.827	0.299



Sporting	Correlation	-0.156	0.179	0.183	-0.048	-0.137
	Value	0.168	0.113	0.104	0.671	0.226

Notes: \*\* Correlation is significant at the 0.01 level (two-tailed). \* Correlation is significant at the 0.05 level (two-tailed).

As evidenced in Table 5, based on pedagogue assessments, a positive correlation was identified at the 0.01 level between academic giftedness and interest in the ‘Man – Technology’ group of professions, and a positive correlation was identified at the 0.05 level between leadership giftedness and interest in the ‘Man – Man’ group of professions.

**Table 6.** Correlation between Parent Assessments of Manifestations of the Various Types of Giftedness in Children and Preschooler Interest in the Groups of Professions

Type of giftedness		Man – Nature	Man – Technology	Man – Man	Man – Sign System	Man – Imagery
Intellectual	Correlation	-0.209	0.159	0.194	0.094	-0.204
	Value	0.062	0.158	0.084	0.409	0.069
Creative	Correlation	<b>-0.229*</b>	<b>0.239*</b>	0.188	0.111	<b>-0.270*</b>
	Value	0.041	0.033	0.094	0.328	0.016
Academic	Correlation	<b>-0.307**</b>	<b>0.268*</b>	0.149	0.049	-0.167
	Value	0.006	0.016	0.187	0.667	0.139
Pictorial	Correlation	-0.129	0.039	0.119	-0.051	0.012
	Value	0.254	0.734	0.293	0.655	0.913
Musical	Correlation	-0.121	0.121	0.051	-0.033	-0.033
	Value	0.283	0.283	0.653	0.77	0.773
Literary	Correlation	<b>-0.282*</b>	0.215	0.116	0.012	-0.087
	Value	0.011	0.055	0.305	0.913	0.442
Performing	Correlation	-0.207	0.166	0.111	-0.076	-0.022
	Value	0.066	0.14	0.326	0.503	0.849
Technical	Correlation	<b>-0.232*</b>	0.16	0.169	0.102	-0.178
	Value	0.038	0.156	0.134	0.368	0.113
Leadership	Correlation	<b>-0.285*</b>	0.142	<b>0.254*</b>	0.078	-0.166
	Value	0.01	0.21	0.023	0.49	0.141
Sporting	Correlation	-0.111	0.157	0.177	-0.042	-0.149
	Value	0.326	0.164	0.117	0.712	0.188

Notes: \*\* Correlation is significant at the 0.01 level (two-tailed). \* Correlation is significant at the 0.05 level (two-tailed)

As evidenced in Table 6, based on parent assessments, a positive correlation was identified at the 0.01 level between academic giftedness and interest in the ‘Man – Technology’ group of professions, between creative giftedness and interest in the ‘Man – Technology’ group of professions, and between leadership giftedness and interest in the ‘Man – Man’ group of professions.

Thus, it may be concluded that children with manifestations of academic and creative giftedness tend to be mostly interested in the ‘Man – Technology’ group of professions, and children with leadership giftedness – in the ‘Man – Man’ group of professions. Such results enable pedagogues in preschool educational institutions construct individual paths for early vocational guidance to gifted children.

**4.5. Interest in professions in highly gifted children**

The authors were also keen to establish whether highly gifted children tend to have a firm interest in one group of professions. To this end, they investigated interest in professions in the 12 identified highly gifted children. It was found that 11 of them had a distinct (6-8 points) interest only in one group of professions. A comparison of the distributions using the 2-sample Z-test for two population proportions showed that the number of highly gifted children with a distinct interest in one group of professions is a lot larger than the number of children with no such interest ( $z = -4.0825, p = 0.00001$  at the 0.05 probability level).

The results align with the findings from a number of other studies. Specifically, A. Bildiren has found that gifted and talented children tend to begin planning their careers at a younger age (Bildiren, 2018).

These conclusions suggest that pedagogical support for highly gifted children ought to be aimed at boosting their interest in the selected group of professions (the selected profession).

Table 7 displays the types of giftedness in the participating highly gifted children and their interest in the professions.

**Table 7.** The Types of Giftedness in the Participating Highly Gifted Children and Their Interest in the Professions

	Child's name	Type of giftedness with a high degree of manifestation	Pedagogue's assessment	Group of professions which the child has displayed a high degree of interest in	Child's assessment
1	Yaroslav Zh.	Intellectual	16	Man – Sign System	6
2	Arina D.	Intellectual	15	Man – Sign System	8
3	Yana V.	Intellectual	15	Man – Sign System	6
4	Sofia N.	Creative	16	Man – Imagery	8
5	Zlata P.	Creative	15	Man – Technology	8
		Literary	15		
6	Eduard K.	Pictorial	16	Man – Imagery	7
		Performing	16		
		Musical	15		
		Literary	15		
		Leadership	16		
		Sporting	16		
		Technical	16	Man – Technology	7
7	Yulia M.	Pictorial	15	Man – Man	7
8	Elizaveta K.	Musical	16	Man – Imagery	7
9	Alisa P.	Performing	15	Man – Imagery	7
10	Felix A.	Leadership	15	Man – Sign System	7
		Sporting	16		
11	Erik A.	Sporting	16	Man – Man	6
12	Darya Z.	Sporting	15	Man – Imagery	7

**5. Conclusion**

The study helped draw the following conclusions:

- giftedness in children ought to be identified and supported starting from senior preschool age;
- purposeful work on identifying and supporting gifted preschoolers is mainly conducted in institutions of supplementary learning for children (linguistic and creative child development centers); however, to reach as many children as possible, this kind of work ought to be conducted in kindergartens as well;

- it will be possible to assess manifestations of giftedness most objectively if empirical observations of classroom teachers are combined with the use of psychodiagnostic methodologies;
- due to the asynchronicity of the development of the various spheres of personality at preschool age, it is important to not only identify manifestations of general giftedness in a child but establish which sphere of personality and which abilities are characterized by increased and advanced development in a specific child. In this context, the best methodology to use is R.G. DeHaan and J. Kough' Talent Map in a version adapted for preschoolers and junior schoolchildren by A.I. Savenkov;
- the types of giftedness that are most prevalent in preschoolers are pictorial, sporting, and intellectual giftedness. The least prevalent in them is technical giftedness. Therefore, the development of giftedness in senior preschoolers in kindergartens ought to involve engaging them in pictorial and sporting activity. At the same time, both at and outside school it will pay to offer the children assignments and didactic games that help develop critical and creative thinking and an interest in technology (TIPS pedagogy and STEM education), gradually making more complex the level of creativity and novelty;
- parent assessments of how much the children are endowed with pictorial, musical, literary, leadership, and sporting giftedness are much higher than pedagogue assessments. Pedagogues in preschool educational institutions ought to work with parents whose assessments of their child's abilities are clearly inflated and who tend to see giftedness where it is not, sharing with them the results from the implementation of psychodiagnostic methodologies, which should facilitate the development of an adequate self-concept in the children;
- preschoolers tend to have manifestations of concurrently several types of giftedness (three and more) at a high level. Pedagogues ought to engage such children in various types of activity in order to development in them various types of giftedness;
- the participating preschoolers have a dominant interest in professions within the 'Man – Imagery' group, which matches the dominant type of giftedness (pictorial). Interest in professions that are significant to the regional market is not prominent in the preschoolers. Pedagogues in the region's preschool educational institutions ought to provide early vocational guidance to the children on these professions;
- children with manifestations of academic and creative giftedness tend to have a dominant interest in the 'Man – Technology' group of professions, and children with leadership giftedness – in the 'Man – Man' group of professions. These linkages ought to be taken into account in building individual paths for early vocational guidance to gifted children;
- the number of highly gifted children with a distinct interest in one group of professions is significantly larger than the number of children with no such interest. Pedagogical support for highly gifted children ought to be oriented toward the development of their interest in the selected group of professions (the selected profession).

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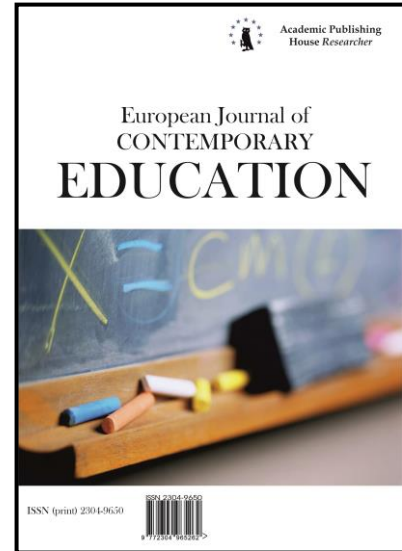
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## Academic Stress, Risk Taking Propensity and Internal Locus of Control in Mexican and Bolivian University Entrepreneurs

Marco Alberto Núñez Ramírez <sup>a,\*</sup>

<sup>a</sup>Department of Management, Instituto Tecnológico de Sonora, Mexico

### Abstract

Although, the study of the relationship between the University and entrepreneurship has been on the increase, special attention should be given to the subject of University entrepreneurship. In this regard, despite studies have emerged that have tried to differentiate the entrepreneur from who is not, the characterization of this type of entrepreneur is not yet clear. An entrepreneur is an individual that combines, at the same time, University studies with the generation and management of his/her own business. The variables that can help describe the characteristics of this type of entrepreneur can be academic stress, internal locus of control and risk taking propensity. This study used a quantitative, descriptive-comparative and correlational method. Through a sample of 356 University students from Mexico and Bolivia, it was possible to find significant differences between University entrepreneurs ( $n = 154$ ) and non-entrepreneur students ( $n = 202$ ). In addition, the results show that entrepreneurs have a lower level of academic stress compared to non-entrepreneurial students, which can be explained by the first group having high levels of internal locus of control and risk taking propensity. This demonstrates the need to study University entrepreneur from his/her own context using a particular approach.

**Keywords:** university entrepreneur, academic stress, internal locus of control, psychology or entrepreneurship.

### 1. Introduction

The study of entrepreneurship has been on the increase within the academic community (Venkataraman, 1997; Shane, Venkataraman, 2000; Montiel et al., 2012). This can be shown in the bibliometric study carried out by Ferreira et al. (2015), who found that during the years 1981 to 2010, the publication on entrepreneurship in top ranked journals grew widely, especially after 2003. In another meta-analysis, Montiel et al. (2012) found that psychology is one of the main disciplines that explain the intellectual structure of entrepreneurial research. This may be because

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\* Corresponding author

E-mail addresses: [marco.nunez@itson.edu.mx](mailto:marco.nunez@itson.edu.mx) (M.A. Núñez Ramírez)

researchers have tried to understand the entrepreneur from two basic perspectives. On the one hand, the first perspective is based on their behavior, that is, what the entrepreneur does (e.g., [Gartner, 1988](#); [Venkataraman, 1997](#); [Schumpeter, 2003](#)); while, on the other hand, there is the posture that focuses on his personality (e.g., [McClelland, 1961](#); [Viinikainen, et al., 2017](#); [López-Núñez et al., 2020](#); [Freeman et al., 2019](#)).

In order to understand the entrepreneur, there is need to first of all, understand it from the individual perspective, which is characterized by the ability to self-employ ([Blanchflower, Oswald, 1998](#)). Under this same aspect, through individual differences, especially from a psychological perspective, it is possible to highlight that an entrepreneur has certain characteristics that differentiates him from the employee ([McClelland, 1961](#); [Kets de Vries, 1985](#); [Kets de Vries, 1996](#); [Akhtar et al., 2012](#); [Karabey, 2012](#); [Hessels et al., 2018](#)). In this context, it is important to highlight that three of the variables that have been used to characterize the entrepreneur have been the risk taking ([Lüthje, Franke, 2003](#); [Tyszka et al., 2011](#); [Karabey, 2012](#); [Ahunov, Yusupov, 2017](#); [Antoncic et al., 2018](#); [Lopera, Marchand, 2018](#)); locus of control ([Mueller, Thomas, 2001](#); [Wang et al., 2010](#); [Pinger et al., 2018](#); [Islam, 2019](#)); and stress ([Chu et al., 2011](#); [Kollmann et al., 2019](#); [Wach et al., 2020](#)). These aspects seem to be different for the entrepreneur from other groups, however, this is not entirely clear.

### **Literature Review and Hypotheses**

First of all, risk plays a very important role in entrepreneurial decision-making ([Lopera, Marchand, 2018](#)). For this reason, there is empirical evidence that addresses risk within entrepreneurial behavior from different perspectives: risk perception ([Stroe et al., 2018](#)), risk attitudes ([Tyszka et al., 2011](#); [Ahunov, Yusupov, 2017](#)), Risk Taking Propensity ([Antoncic et al., 2018](#)), perceived risks ([Forlani, Mullins, 2000](#)), and risk preference ([Karabey, 2012](#)) as well as risk taking ([Lopera, Marchand, 2018](#)).

In essence, entrepreneurs are more likely to risk taking decisions than employees ([Lopera, Marchand, 2018](#)). However, there is no consensus on this within the academic community. For example, [Tyszka et al. \(2012\)](#), showed that empirical evidence that supports entrepreneurs do not have a greater attitude towards risk than other groups. This can be explained through the environment. Then, cultural elements between countries can affect entrepreneurial risk taking ([Antoncic et al., 2018](#)), which has been studied in Israel, USA and Hungary ([Malach-Pines et al., 2005](#)); while [Ozaralli and Rivenburgh \(2016\)](#), compared risk taking propensity in students from USA and Turkey.

Locus of control and entrepreneurship are variables with a very deep relationship. In fact, locus of control research is important to enable the understanding of different aspects related to human behavior ([Wang et al., 2010](#)), and entrepreneurial behavior ([Frese, Gielnik, 2014](#)). This enabled this variable to become one of the most studied psychological contributions in entrepreneurship research ([Mueller, Thomas, 2001](#)), especially, the internal locus of control, which is when an individual considers that the outcome of his life are due to his own effort and abilities ([APA, 2010](#)). Therefore, this has been used for better understanding of decision making ([Pinger et al., 2018](#)), and entrepreneurial intention ([Lüthje, Franke, 2003](#); [Asante, Affum-Osei, 2019](#)).

Finally, despite entrepreneurship has been associated with well-being ([Sánchez-García et al., 2018](#)), another characteristic aspect of entrepreneurial behavior is stress. This is defined as “a state of psychological or physiological response to internal or external forces or events that includes changes that affect almost all body systems” ([APA, 2010: 196](#)). In addition, stress depends on individual differences ([Kollmann et al., 2019](#)). In fact, entrepreneurs must face stressful challenges ([Wach et al., 2020](#)). According to [Chu et al. \(2011\)](#), stress is associated with the success factors of entrepreneurs, citing evidence obtained in China. However, [Baron et al. \(2016\)](#) found that entrepreneurs experience lower levels of stress; this is explained through Attraction-Selection-Attrition (ASA) theory ([Schneider, 1987](#); [Schneider et al., 1995](#)), arguing that entrepreneurs are distinguished by being stress tolerant.

As previously stated, the evidence that addresses the research variables – i.e., risk taking, internal locus of control, and stress– demonstrates that these aspects play a relevant role in characterizing entrepreneurs. But there are still different questions to answer: Are there significant differences among these variables when comparing entrepreneurs with other groups? And, what role does context play in explaining these variables? In order to answer previous questions, it was highlighted that if there is a context in which the understanding of entrepreneurial behavior still

has many areas of opportunity, it is the University entrepreneur. Then, what is the role of business education today? To answer this last question, it is necessary to take into consideration academic entrepreneurship, entrepreneurial education and, finally, the University entrepreneur.

The study of academic entrepreneurship is on the increase (Kakouris, Georgiadis, 2016). In fact, its biggest increase commenced since 2014 in Top Journals (Skute, 2019), becoming one of the main topics of study when examining the relationship between University and industry (Skute et al., 2019). In addition, Kakouris and Georgiadis (2016), through a bibliometric study, found that publications on entrepreneurial education have increased in recent years. Although, personal characteristics are important for the success of an entrepreneur, the environment also plays a relevant role, especially the entrepreneurial education (Bauman, Lucy, 2020) and academic environment (Bercovitz, Feldman, 2008). These elements are based on the premise that entrepreneurship can be learned (Viinikaine et al., 2017; López-Núñez et al., 2020). That is why the training of entrepreneurs is becoming an important aspect of University teaching (Etzkowitz, 2013).

Although progress has been made in understanding entrepreneurship, it is still not entirely clear how the University entrepreneur is characterized (Bergmann et al., 2016). This is most evident when studying stress. As previously stated, the role of stress in entrepreneurial behavior is unclear, and there is little evidence to clarify the role of academic stress in the life of the University entrepreneur (e.g., Rueda et al., 2012). Therefore, it is still unclear how entrepreneurial students experience academic stress. From these elements, are there differences with respect to academic stress among University entrepreneurs compared to non-entrepreneurial students? In this regard, the first research hypothesis emerged:

H<sub>1</sub> = University entrepreneurs have higher levels of academic stress than non-entrepreneurial students.

On the other hand, although certain bibliometric studies have found that within the elements that define personality traits of entrepreneurs, it is possible to find the place of control and risk taking (e.g., Frese, Gielnik, 2014; Kerr et al., 2017). Empirical evidence explaining how these variables distinguish the University entrepreneur and how these are associated with each other is lacking. Therefore, the following research questions arise: are there statistical differences with respect to internal locus of control and risk-taking propensity between University entrepreneurs and non-entrepreneurial students? How internal locus of control and risk taking are associated with academic stress? And finally, how both variables influence academic stress? To answer these questions, the hypotheses are presented below:

H<sub>2</sub> = University entrepreneurs have higher levels of internal locus of control and risk taking propensity than non-entrepreneurial students.

H<sub>3</sub> = The greater the internal locus of control, the lower the academic stress

H<sub>4</sub> = The greater the risk taking propensity, the lower the academic stress

H<sub>5</sub> = Internal locus of control and risk taking propensity negatively influence academic stress.

As empirical evidence, this phenomenon was studied within Latin American countries from two perspectives: research and context. First, certain elements are considered: a) entrepreneurship is a topic least explored in Latin America (Villegas, Amorós, 2019); b) although, the interest in studying entrepreneurship in Latin America has increased in recent years (Ketelhöhn, Ogliastrì, 2013), understanding entrepreneurial behavior in this region can be complex because some studies have found difficulties in explaining this phenomenon with foreign theoretical models (e.g., Guzmán-Alfonso, Guzmán-Cuevas, 2012). Therefore, this could require a particular vision of the Latin American context; and, c) There are few studies that have described these variables among University students (e.g., Contreras et al., 2017). Regarding the context: a) this region, according to the Global Entrepreneurship Monitor (GEM, 2018), presents the high levels of entrepreneurial activity; b) Latin American entrepreneurs have experienced problems being competitive (Vidal, 2008; Lederman et al., 2014); e) and, finally, these countries have tried to strengthen business education programs (Sánchez et al., 2017).

Then, why this research in Mexico and Bolivia? Although, the study of entrepreneurship in Mexico is increasing (e.g., Vidal, 2008; Vargas-Hernández, Reza, 2010; González, Husted, 2011) it is important to note that most of the publications on entrepreneurship come from US, UK, and Canada (Ferreira et al., 2015); while regarding Bolivia, empirical evidence has emphasized business incubation (e.g., Alba, 2015).

Taking into account that Global Entrepreneurship Monitor (GEM), is one of the main tools to understanding the behavior of the entrepreneur in Latin America (Amorós, 2011), it was reported that Mexico during the year 2017, ranked 17th in the world ranking of entrepreneurial activity (GEM, 2018); while Bolivia, according to GEM (2014), which was presented by Querezaju et al. (2015) has stood out for obtaining a sixth place among the evaluated countries, and third in the region, using TEA measurement (Total early-stage entrepreneurial activity), which consists of the percentage of the population between 18 and 64 years old that starts a business. This shows that these countries are recognized globally in terms of entrepreneurship.

Regarding the research variables, there is little empirical evidence of the relationship between risk and entrepreneurship in 14 western European countries (Ahunov, Yusupov 2017); as well as internal locus of control and entrepreneurship in nine countries (Mueller, Thomas, 2001). In this regard, more research is required to consolidate this area of knowledge from an international perspective, especially in Latin America, where there are many research opportunities (López, Álvarez, 2018). In this context, entrepreneurial education could be an alternative to reduce youth unemployment problems (Sánchez et al., 2017). In addition, there are few studies on entrepreneurship among Latin American students (e.g., Contreras et al., 2017). In the case of Mexico, education has played an important role in the development of entrepreneurial oriented human capital (González, Husted, 2011). For this reason, considering the peculiarity of this region, the study was conducted in two countries: Mexico and Bolivia. Thus, the last research question and hypothesis are proposed: Are there significant differences in business practice between University students from Bolivia and Mexico?

H<sub>6</sub>= There are significant differences in business practice between University students from Bolivia and Mexico?

## **2. Materials and methods**

A quantitative, descriptive, comparative and correlational research was carried out. A non-probability sample consisting of 356 University students was obtained: Mexico ( $n = 187$ ) and Bolivia ( $n = 169$ ). The sample was characterized by 154 University entrepreneurs and 202 non-entrepreneurial students. Other sociodemographic data obtained are shown below: a) gender: male ( $n = 146$ ) and Female ( $n = 210$ ); b) educational programs (management [25 %], finance [25 %], tourism [12.1 %], accounting [10.4 %], and others [27.5 %]); c) and semesters (1-10).

### **Instruments**

Regarding the measurement of academic stress, a five-item instrument was shaped based on some indicators from the questionnaire proposed by García-Ros et al. (2012). The items measured the stress associated with these elements: a) try to pass the exams, b) professional goals, c) scholarships, d) academic overload, and e) grades. A Likert scale with 5 points was used with these options: 1 (*None*), 2 (*Low*), 3 (*Regular*), 4 (*Moderate*) y 5 (*High*). In internal locus of control and Risk-taking propensity, an adaptation to Spanish derived from the questionnaire proposed by Lüthje and Franke (2003) was used, where, in both cases, two items were taken. A 5 point Likert scale was used for both variables, in which the options were: 1 (*Totally disagree*), 2 (*disagree*), 3 (*Neither agree nor disagree*), 4 (*Agree*) and 5 (*Totally agree*). It should be noted that the values were inverted in the second variable.

### **Validity and Reliability**

In order to measure the convergent validation of the three variables, Average variance extracted (AVE) was tested, where levels above .50 were found in all cases, which according to Hair et al. (2014), are favorable levels. On the other hand, regarding reliability, favorable Cronbach's alpha coefficients were obtained: academic stress ( $\alpha = .676$ ), internal locus of control ( $\alpha = .731$ ) and risk taking propensity ( $\alpha = .60$ ). It is important to note that .60 is the lowest level of acceptance for this test (Hair et al., 2014).

### **Research Process**

The research was carried out in the northwest region of Mexico, as well as in the Department of Santa Cruz de la Sierra in Bolivia. After obtaining approval from the authorities of the participating Universities, the questionnaires were self-administered by University students from both countries who decided to participate in the research. In order to test the four hypotheses, the following statistical tests were applied: Mann-Whitney U test for independent samples (H<sub>1</sub> y H<sub>2</sub>), correlation (H<sub>3</sub> y H<sub>4</sub>) and multiple linear regression (H<sub>5</sub>) and X<sup>2</sup> (H<sub>6</sub>). The results are shown below.



### 3. Results and discussion

In order to support hypothesis 1, two analyzes were tested. Firstly, University entrepreneurs showed lower levels in three items of academic stress, except scholarships (see Table 1). A more robust result can be observed in Table 2, where significant results were observed when comparing academic stress among both groups. It is important to note that, regarding academic overload and grades, no significant results were found. These findings empirically verify the hypotheses. In addition, these try to provide empirical evidence on two least studied topics: University entrepreneur's personality (Bergmann et al., 2016), especially how this individual, performing two activities at the same time (student and entrepreneur) live academic stress (Rueda et al., 2012). The results suggest that, the interpretation of the role of stress in the entrepreneur's life depends on their individual differences (Kollmann et al., 2019), despite facing stressful challenges daily (Wach et al., 2020). In effect, University entrepreneurs experienced lower levels of academic stress than non-entrepreneurial students. This agrees with Baron et al. (2016), who through ASA theory (Schneider, 1987; Schneider et al., 1995), argued that entrepreneurs have a high level of stress tolerance.

**Table 1.** Comparison of academic stress between entrepreneurs and non-entrepreneurs

	University Entrepreneurs (n = 154)		Non-entrepreneurs (n = 202)		p
	M	SD	M	SD	
Try to pass the exams	3.56	1.06	3.81	1.01	.020
Professional goals	3.22	1.27	3.70	1.16	.000
Scholarships	2.82	1.33	3.16	1.34	.018
Academic overload	3.63	1.16	3.74	1.17	.333
Grades	3.24	1.27	3.37	1.22	.391

Regarding hypothesis 2, the results show that University entrepreneurs have higher values of Internal locus of control and Risk taking propensity, aspects that characterized the Personality Traits of Entrepreneurs in general (Frese, Gielnik, 2014; Kerr et al., 2017). These findings empirically check the hypotheses (Table 2). However, more empirical evidence is required to understand the University entrepreneur in Latin America, who has characteristics that do not coincide with the dominant culture of the region. For example, revisiting both stress and Risk-taking propensity, from a cultural approach, this region has been distinguished for having a low tolerance to uncertainty (Hofstede, Hofstede, 2005).

**Table 2.** Comparison of variables

Variables	University Entrepreneurs (n = 154)		Non-entrepreneurs (n = 202)		p
	M	SD	M	SD	
Academic Stress	3.30	.790	3.56	.865	.001
Internal locus of control	3.79	.918	3.25	1.03	.000
Risk taking propensity	4.30	.720	4.12	.697	.006

After performing correlation, the results showed that academic stress is negatively associated with internal locus of control and the risk taking propensity; then, when these variables have high levels, academic stress will decrease (Table 3). In this regard, the third hypothesis was tested. In addition, multiple regression was carried out using three models. After using control variables, it was found that gender, semester and country, affected the dependent variable. Academic stress was negatively influenced by Internal locus of control ( $\beta = -.113$ ;  $p \leq .05$ ;  $R^2 = 7.8\%$ ) and Risk taking propensity ( $\beta = -.114$ ;  $p \leq .05$ ;  $R^2 = 9.1\%$ ), respectively. It is important to note that there are no collinearity problems, because the Variance inflation factor (VIF) of the three models was lower



than 10, that according to Hair et al. (2014) is acceptable. This can be corroborated in the correlation coefficients, where values less than 0.80 are acceptable (Field, 2009).

**Table 3.** Correlation of variables

Variables	M	SD	1	2	3
1. Academic Stress	3.44	.841	1		
2. Internal locus of control	3.48	1.02	-.123*	1	
3. Risk taking propensity	4.15	.644	-.122*	.055	1

\*  $p \leq .05$  (2-tailed).

Positive psychology can promote understanding of entrepreneurship (Juhdi, Juhdi, 2013), through which Internal locus of control and risk taking propensity can be considered as strengths that favor the entrepreneurial practices of University students, and can allow efficient stress management. This agrees with Chu et al. (2011), who discovered that stress promotes business success. If the ASA theory (Schneider, 1987), argued that individuals can determine context, then, the University entrepreneur, in order to attend both the school and their own business, through high levels of Internal locus of control and Risk taking propensity, presents certain strengths that make him different from other University students.

**Table 4.** Regression coefficients on academic stress

Variables	Model 1	Model 2	Model 3
-Control Variables			
Gender	-.195*** (.089)	-.195*** (.088)	-.197*** (.088)
Educational programs	.024 (.019)	.025 (.019)	.031 (.018)
Semester	-.179** (.017)	-.176** (.017)	-.163** (.017)
Country	.158* (.127)	.145 (.127)	.148* (.126)
-Risk taking propensity		-.113* (.061)	-.106* (-.061)
-Internal locus of control			-.114* (.043)
R <sup>2</sup>	6.6%	7.8%	9.1%
Adjusted R <sup>2</sup>	5.5%	6.5%	7.5%
F	6.157***	4.801*	4.883*
VIF	1.018	1.009	1.030

(Standard error)

VIF = Variance Inflation Factor

Finally, using X<sup>2</sup>, some differences were found among countries regarding the practice of entrepreneurship. This result empirically supports the proposed hypothesis and, at the same time, coincides with the results reported by the GEM (2018) for Mexico, and the GEM (Querezaju et al., 2015) for Bolivia, in which the reports showed that Bolivia has high levels of TEA measurement. It is important to note that, due to the type of sampling (non-probabilistic), these findings cannot be generalized, especially, for this last test. However, this is for the purpose of showing a summary of what is happening in this region.

**Table 5.** Differences between Mexico and Bolivia

Groups and Variables	México (n = 187)		Bolivia (n = 169)		df	X <sup>2</sup>
	n	%	n	%		
University Entrepreneurs	71	46	83	54	1	4.42*
Non-Entrepreneurs	116	57.5	86	42.5		
<i>Academic Stress</i>	n	%	n	%	df	X <sup>2</sup>
1	9	5	0	0.0	20	36.41*
2	30	16	12	7.1		
3	48	26	69	40.8		
4	81	43	73	43.2		
5	19	10	15	8.9		
<i>Internal Locus of Control</i>	n	%	n	%	df	X <sup>2</sup>
1	9	4.8	0	0	8	36.96***
2	28	15	11	6.5		
3	54	28.9	42	24.8		
4	49	26.2	78	46.2		
5	47	25.1	38	22.5		
<i>Risk Taking Propensity</i>	n	%	n	%	df	X <sup>2</sup>
2	2	1	2	1	9	11.96
3	23	12	29	17		
4	89	48	93	55		
5	73	39	45	27		

\* p ≤ .05; \*\*\* p ≤ .001.

#### 4. Conclusion

The University entrepreneur plays a very important role, and he/she is perceived as an individual who has created a company while studying at a University (Bergmann et al., 2016). Studies on this topic have emphasized the influence of external factors on the University entrepreneur: i.e., University and regional context (Bergmann, 2017), as well as industry and government (Etzkowitz, Leydesdorff, 1997); however, much remains to be studied about the internal aspect of this type of entrepreneur.

From a theoretical approach, the understanding of entrepreneurship has been complemented by the intervention of different disciplines. In this context, psychology has intervened to enable better understanding of the entrepreneur's personality and behavior. These aspects are vital in understanding who an entrepreneur is. In this regard, Venkataraman (1997) stated that the essence of entrepreneurship is found in the relationship between opportunities and individuals. In order to be successful, these opportunities must be discovered and, later exploited; however, for the latter to happen, there must be certain individual differences (Shane, Venkataraman, 2000). It is important to point out these differences that will become skills (Lazear, 2005), and which will enable an individual to create a company (Gartner, 1988).

Actually, there are gaps in the study of entrepreneurship (Low, 2001). An example of this, is the University entrepreneur, who cannot be studied as a common entrepreneur. The study of entrepreneur requires a particular theoretical and empirical approach. For this reason, proposals for entrepreneurial education have emerged (e.g., Kakouris, Georgiadis, 2016; Fellnhofner, 2019); entrepreneurial University (e.g., Etzkowitz, Leydesdorff, 1997; Etzkowitz et al., 2000; Etzkowitz, 2013; Guerrero-Cano et al., 2006; Ndofirepi, 2020); and the academic entrepreneur (e.g., Bercovitz, Feldman, 2008; Abreu, Grinevich, 2013; Skute, 2019); similarly, a study of the characteristics of a University entrepreneur must be exhaustively studied. Although, some studies have emerged that have tried to differentiate the entrepreneur from who is not (e.g., Gartner, 1988, Blanchflower, 1998), the University entrepreneur requires his/her own field of study. However,

although the study of the University entrepreneur requires independence, there is need to consider it from a psychological perspective.

After reviewing the empirical evidence on the psychology of entrepreneurship, it could be observed that, according to a bibliometrics carried out by Frese and Gielnik (2014), a study of the entrepreneur's personal attributes has attracted the attention of many researchers, where it was found that three of the most characteristic elements of the entrepreneur's personality are stress, locus of control and risk propensity.

Despite there is no complete consensus on the interpretation of these variables within entrepreneurial behavior, this may be a starting point for other theoretical approximations. Both risk taking and internal locus of control, being characteristics of the entrepreneur's personality could be interpreted under the positive psychology (Juhdi, Juhdi, 2013), that focus on human strengths (Seligman, Pawelski, 2003), and allows the development of business activity.

In conclusion, within the present investigation, it was possible to empirically test the six hypotheses. In essence, from a theoretical approach, the contribution to this document is based on two aspects. First of all, a topic least studied within the academic community was addressed: the University entrepreneur. On the other hand, entrepreneurial behavior can be understood theoretically from positive psychology (Juhdi, Juhdi, 2013), and the ASA Theory (Schneider et al., 1995), in which – together – it is possible to support the understanding of the University entrepreneur, who as an individual has certain characteristics that make him different, where certain strengths of his/her personality traits stand out, this determines the context.

Regarding the empirical test, the following results are presented: a) the University entrepreneurs present lower levels of stress than non-entrepreneurial students; b) in addition, University entrepreneurs have higher values of internal locus of control and risk-taking propensity; c) the low stress levels of the University entrepreneur can be explained through internal locus of control and risk-taking propensity, that regulate academic stress; d) in a region such as Latin America, where entrepreneurship has become an economic alternative to avoiding unemployment, especially for young people (Sánchez et al., 2017), it was possible to determine that the contextual part also play a relevant role in understanding the University entrepreneur.

Within the limitations of the study, the sample used stands out. It is recommended for future research to carry out a probabilistic study that best represents the reality of both countries. Although, this research used students from Mexico and Bolivia as case study, in order to present the reality of Latin America, there is need to collect data from other countries in the region. Finally, considering that the characterization of the University entrepreneur is not yet clear, it is recommended to increase the empirical evidence, especially by conducting studies that describe the internal aspects (personality and attributes), as well as the external aspects that determine the University entrepreneur, who is distinguished because, at the same time, he/she is studying at the University, and he/she has also started his own company (Bergmann et al., 2016). Based on this context, it would be relevant to study how the University has influenced entrepreneurial decisions; this is done in order to know the impact of the University system on entrepreneurship.

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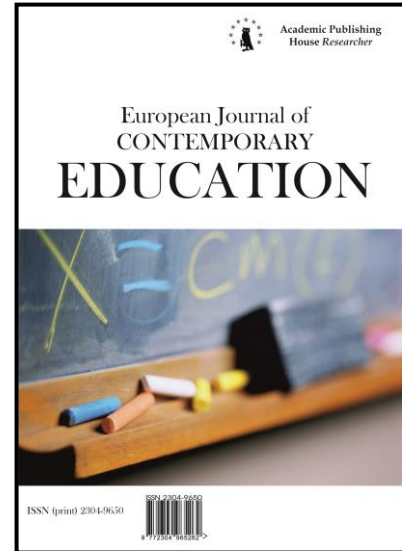
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## Anxiety Determinants Towards Mathematics in Mexican High School Students

Carlos Alberto Rojas-Kramer <sup>a</sup>, Elena Moreno-García <sup>a,\*</sup>, Francisco Venegas-Martínez <sup>b</sup>

<sup>a</sup> Universidad Cristóbal Colón, Mexico

<sup>b</sup> Instituto Politécnico Nacional, Mexico

### Abstract

The study aimed to measure the level of anxiety towards mathematics in high school students and if they differs by gender and institution. For this, the scale designed by Muñoz-Cantero and Mato-Vázquez (2007) was applied to 536 Mexican students from three different institutions in the public sector. This instrument is divided into five factors: anxiety towards the evaluation, towards the temporality, towards the understanding of the problems, towards the numbers and the mathematical operations and towards real life situations. The data matrix was analyzed using the Cronbach's alpha coefficient to validate its consistency, from which a very acceptable value of .932 was obtained. The analysis confirmed that the data matrix is not an identity matrix and presents acceptable correlations between variables, confirming the extraction of five factors that explain 63.38 % of total assimilable variance. In addition, the ANOVA test was calculated with the F statistic and its significance to prove the hypothesis of equality of means. A significant difference of means by gender was found in four of the five factors. Only anxiety towards real-life mathematical situations had no significant difference in means. Otherwise, the academic institution variable show difference between groups only in anxiety towards real-life mathematical situation. The Levene statistic was calculated for both variables to prove the hypothesis of equality of population variances. The gender variable presented equality of population variances in the five factors. The institution variable had not equality in population variances in anxiety towards mathematical problems comprehension and anxiety towards real-life mathematical situation.

**Keywords:** Anxiety, attitude, mathematics, evaluation, skills, students, mexicans.

### 1. Introduction

Mathematics is an ancient science, of the utmost importance in any area of society. It originated in different cultures in order to solve man's everyday problems. Despite this, it is

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\* Corresponding author

E-mail addresses: [elenam@ucc.mx](mailto:elenam@ucc.mx) (E. Moreno-García), [crojask@hotmail.com](mailto:crojask@hotmail.com) (C.A. Rojas-Kramer), [fvenegas1111@yahoo.com.mx](mailto:fvenegas1111@yahoo.com.mx) (F. Venegas-Martínez)

sometimes seen as a problem and its learning process at any level is considered a difficult task for the student and perceived as a hard, rigorous and formal subject (Farias, Pérez, 2010). For students, anxiety towards mathematics is perhaps the origin of phobias or school rejection (Muñoz-Cantero, Mato-Vázquez, 2007).

Despite the fact that mathematics is of substantial importance in our lives, Mexico has great limitations in this regard, as evidenced by the results of the Program for International Student Assessment (PISA) that the OECD carried out in 2018. The results of this evaluation reveal that 44 % of students in Mexico reach level 2 in mathematics. This means that they can recognize and interpret mathematical operations without direct instruction, for example, calculate the value of a product in different currencies or even compare two distances with two alternative routes (OECD, 2019).

The report acknowledges that the average performance in Mexico has maintained a flat trend line since its participation in the test began. This leads us to question whether poor performance in this subject is directly linked to math anxiety.

In this sense, Larracilla-Salazar, Moreno-García and García-Santillán (2019), point out that the teaching of mathematics is frequently related to complexity, difficulty, problems without practical application in daily life and other aspects that lead to negatively assimilate it. For some, these are only activities that involve following a sequence of actions without really knowing why and for what (Balbuena et al., 1991).

Paradigms for teaching mathematics have been in constant evolution since the last decades of the 20th century. In more recent years, complexity logic and competence models have arisen, so not only do mathematical skills include knowledge, but also procedural skills, attitudinal and metacognitive dimensions ought to be considered (García-Santillán et al., 2016).

Based on the evidence provided by various studies, it is essential to include anxiety towards mathematics and its influence on students' performance as part of the learning process (García-Santillán et al., 2016). But up to this point, do we really understand what math anxiety is? At the time Hembree (1990) defined it as: "a state of mind supported by fear and terror. This emotion is unpleasant, and has special characteristics such as feelings of insecurity and helplessness in dangerous situations".

Other definitions indicate that it is the feeling of tension and anxiety that interferes with the manipulation of mathematical problems both in the academic context and in everyday life (Richardson, Suinn, 1972). Similarly, math anxiety is defined as a feeling of tension, apprehension, or fear that interferes with mathematical performance and is suffered by 5 % to 20 % of the population (McLeod, 1994).

### **Research Question**

The arguments previously presented make the following questionable: Is there an underlying structure that can explain anxiety towards mathematics in students of upper secondary education? Similarly, it is questioned whether these anxiety levels differ according to the academic institution. Finally, it is convenient to know if there are differences based on gender. To respond to these concerns, the study aims to determine if there is a set of factors that explains the level of anxiety towards mathematics in upper secondary education students and if there are differences by academic institution and gender.

The importance of the study lies in the concern of the academic authorities who were part of the process, due to the low performance of some groups in the subject of mathematics. It is also important to emphasize that the student's mathematical understanding is of the utmost importance for his interaction in daily life activities. Therefore, this research, within its scope and limitations, seeks to provide some evidence that adds to the existing studies on this phenomenon.

Likewise, this analysis tries to obtain, through the model of anxiety towards mathematics proposed by Muñoz-Cantero and Mato-Vázquez (2007), the necessary data to explain those factors that are present in students of upper secondary education and that influence their learning process. This would somehow provide the basis for the definition of new teaching-learning strategies in the institutions that participated in this study.



### **Literature review**

Theoretical studies show that anxiety towards mathematics has generated special interest in previous decades, so from the theoretical review it is sought to understand how the construct of mathematical anxiety has been defined (García-Santillán et al., 2018).

In this sense, we find that Pólya in 1945 (cited by Estrada, Diez-Palomar, 2011) pointed out that a positive or negative attitude towards failures has an important influence on the ability to solve mathematical problems. It is false to think that the solution to a problem is a matter of an intellectual nature; emotions and determination play a very important role. He also mentions that: “a somewhat lukewarm determination, a vague desire to do as little as possible can suffice for a routine problem that arises in class; but, to solve a serious scientific problem, a will power capable of withstanding years of work and bitter failures is needed” (sic).

Gough's seminal studies (1954) coin the name of mathemaphobia; stating that this is the main reason why students fail this subject. Studies were conducted subsequently on the effects of attitudes towards mathematics, discovering that they are correlated with previous experiences and with factors such as intelligence and achievement (Aiken, Dreger, 1961). However, a review of the literature leads us to discover that the term anxiety towards mathematics as we know it, became present in the 1970s, as referred to in their work by Richardson and Suinn (1972) Fennema and Sherman (1976) and Tobías (1976) cited in Larracilla et al (2019).

Both Richardson and Suinn (1972) and Fennema and Sherman (1976) coincide in viewing anxiety towards mathematics as a feeling of terror and nervousness that arises when performing mathematical homework. Tobías (1976 cited in Larracilla et al, 2019), raises it as a key to succeed on a day-to-day basis, because in addition to intelligence and ability, attitude is another important factor in the study of the phenomenon (Aiken, 1976).

Avia and Ruiz (1987) come to the conclusion that this phobia must be addressed from the most common forms of therapy in anxiety problems; that is, desensitization and cognitive treatments. Analogously, Hart (1989) considers this phenomenon in a more complex way and from a multidimensional perspective, whose peculiarity is the emotions towards mathematics and the beliefs about the subject. This results in avoidance behavior, that is, at higher levels of anxiety the individual tends to avoid activities that involve mathematics (Hembree, 1990).

In other studies, they have considered that gender influences anxiety towards mathematics, with women having the highest levels of anxiety (Hembree, 1990; Ma, 1999). Other authors consider that this relationship is not so clear and consider that women are more capable than men to admit their anxiety (Ashcraft, Ridley, 2005). In addition, it is pertinent to point out that teachers' beliefs, attitudes and emotions affect students' learning (Carpenter, Fennema, 1992), therefore, the lack of adequate schemes in the teaching method suggests a blockage in the understanding and performance of mathematical tasks (Auzmendi, 1992).

The works of McLeod (1988, 1992 and 1994) provided evidence that suggests that the affective level is fundamental in both the teaching and learning of mathematics. Gil, Blanco and Guerrero (2005) mention beliefs, attitudes and emotions in their studies as the main components of the affective domain, and as a result the predisposition to success and/or failure of students when facing this subject. Likewise, age is considered another determining factor in the disposition of mathematics students (Watt, 2000).

Regarding this, Gil et al (2005) refer to the works of Mandler (1984, 1985, 1988, 1989a and 1989b) and Weiner (1986); from the first they point out the Discrepancy Theory, which explains the way in which students' beliefs and their integration with problem-solving situations lead to an affective response. The discrepancy occurs when the classroom instruction is totally different from what the students expect, which leads to stress. As for Weiner (1986), Gil et al (2005) mention the Attribution Theory, which raises the process of cognition-emotion, that is, after the result of an event, there is a total positive or negative reaction (primitive emotion) based on perceived success or failure on the outcome (primary assessment). Likewise, it studies and involves seven emotions (anger, guilt, shame, hopelessness, pride and self-esteem, compassion and gratitude), hence these contributions help to understand students' emotions.

Given its importance, there is an extensive literature on the matter, since this study phenomenon could not be more contradictory. On the one hand, mathematical knowledge is essential in modern societies and, on the other, the multiple studies carried out show a number of attitudes that make it an



inaccessible knowledge (Núñez et al., 2002) since it interrupts cognitive performance in the extent to which the mathematical task depends on working memory (Ashcraft, 2002).

In the same work, Ashcraft (2002) reveals that the higher the complexity of the mathematical task, the higher the level of anxiety and therefore people tend to avoid not only tasks, but also professional careers. This is derived from the doubts that arise about their intellectual capacities, motivated by the frustration of previous failures that block the possibilities of learning and therefore they determine themselves as incapable of achieving success and predisposed to fail again (Blanco and Guerrero, 2002, cited by Gil, et. al., 2005).

Other studies underpin the relevance of effective mastery in teaching and learning in teachers, as evidenced by the works of Muñoz-Cantero and Mato-Vázquez (2007), Rosario, Núñez, Salgado, González-Pineda, Valle, Joly and Bernardo (2008), Sánchez, Segovia and Miñan (2011), Pérez-Tyteca (2012), Palacios, Hidalgo, Moroto and Ortega (2013), Nortes and Nortes (2014, 2017), Maroto (2015) and Gómez-Chacón (2016). Hence, García-Santillán, Escalera y Martínez (2013) considers it necessary for the teacher to work on the affective part, so that the student puts aside the emotional blockage caused by mathematics.

Therefore, it is very important to develop instruments that allow to evaluate and determine anxiety towards mathematics. Among the most used is the MARS (The Mathematics Anxiety Rating Scale), a test made up of 98 items on the Likert scale that evaluates everyday and formal situations. It was designed by Richardson and Suinn, (1972) to obtain a measure of anxiety towards the manipulation of numerical aspects and the use of mathematical concepts.

Later, Fennema and Sherman (1976) elaborated a mathematical anxiety scale (MAS), in order to evaluate the feelings of fear, nervousness and bodily symptoms associated with mathematical homework in secondary school students.

Given the complexity of the MARS, in subsequent years, various authors have made adaptations of this instrument, such is the case of Suinn and Edwards (1982) who made a version for primary and secondary education students (MARS-A). Similarly, Plake and Parker (1982) elaborated a reduction with the same variables to increase its effectiveness. Later Alexander and Martray (1989) provide the AMARS, derived from MARS that contains only 25 items. Another adaptation for children from the fourth year of primary school is the Math Anxiety Scale for Children (MASC), which comprises 22 items (Chiu, Henry, 1990).

Likewise, Gierl and Bisanz (1995) developed the mathematical survey (MAXS), in order to be used at younger ages. Thomas and Dowker (2000) developed the Mathematics Anxiety Questionnaire (MAQ), whose answers are presented in images, with the aim of evaluating experiences of happiness and stress due to arithmetic problems.

This is how Muñoz-Cantero and Mato-Vázquez (2007), when considering anxiety as “the root of many cases of school refusal”, developed a questionnaire to assess the students' anxiety towards mathematics. They applied a 24-item test prepared by them to a sample of 1,220 Compulsory Secondary Education students in A Coruña, obtaining a Cronbach's Alpha reliability of 0.95.

Other studies such as those of Rosario et al (2008) carried out an investigation in two independent samples of 533 and 796 high school students, whose participants were slightly more than 50 % women and the rest were men. Their findings showed differences in the tests based on gender, with women being more anxious than men. In addition, they presented evidence that anxiety decreases when math performance increases. In the second sample they confirmed the first results.

In order to determine which factors predict anxiety in the face of mathematics, Tejedor, Auxiliadora, García-Orza, Carratala and Navas (2009) carried out a study on 55 sixth grade students. Results shows that the anxiety and the opinion that the children have on their performance in this subject are the best predictors. They also observed consequences of anxiety towards mathematics on a physiological level such as increased sweating and heart rate.

Meanwhile, Estrada and Díez-Palomar (2011) investigated the relationship between the affective and cognitive dimension from three points of view: age, level of studies achieved, and dimensions related to learning. The instrument was applied to 177 relatives of students from a primary and a secondary school, both in Spain. The study reached the following conclusions: first, there is no significant relationship between age and attitude towards mathematics; second, there is a certain relationship between the level of studies reached and the feeling towards mathematics;

and finally, there is a clear relationship between the emotional and cognitive dimensions in learning mathematics.

Later García-Santillán et al (2016) carried out an investigation in a sample of 303 university students. For the study they used the Muñoz-Cantero and Mato-Vázquez scale (2007) and the findings indicate that the factor anxiety towards mathematics in real life situations is the one that has the highest incidence in students, although there is a close relationship between all factors of his study. In contrast to the above, García-Santillán, Schnell and Ramos-Hernández (2017) conducted a study of higher-level students, the results of which indicate that anxiety towards mathematical situations in daily life is the factor with the least weight. The highest levels were occupied by anxiety about understanding math problems and anxiety about numbers.

Other studies have provided evidence that there are differences by gender, as is the case of Nortes and Nortes (2017). In a study they conducted with future primary school teachers, they showed that women are more motivated but at the same time more anxious than men towards evaluations. The difference is that they are more confident. Result that coincides with that found by Pérez-Tyteca, Castro, Segovia, Castro, Fernández and Cano (2009), Nortes and Nortes (2014) and Agüero, Meza, Suárez and Schmidt (2017). On the other hand, García-Santillán et al (2018) found no differences in gender in an investigation carried out with 200 high school students, similar to the results of Yenilmez, Girginer and Uzun (2007) and Wilson (2012).

Finally, after analyzing the state of the art, it is clear that anxiety towards mathematics is a topic of great relevance both in the academic field and in everyday life. Therefore, to answer the research questions and to achieve the objectives, the following hypotheses are established:

H1: There is a structure of factors that explain the level of anxiety towards mathematics in upper secondary school students.

H2: Anxiety towards mathematics differs by gender and academic institution.

### **Methodology**

It is a non-experimental study since the independent factors that modify the effect (Y) are not manipulated, a cross-sectioned study approached from the quantitative paradigm, of a descriptive, correlational, exploratory and explanatory type, considering that the objective is to find a set of factors that allow to explain the phenomenon of mathematical anxiety.

### **Participants**

The participants are high school students from the following academic institutions: Colegio Madrid de Veracruz, Colegio de Educación Profesional Técnica del Estado de Veracruz (CONALEP – Veracruz Campus) and the Telebachilletaro Cotaxtla, all belonging to the state of Veracruz, Mexico. The inclusion criteria were: students enrolled in the aforementioned academic institutions, who were in the second, fourth or sixth semester, and who had agreed to answer the survey voluntarily and without coercion from the educational authorities. Their participation was anonymous.

### **Sample**

The sample is non-probabilistic for convenience, since the contact was direct with the academic authorities of the schools and the test was applied to the students present at that time through them. The information collection was carried out in the months of April and May of 2019. The total sample was 536 students; of which 252 belonged to Madrid School, 143 to the Technical Professional Education College in Veracruz (CONALEP – Veracruz Campus) and 141 to the Telebachillerato Cotaxtla.

### **Instrument**

The “Test of anxiety towards mathematics” scale designed by Muñoz-Cantero and Mato-Vázquez (2007) was used. This instrument is divided into five factors and 24 items: anxiety towards the evaluation, towards the temporality, towards the understanding of the problems, towards the numbers and the mathematical operations and towards real life situations (Table 1). The response options are presented in a Likert-type format that ranges from 1 to 5, where: 5 means totally agree, up to 1 meaning totally disagree. In addition, the survey included the following

sociodemographic variables: gender, age, marital status, employment status, income, medical care, and relationship with the head of the family.

**2. Results**

**Table 1.** Dimensions and indicators of the anxiety towards mathematics scale

Code	Factors	Items
X1AE	Anxiety towards evaluation.	1, 2, 8, 10, 11, 14, 15, 18, 20, 22, 23.
X2AT	Anxiety towards temporality.	4, 6, 7, 12
X3ACPM	Anxiety towards mathematical problems comprehension	5, 17, 19
X4ANOM	Anxiety towards numbers and mathematical problems	3, 13, 16
X5ASM	Anxiety towards mathematical situations of real life	9, 21, 24

Source: Muñoz-Cantero and Mato-Vázquez (2007)

**Procedure**

In the first instance, the data matrix is validated to determine the internal consistency of the items using Cronbach's alpha coefficient, accepting as a minimum value  $\alpha = 0.7$  (Celina, Campo-Arias, 2005). Considering that the instrument is of a scale type, it is recommended to use the polychoric correlation matrix (Richaud, 2005; Ogasawaras, 2011) for the Exploratory Factor Analysis with component extraction and Varimax orthogonal rotation.

For this, the Bartlett test of sphericity is calculated with the Kaiser-Meyer-Olkin (KMO), the anti-image matrix to obtain the values of sample adequacy per variable, the value of the determinant, considering that values close to zero show high correlations. Then the factorial weights and their communalities are calculated, which allow us to identify the total variance. In addition, to test the hypothesis that says there is a difference by gender and by institution, the one-way ANOVA is used.

**Data analysis**

The data matrix was validated with Cronbach's Alpha index, whose value of .932 demonstrates high internal consistency (Hair et al., 1979).

**Exploratory Factorial Analysis for the H1 test**

To find the structure that underlies in mathematical anxiety, first of all it must be shown that the data matrix is not an identity matrix, that is, that all the correlations become 1. We will seek to show that the data matrix presents acceptable correlations and the value of the determinant is close to zero.

For this, the polychoric correlation matrix and its determinant, the sample adequacy measure for each factor of the instrument, as well as the Bartlett sphericity test were calculated to validate the relevance of the use of exploratory factorial analysis. Results are shown in Table 2.

**Table 2.** Correlation matrix<sup>a</sup> and sample adequacy measure

Correlation	X1AE	X2AT	X3ACPM	X4ANOM	X5ASM	MSA
X1AE	1	0.784	0.663	0.733	0.349	.826 <sup>a</sup>
X2AT		1	0.68	0.752	0.427	.841 <sup>a</sup>
X3ACPM			1	0.728	0.545	.871 <sup>a</sup>
X4ANOM				1	0.486	.868 <sup>a</sup>
X5ASM					1	.848 <sup>a</sup>

a. Determinant = .041

The correlations between the study factors, the value of the determinant close to zero and the sample adequacy measure by factor ( $> .5$ ) provide evidence of a robust matrix whose factorial scores make the use of the technique relevant. In addition, the Bartlett sphericity test yields  $\chi^2$  values of 1694.96 with  $df = 10$  and  $p = 0$  and the KMO measure of .851 support the use of the technique for factoring the data matrix.

Next, [Table 3](#) shows the extraction of the five factors of the dimensions of the Muñoz-Cantero and Mato-Vázquez (2007) scale, with orthogonal Varimax rotations to identify the highest factorial weights of the extraction. In the same [Table 3](#) the initial auto values are observed with their corresponding proportion of the variance, as well as the total accumulated variance.

**Table 3.** Rotated component matrix<sup>a</sup> by dimension

Dimensions	Component				
	1	2	3	4	5
X5ASM	.952				
X1AE		.844			
X3ACPM			.835		
X2AT				.806	
X4ANOM					.799
Auto valores iniciales	9.893	2.404	1.202	.903	.809
% de varianza x factor	41.222	10.018	5.008	3.764	3.370
Varianza acumulada %	41.222	51.240	56.248	60.013	63.383

Extraction method: Main components analysis. Rotation method: Varimax with Kaiser Standardization. <sup>a</sup>. Rotation converged in 5 iterations.

The data shown in [Table 3](#) prove the existence of a scale of five factors, which makes it clear that they align with the proposal of Muñoz-Cantero and Mato-Vázquez (2007), however, the arrangement of the indicators seems to be perceived by the students in a different way. [Table 4](#) describes the comparison between the indicators of the original scale and the factors of the rotated matrix.

**Table 4.** Comparison of items by dimension

Code	Original Scale Items	Rotated Scale Items
X1AE	1, 2, 8, 10, 11, 14, 15, 18, 20, 22, 23.	1, 11, 2, 4, 15, 20, 7, 18
X2AT	4, 6, 7, 12	19, 13, 6, 17, 16, 24, 3, 10, 5
X3ACPM	5, 17, 19	23, 14
X4ANOM	3, 13, 16	9, 21
X5ASM	9, 21, 24	8

### One-way ANOVA for H2

For the test, it is analyzed if there is a difference in means by gender and by academic institution, so the ANOVA test is calculated with the F statistic and its significance, as well as the Levene statistic to prove the hypothesis of equality of means and the hypothesis of equality of population variances.

**Table 5.** ANOVA of gender and Institution

Factors		Gender				Educational institution			
		gl	Quadratic			gl	Quadratic		
			mean	F	Sig.		mean	F	Sig.
X1AE	Between groups	2	2754.08	28.31	.00	181.87	1.70	.18	
	Within groups	533	97.29			106.95			
X2AT	Between groups	2	241.88	13.87	.00	1.36	.07	.93	
	Within groups	533	17.43			18.34			

X3ACPM	Between groups	2	143.99	14.18	.00	23.50	2.22	.11
	Within groups	533	10.15			10.60		
X4ANOM	Between groups	2	169.53	15.39	.00	32.16	2.79	.06
	Within groups	533	11.02			11.54		
X5ASM	Between groups	2	8.31	.87	.417	54.94	5.91	.00
	Within groups	533	9.48			9.30		

As observed in Table 5 ANOVA, the values of the F statistic with the level of significance ( $p \leq .05$ ) in the case of the gender variable, is presented in four of the five factors: X1AE, X2AT, X3ACPM, X4ANOM. For the X5ASM factor the value is  $p \geq .05$ . As for the academic institution variable, the behavior is different, since the first four factors (X1AE, X2AT, X3ACPM, X4ANOM) present p values  $\geq .05$ , but not the X5ASM factor, which presents a p value  $\leq .05$ . Based on the theoretical criterion that indicates that if the intra class significance value (sig.) is  $\leq$  less than or equal to 0.05, the hypothesis of equality of means must be rejected. This implies that there is a difference of means. On the contrary if it is higher than .05, equality of means is accepted, which means that there are no significant differences between the groups.

On the other hand, the hypothesis of population variances is contrasted and for this the Levene statistic is calculated with gl1 and gl2. Therefore, the theoretical criterion establishes that if  $p = \leq 0.05$ , the hypothesis of equality of variances is rejected. Otherwise if it is  $>$  the hypothesis of equality of variances is accepted (Table 6).

**Table 6.** Homogeneity of variances' test

Dimensions	Levene Statistical	Gender			Educational Institution			
		df1	df2	Sig.	Levene Statistical	df1	df2	Sig.
X1AE	1.803	1	533	.180	.178	2	533	.837
X2AT	.183	1	533	.669	.488	2	533	.614
X3ACPM	.066	1	533	.797	3.438	2	533	.033
X4ANOM	2.279	1	533	.132	1.044	2	533	.353
X5ASM	1.555	1	533	.213	3.419	2	533	.033

The p values  $> .05$  give evidence of equality of variances in all the factors of the gender variable. Otherwise in the academic institution variable, X3ACPM and X5ASM ( $\leq 0.05$ ) suggests that the hypothesis of equality of variances should be rejected, but not in the rest of the factors.

### 3. Discussion

It is clear that the phenomenon of mathematical anxiety encompasses various aspects of the individual, which makes it more complex, as Hart (1989) has pointed out. This author has referred that this phenomenon should be approached from a multidimensional perspective, where emotions and beliefs constitute an important element for the individual to avoid activities where mathematics are involved, as Hembree (1990) had pointed out.

The results of this research coincides with other studies that have found various explanations for this phenomenon, ranging from psychological, teaching and environmental aspects, as Eccius-Wellman and Lara-Barragan (2016) have pointed out.

By finding a robust structure in theoretical terms, the scale of Muñoz-Cantero and Mato-Vázquez (2007) allows us to find the multidimensional proposal of Hart (1989) and Hembree (1990). The scale collects feelings associated with the psychological profile such as anxiety towards mathematical evaluations, the understanding of mathematics topics and above all, when the individual is faced with real life situations where mathematical aspects are involved.

García-Santillán et al (2016) used this same scale by Muñoz-Cantero and Mato-Vázquez (2007) in the Mexican context with 303 university students who presented a higher level of anxiety towards mathematics in real life situations, and as a whole, a close relationship between all factors of the scale. This coincides with this empirical study, since the anxiety that presented the highest level was that related to real-life mathematical situations, followed by anxiety towards evaluation.



In contrast, García-Santillán, Schnell and Ramos-Hernández (2017) used the same scale with university students. They showed that anxiety towards mathematical situations in everyday life is the factor with the least weight, while the highest levels were occupied by anxiety before understanding math problems and anxiety about numbers.

On the other hand, the results of the hypothesis test about difference by gender and by academic institution to which the participating students correspond are discussed.

The results show that in the gender variable there is a difference in means in four of the five factors (X1AE, X2AT, X3ACPM, X4ANOM), but not in the dimension of anxiety towards real life mathematical situations (X5ASM). In addition, evidence indicates that there is equality in population variances with respect to gender. In the academic institution variable, dimensions of anxiety towards the understanding of mathematical problems (X3ACPM) and anxiety towards real-life mathematical situations (X5ASM) values  $\leq 0.05$  were observed. Therefore, the hypothesis of equality of variances in these factors is rejected, not so in the rest of the factors.

There are studies that have shown that gender has a significant impact on anxiety towards mathematics, and that it is in women where higher levels of anxiety have been observed, as demonstrated by Hembree, (1990) and Ma (1999). However, other studies postulate that this assertion is not clear, that rather it is women who are able to admit that they have anxiety towards mathematics (Ashcraft, Ridley, 2005).

On the other hand, García-Santillán et al (2018), carried out a study with 200 high school students, and found no gender differences, contrasting their results with this empirical study. Other studies that found differences by gender were documented in the work of Yenilmez, Girginer and Uzun (2007) and Wilson (2012). In the case of Nortes and Nortes (2017) they showed that women have greater motivation but at the same time more anxiety than men towards evaluations; the difference is that they are more confident. The results presented by Pérez-Tyteca, Castro, Segovia, Castro, Fernández and Cano (2009), Nortes and Nortes (2014) and Agüero, Meza, Suárez and Schmidt (2017) are similar.

#### 4. Conclusion

The results of this research made possible to demonstrate the existence of a structure that underlies the explanation of the phenomenon of mathematical anxiety in the Mexican students population analyzed. This phenomenon of anxiety seems to be determined in general by gender but not by the academic institution of the students. Particularly, students that participated in this research showed a different behavior in the anxiety they feel towards mathematical situations of real life. This way, there is not anxiety towards mathematical situation of real life different between men and women, but it is different by the academic institution they belong.

To summarize, we can think that the phenomenon of anxiety towards mathematics is and will be a topic in the academic and scientific discourse. It is desirable to continue analyzing different populations and different context to find more elements to explain the phenomenon and to propose solutions.

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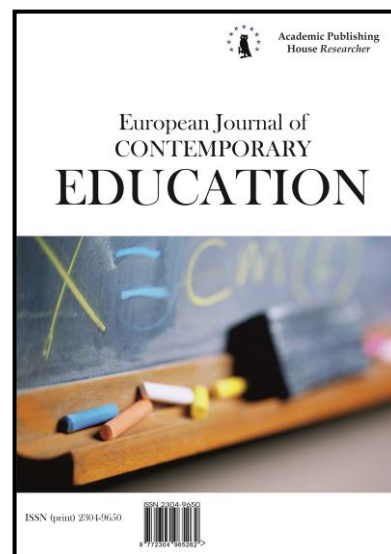
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## Gender Differences in Mathematics Anxiety Across Cultures: A Univariate Analysis of Variance Among Samples from Twelve Countries

Jacob Owusu Sarfo <sup>a,\*</sup>, Arturo García-Santillán <sup>b</sup>, Henry Adusei <sup>c</sup>, Violetta S. Molchanova <sup>d</sup>, Marina Drushlyak <sup>e</sup>, Olena Semenikhina <sup>e</sup>, Philip Soyiri Donyeh <sup>a</sup>, Somayeh Zand <sup>f</sup>, Reza Najafi <sup>f</sup>, Violeta Enea <sup>g</sup>, Sadia Malik <sup>h</sup>, Farzana Ashraf <sup>i</sup>, Najma Iqbal Malik <sup>h</sup>, Edward Wilson Ansah <sup>a</sup>, Hattaphan Wongcharee <sup>j</sup>, Felix O. Egara <sup>k</sup>, Arun Tipandjan <sup>l</sup>, Josephine Cudjoe <sup>m</sup>, Uzma Azam <sup>n</sup>, Mohammed Salah Hassan <sup>o</sup>, Mai Helmy <sup>p</sup>, Zahir Vally <sup>q</sup>

<sup>a</sup> University of Cape Coast, Cape Coast, Ghana

<sup>b</sup> Universidad Cristóbal Colón, Veracruz, México

<sup>c</sup> Pope John Senior High School, Koforidua, Ghana

<sup>d</sup> International Network Center for Fundamental and Applied Research, Washington, USA

<sup>e</sup> Makarenko Sumy State Pedagogical University, Sumy, Ukraine

<sup>f</sup> Islamic Azad University, Rasht Branch, Rasht, Iran

<sup>g</sup> Alexandru Ioan Cuza University, Iasi, Romania

<sup>h</sup> University of Sargodha, Sargodha, Pakistan

<sup>i</sup> COMSATS University, Lahore, Pakistan

<sup>j</sup> Pathumwan Institute of Technology, Bangkok, Thailand

<sup>k</sup> University of Nigeria, Nsukka, Nigeria

<sup>l</sup> International Centre for Psychological Counseling and Social Research, Puducherry, India

<sup>m</sup> Independent Researcher, Koforidua, Ghana

\*Corresponding author

E-mail address: [sarfojo@yahoo.com](mailto:sarfojo@yahoo.com) (J.O. Sarfo), [agarcias@ucc.mx](mailto:agarcias@ucc.mx) (A. García-Santillán), [henadusei@gmail.com](mailto:henadusei@gmail.com) (H. Adusei), [v.molchanova\\_1991@list.ru](mailto:v.molchanova_1991@list.ru) (V.S. Molchanova), [marydru@fizmatsspu.sumy.ua](mailto:marydru@fizmatsspu.sumy.ua) (M. Drushlyak), [e.semenikhina@fizmatsspu.sumy.ua](mailto:e.semenikhina@fizmatsspu.sumy.ua) (O. Semenikhina), [philip.soyiri@ucc.edu.gh](mailto:philip.soyiri@ucc.edu.gh) (P.S. Donyeh), [s.zandd.1992@gmail.com](mailto:s.zandd.1992@gmail.com) (S. Zand), [r.najafi.1991@gmail.com](mailto:r.najafi.1991@gmail.com) (R. Najafi), [violeta.enea@uaic.ro](mailto:violeta.enea@uaic.ro) (V. Enea), [drsadiamalik13@gmail.com](mailto:drsadiamalik13@gmail.com) (S. Malik), [farzana.ashraf@cuilahore.edu.pk](mailto:farzana.ashraf@cuilahore.edu.pk) (F. Ashraf), [najmamalik@gmail.com](mailto:najmamalik@gmail.com) (N.I. Malik), [edward.ansah@ucc.edu.gh](mailto:edward.ansah@ucc.edu.gh) (E.W. Ansah), [hattaphanpsy@gmail.com](mailto:hattaphanpsy@gmail.com) (H. Wongcharee), [felix.egara@unn.edu.ng](mailto:felix.egara@unn.edu.ng) (F.O. Egara), [aruneps73@gmail.com](mailto:aruneps73@gmail.com) (A. Tipandjan), [cudjoej1@gmail.com](mailto:cudjoej1@gmail.com) (J. Cudjoe), [uzmaazamo8@gmail.com](mailto:uzmaazamo8@gmail.com) (U. Azam), [sala@siswa.um.edu.my](mailto:sala@siswa.um.edu.my) (M.S. Hassan), [mai.helmy@art.menofia.edu.eg](mailto:mai.helmy@art.menofia.edu.eg) (M. Helmy), [zvally@gmail.com](mailto:zvally@gmail.com) (Z. Vally)



<sup>n</sup> Aligarh Muslim University, Uttar Pradesh, India

<sup>o</sup> University of Malaya, Kuala Lumpur, Malaysia

<sup>p</sup> Menoufia University, Shebin El-Kom, Egypt

<sup>q</sup> United Arab Emirates University, Al Ain, United Arab Emirates

### **Abstract**

Mathematics anxiety (MA) has a debilitating impact on learning, achievement, mental health, and the future career life of students. Though MA is a popular research theme, there is little agreement among researchers regarding the cross-cultural effect of gender. The purpose of this paper was to explore the perceived MA differences among males and females across cultures using the Anxiety Towards Math Scale (ATMS; Muñoz and Mato, 2007). Data were collected between October 2019 and September 2020) from students (N = 4,340) in 12 countries. Using univariate analysis of variance, the results indicate that gender has a significant main effect on MA with females recording higher mean scores than males, [71.816 > 68.118]. Examining the interaction effect of gender and location, significant differences in MA scores exist between males and females across all locations except for Egypt, Malaysia, and Nigeria (Enugu State). Conversely, females reported significantly higher MA scores than males in the rest of the locations, except Iran (Tehran and Qom) and Pakistan (Faisalabad). Gender-based ranking of the top-three locations with high MA scores indicates that females, starting from Malaysia, Thailand (Bangkok), and Nigeria (Enugu State) ranked the highest. Similarly, males beginning from Malaysia, Nigeria (Enugu State), and Thailand (Bangkok) ranked the top-three in MA. The implications are that mathematics teachers need to adopt different culturally-appropriate and gender-focused interventions to support students with MA challenges. Though interpreting the results from this survey need to be done with caution due to the smaller community and national online samples, the role of cross-cultural gender differences in MA cannot be overlooked.

**Keywords:** cross-cultural study, gender differences, mathematics anxiety, mathematics, univariate analysis of variance.

### **1. Introduction**

Learning and achievements in mathematics are affected by several factors. Occasionally, persons with specific mathematical learning disabilities may see the use of numbers and mathematics operations as cognitively demanding (Dowker et al., 2016). However, emotional factors like mathematics anxiety (MA) are also known to negatively affect learning and performance in mathematics (Ahmed et al., 2012; García-Santillán et al., 2016). Specifically, MA is known for causing serious mathematical impairment in students as early as primary school levels (Sorvo et al., 2017).

MA is an essential psychological phenomenon to researchers, educators, and psychologists since mathematics provide a universal language to define concrete and abstract events (Alvarado-Mateo, 2007; García-Santillán et al., 2016; Wang et al., 2020). Dreger and Aiken (1957) first introduced the concept of MA as “number anxiety”. It can be described as a feeling of pressure and fear that impede the use of numbers and mathematical operations in both academic and in real-life situations (Alam, Halder, 2018; Richardson, Suinn, 1972). Furthermore, studies have attributed MA to many causal factors such as poor test result, age, negative classroom experience, lack of eagerness to complete a difficult assignment, negative attitude towards mathematics learning, and gender (Alam, Halder, 2018; Dowker et al., 2016; Mollah, 2017).

Unlike the considerations given to the subject of mathematics instruction and students' achievements in research circles, MA has often received less attention over the years (Foley et al., 2017). From the revolutionary work of Fennema and Sherman (1976) to design a 108-factor scale to assess the student's MA, the subject of MA is gradually gaining relevance in research and practice (Glencross, Cheriam, 1992; Stoet et al., 2016; Tapia, Marsh, 2004). The acceptance of MA in research is steadily growing primarily because of the negative impact of MA on an individual's initial and future learning, achievements, and use of mathematics (Dowker et al., 2016; Soumen, Susanta, 2018). However, the role of gender within and among cultures remains less explored using large-scale data (Morsanyi et al., 2016)

Over the years, most of the MA studies were usually conducted using samples from a single western country (Morsanyi et al., 2016). Besides, most of these studies could not account for the

prevalence of cross-cultural MA gender differences because of the methodological limitation of excluding samples from Africa (Abraham et al., 2017; Abraham et al., 2017; García-Santillán et al., 2016; Soumen, Susanta, 2018). Additionally, there have been reports of conflicting gender differences in MA among most researchers (Dowker et al., 2016). While some researchers (Abraham et al., 2017; Pourmoslemi et al., 2013) observed gender-based differences in MA, others (Soumen, Susanta, 2018; Zakaria et al., 2012) reported no such differences. Besides, the need to examine the cross-cultural gender effect on MA in this current study is necessary since the use of numbers and mathematical operations go beyond mere “test anxiety” (Richardson, Woolfolk, 1980: 271) to include daily-life activities like payment for goods and services (García-Santillán et al., 2016).

The purpose of this study is to identify the role gender plays in determining MA among students in 12 countries. We also calculated the gender and location pairwise comparisons of MA.

## 2. Method

All participants were purposively sampled using a combination of face-to-face, paper/pencil test, and an online survey. The MA dataset comprised a total of 4,342 students (males= 1,738, females= 2,602) from 12 countries and 18 locations, with an overall mean age of 19.75 (SD = 2.12) and an overall mean MA score of 71.83 (SD = 21.62). A detailed description of research sites and their respective Mean ages (SD) are reported in Table 1.

**Table 1.** Sample descriptions of data from the mathematics anxiety survey

Country	Region collected	Gender (n)		Mean age (SD)
		Male	Female	
Egypt	Online	84	417	20.45 (3.05)
Ghana	Cape Coast	93	137	19.63 (2.02)
	Koforidua	95	72	19.67 (2.33)
India	Puducherry	47	203	20.39 (1.70)
	Uttar Pradesh	76	131	19.41 (2.47)
Iran	Qom	75	80	19.09 (2.27)
	Tehran	79	71	19.04 (2.31)
Malaysia	Online	279	231	19.97 (2.15)
Mexico	Veracruz	132	69	20.22 (2.23)
Nigeria	Enugu State	53	64	17.03 (1.04)
Pakistan	Faisalabad	40	116	20.60 ( 1.42)
	Lahore	148	183	20.00 (1.88)
	Rawalpindi	83	121	20.03 (1.40)
	Sargodha	168	226	19.77 (1.54)
Romania	Online	83	111	19.53 (2.12)
Thailand	Bangkok	82	73	20.63 ( 1.77)
Ukraine	Sumy	32	69	19.14 (2.17)
United Arab Emirates	Online	89	228	19.94 (1.70)
<b>Total</b>	<b>18</b>	<b>1,738</b>	<b>2,602</b>	<b>19.75 (2.12)</b>

## Instrument

All participants were requested to complete the ATMS (Muñoz, Mato, 2007) as a written paper and pencil test or an online test. This scale has 24-items clustered into five subscales: anxiety towards the evaluation of mathematics, anxiety towards temporality, anxiety towards the understanding of mathematical problems, anxiety towards numbers and mathematical operations, and anxiety towards mathematical situations in daily life. This scale has been reported by studies like García-Santillán et al. (2018) to have a higher Cronbach’s alpha coefficient of 0.97. Similarly, our data indicated a higher Cronbach’s alpha coefficient of above 0.90 for all the sites.

### Procedure

Ethical clearance for the project was acquired from the Institutional Review Board of the International Network Center for Applied Research (INCFAR-IRB/009/01-2020). However, collaborators who needed additional local or institutional ethics approval were allowed to apply for them. Also, collaborators were allowed to translate the study protocol and instrument (where necessary into their national/native language). Each collaborating location was to collect a minimum of 150 community-based participants (relaxed in two cases: Ukraine [Sumy] and Nigeria [Enugu State] from their respective communities (relaxed in four cases: Romania, Malaysia, Egypt, and United Arab Emirates where online data was collected).

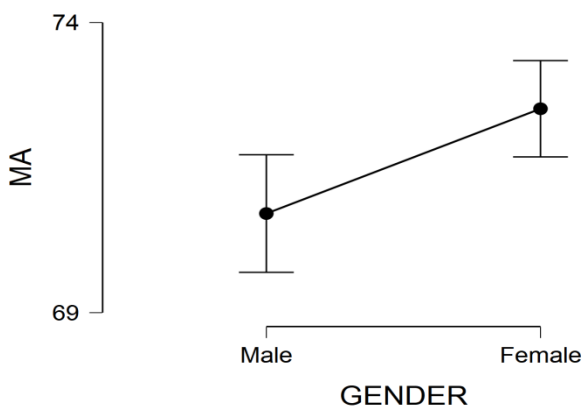
### Data Analysis

The data for male and female students and their respective locations were compared on their respective perceived MA scores. Both descriptive statistics (mean, standard deviations, reliability estimates, inter-item associations, Levene's Test of Equality of Error Variances, normality of data distribution test, and Pearson's correlations) and univariate analysis of variance were conducted after data cleaning was completed. This process enabled us to examine the gender differences in MA scores across individual sites.

Additionally, we set the likelihood of type I error (alpha) at .05 and calculated the effect size estimates for respective comparisons (Cohen, 1987). To measure the gender differences in MA across individual sites, Type III Sum of Squares was preferable as it is the most secured approach to analyse data with unequal sample sizes. Further, the global MA score which was derived from the addition of all the 24-items were computed to observe the differences between genders across locations. Also, pairwise comparisons for both gender and location were calculated using the Bonferroni test with their mean differences significant at the .05 level.

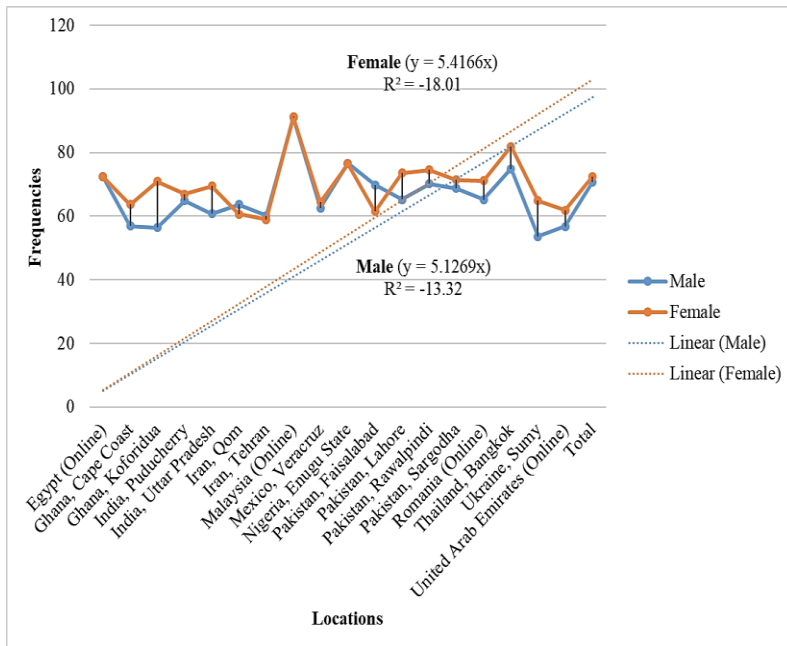
### 3. Results

Generally, the analysis shows that females significantly have higher MA scores across all the locations when compared with males (see Figure 1 for the mean plot). Pairwise comparisons using the Bonferroni test are based on estimated marginal means of gender alone. These comparisons indicate that females were seen to have a high MA mean score than males, [71.816 > 68.118].



**Fig. 1.** Gender differences in mathematics anxiety

Furthermore, the results show that gender and location of data collection had significant main effects on perceived MA score. From Table 2, gender had a main significant effect on students' perceived MA score [ $F(1, 4,339) = 28.357, p = .000$ ]. Concerning the interaction effect of gender and location on MA, females reported significantly higher MA scores than males in the rest of the locations, except Iran (Tehran and Qom) and Pakistan (Faisalabad). Nonetheless, there were no significant differences in MA scores between males and females in Egypt, Malaysia, and Nigeria (Enugu).



**Fig. 2.** Mean gender differences in mathematics anxiety across locations

Specifically, females from Malaysia (online), Thailand (Bangkok), and Nigeria (Enugu State) are the top three regions with the highest MA scores. Nonetheless, males from Malaysia (online), Nigeria (Enugu State), and Thailand (Bangkok) also ranked among the top three regions with the highest MA scores (see Figure 2).

**Table 2.** Univariate effects of location and gender on mathematics anxiety

Country	Region collected	N = 4,340		
		Male Mean (SD)	Female Mean (SD)	Mean (SD) of MA
Egypt	Online	72.33 (22.76)	72.42 (23.58)	72.40 (23.43) <sup>ns</sup>
Ghana	Cape Coast	56.87 (20.69)	63.70 (20.25)	60.94 (20.66) *
	Koforidua	56.41 (21.46)	70.93 (20.35)	62.67 (22.14) **
India	Puducherry	64.85 (20.80)	66.99 (18.29)	66.59 (18.77) *
	Uttar Pradesh	60.82 (20.99)	69.53 (23.84)	66.33 (23.17) *
Iran	Qom	63.73 (19.15)	60.69 (20.38)	62.16 (19.79) *
	Tehran	60.20 (16.91)	58.94 (18.89)	59.67 (17.82) *
Malaysia	Online	91.01 (6.31)	91.22 (6.78)	91.11 (6.52) <sup>ns</sup>
Mexico	Veracruz	62.63 (20.41)	64.42 (18.69)	63.24 (19.81) *
Nigeria	Enugu State	76.55 (12.35)	76.43 (12.41)	76.48 (12.33) <sup>ns</sup>
Pakistan	Faisalabad	69.85 (17.39)	61.56 (16.84)	63.67 (17.31) *
	Lahore	65.29 (22.38)	73.54 (21.20)	69.85 (22.09) *
	Rawalpindi	70.23 (19.19)	74.50 (19.51)	72.76 (19.45) *
	Sargodha	68.76 (20.45)	71.38 (21.10)	70.26 (20.84) *
Romania	Online	65.29 (17.69)	71.12 (17.01)	68.62 (17.50) *
Thailand	Bangkok	74.89 (17.38)	81.90 (16.04)	78.19 (17.07) **
Ukraine	Sumy	53.63 (16.42)	64.86 (18.63)	61.30 (18.63) *
United Arab Emirates	Online	56.81 (17.10)	61.91 (20.50)	60.47 (19.71) *
Total		70.75 (21.56)	72.55 (21.63)	71.83 (21.62) *
		<b>df</b>	<b>F</b>	<b>η<sup>2</sup><sub>p</sub></b>
Gender		1	28.834***	.007
Location		17	49.971***	.165
Gender * Location		17	3.391***	.013
Total		4,339		

Notes: \*\*\* $\rho < .001$ , \*\* $\rho < .01$ , \* $\rho < .05$

Additionally, location of data collection had a main significant effect on students' perceived MA score [ $F(17, 4,339) = 28.357, \rho = .000$ ]. Specifically, linearly independent pairwise comparisons among the estimated marginal means using the Bonferroni test show that there were several significant differences among the regions. For example, Malaysia (Online) had a significantly higher MA mean score than all the regions while the rest of the regions indicated varied differences against the other locations (see Table 3 for respective means).

**Table 3.** Ranked Means and Mean Differences in Locations' Mathematics Anxiety

Location	Mean	Mean Difference																	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. Malaysia (Online)	90.95	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2. Thailand, Bangkok	81.64	9.4*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3. Nigeria, Enugu State	79.49	11.5*	2.2 <sup>ns</sup>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4. Pakistan, Rawalpindi	75.38	15.6*	6.3 <sup>ns</sup>	4.1 <sup>ns</sup>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5. Pakistan, Sargodha	73.05	17.8*	8.6*	6.4 <sup>ns</sup>	2.3 <sup>ns</sup>	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6. Egypt (Online)	72.38	18.6*	9.3*	7.1 <sup>ns</sup>	3.0 <sup>ns</sup>	.7 <sup>ns</sup>	-	-	-	-	-	-	-	-	-	-	-	-	-
7. Pakistan, Lahore	72.12	18.8*	9.5*	7.3 <sup>ns</sup>	3.2 <sup>ns</sup>	.9 <sup>ns</sup>	.3 <sup>ns</sup>	-	-	-	-	-	-	-	-	-	-	-	-
8. Romania (Online)	70.74	20.2*	10.9*	8.8*	4.6 <sup>ns</sup>	2.3 <sup>ns</sup>	1.7 <sup>ns</sup>	1.4 <sup>ns</sup>	-	-	-	-	-	-	-	-	-	-	-
9. India, Puducherry	68.41	22.4*	13.2*	11.1*	7.0 <sup>ns</sup>	4.6 <sup>ns</sup>	4.0 <sup>ns</sup>	3.7 <sup>ns</sup>	2.3 <sup>ns</sup>	-	-	-	-	-	-	-	-	-	-
10. Pakistan, Faisalabad	68.28	22.7*	13.4*	11.2*	7.1 <sup>ns</sup>	4.8 <sup>ns</sup>	4.1 <sup>ns</sup>	3.8 <sup>ns</sup>	2.5 <sup>ns</sup>	.1 <sup>ns</sup>	-	-	-	-	-	-	-	-	-
11. India, Uttar Pradesh	67.43	23.5*	14.2*	12.1*	8.0*	5.7 <sup>ns</sup>	5.0 <sup>ns</sup>	4.7 <sup>ns</sup>	3.3 <sup>ns</sup>	1.0 <sup>ns</sup>	.9 <sup>ns</sup>	-	-	-	-	-	-	-	-
12. Ghana, Koforidua	65.52	25.4*	16.1*	14.0*	9.9*	7.5*	6.9 <sup>ns</sup>	6.6 <sup>ns</sup>	5.2 <sup>ns</sup>	2.9 <sup>ns</sup>	2.8 <sup>ns</sup>	5.1 <sup>ns</sup>	-	-	-	-	-	-	-
13. Mexico, Veracruz	65.32	25.6*	16.3*	14.2*	10.1*	7.7*	7.1*	6.8*	5.4 <sup>ns</sup>	3.1 <sup>ns</sup>	3.0 <sup>ns</sup>	2.1 <sup>ns</sup>	.2 <sup>ns</sup>	-	-	-	-	-	-
14. Iran, Qom	64.37	26.6*	17.2*	15.1*	11.0*	8.7*	8.0*	7.8*	6.4 <sup>ns</sup>	4.0 <sup>ns</sup>	3.9 <sup>ns</sup>	3.1 <sup>ns</sup>	1.2 <sup>ns</sup>	1.0 <sup>ns</sup>	-	-	-	-	-
15. Ghana, Cape Coast	62.35	28.6*	19.3*	17.1*	13.0*	10.7*	10.0*	9.8*	8.4*	6.1 <sup>ns</sup>	5.9 <sup>ns</sup>	5.1 <sup>ns</sup>	3.2 <sup>ns</sup>	3.0 <sup>ns</sup>	2.0 <sup>ns</sup>	-	-	-	-
16. Iran, Tehran	61.55	29.4*	20.1*	18.0*	13.8*	11.5*	10.8*	10.6*	9.2*	6.9 <sup>ns</sup>	6.7 <sup>ns</sup>	5.8 <sup>ns</sup>	4.0 <sup>ns</sup>	3.8 <sup>ns</sup>	2.8 <sup>ns</sup>	.8 <sup>ns</sup>	-	-	-
17. Ukraine, Sumy	61.07	29.8*	20.5*	18.4*	14.3*	12.0*	11.3*	11.1*	9.7*	7.3 <sup>ns</sup>	7.2 <sup>ns</sup>	6.4 <sup>ns</sup>	4.5 <sup>ns</sup>	4.3 <sup>ns</sup>	3.3 <sup>ns</sup>	1.3 <sup>ns</sup>	.5 <sup>ns</sup>	-	-
18. United Arab Emirates (Online)	59.36	31.5*	22.3*	20.1*	16.0*	13.7*	13.0*	12.8*	11.4*	9.0*	8.9*	8.1*	6.2 <sup>ns</sup>	6.0 <sup>ns</sup>	5.0 <sup>ns</sup>	3.0 <sup>ns</sup>	2.2 <sup>ns</sup>	1.7 <sup>ns</sup>	-

Notes:

\*. The mean difference is significant at the .05 level.

ns = not significant.

Adjustment for multiple comparisons: Bonferroni.

#### 4. Discussion

The study explored the role of gender in determining MA across locations in 12 countries (Malaysia, Thailand, Nigeria, Pakistan, Egypt, Romania, India, Ghana, Mexico, Iran, Ukraine, and United Arab Emirates), and 18 locations or sites (see Tables 1, 2). Further, we calculated the pairwise comparisons in MA scores for both gender and location.

Our findings indicated that gender differences play a significant role in determining MA across different locations or cultures (Dowker et al., 2016; Sokolowski et al., 2019). Though the results painted different pictures of the effects of gender on MA, females were seen to have an overall higher MA score than males. This is a common perception that has been shared by several studies over the years. For example, studies conducted in the Southeast Anatolia Region of Turkey (Erdem, 2017) and Hamedan, Iran (Pourmoslemi et al., 2013) found females to rate themselves higher in MA than males. This increase in anxiety among females may be because mathematics and other related-subjects are culturally perceived to be fields for the male-gender instead of females (Dowker et al., 2016).

However, the results pointed out that male participants in three locations (Iran [Qom and Tehran], Pakistan [Faisalabad]) reported higher MA than their female counterparts. This finding is also supported by a study by Abraham et al. (2017) with samples from southern, central, and northern parts of Kerala, India. Another explanation for the recent positive perception of Iranian females towards



mathematics and a possible lower MA scores than their male counterparts as compared to some past studies in Iran (Keshavarzi, Ahmadi, 2013; Pourmoslemi et al., 2013) might be derived from a proposition by Castelvechi (2020). According to Castelvechi (2020), Iranian girls have been motivated to take up mathematics as a result of the success of the late Maryam Mirzakhani (the first woman to win the Fields Medal; the highest global mathematics prize in 2014). Thus, such a role model could be very positive in lowering national mathematics-related anxiety among females.

Furthermore, the study's findings showed that there are no significant differences between males and females in Egypt, Malaysia, and Nigeria (Enugu State). Likewise, analogous findings were observed in studies conducted in Selangor, Malaysia (Zakaria et al., 2012), Purulia district, India (Soumen, Susanta, 2018), Ciamis District, Indonesia (Amam et al., 2019), and Shiraz, Iran (Keshavarzi, Ahmadi, 2013). However, these nations (Malaysia and Nigeria [Enugu State]) recorded overall high scores in MA, which need to be explored further to understand the factors affecting such results.

### 5. Limitations

This survey is among the few recent studies of MA with participants from 12 countries. Nonetheless, the findings from our study cannot be generalised for the entire national populations of these countries owing to the nature of the small exploratory community samples collected across the various locations. Additionally, samples that were collected via online surveys (Romania, Malaysia, Egypt, and United Arab Emirates) are limited to individuals with access to internet services and may not be representative of all students in these countries. Though our results should be interpreted with caution, they provide a broader picture of the effect of gender on MA scores across several countries.

### 6. Conclusion

The study suggests that the effects of gender on MA is a cross-cultural phenomenon. Moreover, ATMS (Muñoz, Mato, 2007) is a reliable and valid scale for measuring and screening MA among students across different countries and locations. Based on our findings, we suggest that mathematics teachers need to adapt to different gender-focused teaching and learning interventions according to their prevailing psychosocial environment. These interventions would assist students to work with mathematics better. Moreover, particular attention is needed to explore further the MA perceptions in Malaysia, Thailand (Bangkok), and Nigeria (Enugu) since they ranked among the locations with highest MA scores.

### 7. Acknowledgments

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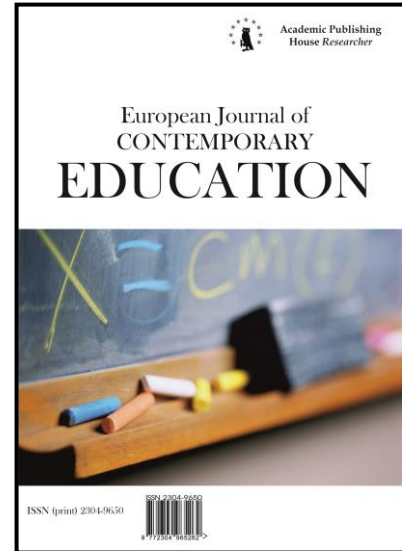
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## Global Level of Trait Emotional Intelligence as a Predictor of Achievement Motivations of Students of Physical and Sports Education

Miroslav Slizik<sup>a</sup>, Lucia Paskova<sup>a</sup>, Jana Stehlikova<sup>a</sup>, Pavol Bartik<sup>a,\*</sup>

<sup>a</sup>Matej Bel University, Banská Bystrica, Slovakia

### Abstract

**Introduction:** The role of emotions in increasing the achievement of athletes is at the forefront of sports psychology whilst it is a key area not only in terms of perception and orientation in their own emotions, but also their management and control to succeed, which motivated us to analyze the relationship of EI as a complex of dispositions to behave emotionally in a competent way and the tendency to deliver high sports achievement. The research group consisted of achievement athletes studying physical and sports education.

**Material and Methods:** The design is in the form of a cross-sectional study. The research group consisted of 183 respondents – university students. To record the level of EI, we used TEIQue-SF/TEIQue-ASF (Slovak translation by: Kaliska, Nabelkova and Salbot, 2015) and to determine the share of individual personality dimensions on a global level of achievement motivation, we used LMI (translation and editing by: Hoskovcová, 2003). From mathematical-statistical methods, we subjected the data to correlation and regression analysis.

**Results:** We found the closest significant correlations in the case of well-being and confidence in success, flexibility, which is also significantly associated with self-control. Sociability is most strongly associated with dominance and emotionality with flexibility and internality. The global level of trait EI is most significantly associated with confidence in success and flexibility.

**Discussion:** Our findings clearly show that adequate processing of one's own emotions contributes to a deepening of concentration on sport achievement as well as to a higher self-confidence reflected in the setting of more adequate and realistic goals.

**Keywords:** achievement motivation, sport, physical education, students.

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\* Corresponding author

E-mail addresses: [pavol.bartik@umb.sk](mailto:pavol.bartik@umb.sk) (P. Bartik), [miroslav.slizik@umb.sk](mailto:miroslav.slizik@umb.sk) (M. Slizik), [lucia.paskova@umb.sk](mailto:lucia.paskova@umb.sk) (L. Paskova), [jana.stehlikova@umb.sk](mailto:jana.stehlikova@umb.sk) (J. Stehlikova)

## **1. Introduction**

Currently, one of the key factors of long-term achievement motivation, regardless of the type of sport and its achievement level, is the ability and possibility of self-knowledge, whose interpretive competences are limited by the level of knowing the interrelationships of variables participating in achievement. In the case of the evaluation of sports achievement, it is necessary at least to know the approximate extent to which individual factors contribute to it. Achievement can be affected by age, health status, level of physical abilities, degree of acquisition of sports equipment or, in the case of team sports, of social relationships (Austin, 2004).

According to Petrides and Furnham (2006), as the activation gradually increases due to emotional stimulation from the environment or the speed of activity-relevant signals, achievement will also increase. This increase will continue until the optimum is reached, then the range of attention will be narrowed so that even the relevant signals for operation will not be accepted and there will be a decrease in achievement.

The greater the fear of failure, the weaker the motive for achievement. According to Atkinson, there are two achievement orientations in humans – to achieve success and to avoid failure. Conroy et al. (2007) consider the tendency to achieve success and avoid failure as relatively constant dispositions that lead to transititionally consistent behavior. This view has not been confirmed by research, but the truth remains that Atkinson's findings have triggered a number of research activities that persist to this day. The expression of motivational tendencies was experimentally verified by equations, and techniques for determining individual variables were developed. Verification of the relationships and connections of the basic variables of achievement behavior, as well as verification of their connections with other variables, is the main goal and problem for many researches.

Equally inspiring is the McClelland concept, which understands achievement motivation as a relatively constant predisposition of an individual - the expectation of certain affective changes in relation to achieving or failing a goal (this is the motivational effect of hope on success and fear of failure). All people desire success, but they differ in the strength of the motive of achievement, which is given by the ratio of the desire for success and the fear of failure (the greater this fear, the weaker the motive of achievement).

The role of emotions in choosing the difficulty of the goal is described by Goleman (2017), who claims that emotional intelligence not only helps to achieve ever better achievement, but also inspires to start an activity, with enthusiasm, even if it is an extremely challenging task. Another category supporting the interconnection of achievement motivation and emotional intelligence is Atkinson's assumption that goal setting depends on two variables: the probability of achieving the success – expectation (achievement motive decreases with decreasing probability of success) and the value of the goal achieved (attractive goal = strong motivation).

The concept of achievement motivation has been supplemented by various authors with other point of view. An important role in them was played by de Charms' personal causality (1976), Heider's concept of causal attributes (1958), Escalon's and Festinger's concept of the resulting valence (Anshel, 1996) etc. At present, Heckhausen 's model of self-evaluation is one of the most comprehensive views of achievement motivation and appears to be very close to Meyer' s concept of self-talent, which is related to Bandura 's concept of self-efficacy. According to the author, human is not solely motivated by internal forces, nor automatically shaped by the external environment, but he himself contributes to his motivation, activity and development of himself. The perception of self-realization is a flexible system of self-confidence that helps to overcome failure. Confidence in one's own ability is manifested through 4 processes: cognitive processes – high self-confidence affects the structure of thinking, and thus also behavior (high self-evaluation forces us to set higher goals), emotional processes – especially in the area of stress and anxiety (people who believe that they can at least partially control threatening situations, do not feel as strong anxiety as those who experience helplessness), motivational processes – their own efficiency contributes to e.g. perseverance, will processes – it is a choice of challenging but manageable situations and activities (Biddle, 1997).

The role of emotions in the athlete's achievement motivation is undeniable, especially in case of fear and anxiety. The ability to perform successfully under the influence of fear largely determines the course of mental processes. Against the background of a negative mental state, sports performance is subsequently deformed and it often causes an unsuccessful result.



Heckhausen (1980) argues that the fear of failure is not the only inhibitory factor of success-focused activity. This view has also been verified in research by Buckert, Mayer and Schmatt having shown that the fear of failure can inhibit human activity only in conjunction with low appreciation of one's own abilities (Bipp, van Dam, 2014).

Rehulkova, Frankova and Osecka (1995) studied the relationship between performance motivation and anxiety while finding that anxiety that inhibits achievement is associated with both state and trait anxiety. Negative trait anxiety is most associated with achievement-inhibiting anxiety. Of all the negative and positive components, negative trait anxiety is used as the only predictor of anxiety inhibiting athletic achievement. Achievement – enhancing anxiety, according to research findings, is not related to status or trait anxiety, but it is related to the positive component of trait anxiety, which means that the happier people students considered themselves to be, the higher was their motivation to achieve.

The positive relationship between achievement motivation and currently experiencing anxiety can be interpreted in two ways. On the one hand, it is possible that high achievement motivation increases the currently experienced feeling of anxiety. On the other hand, it is possible that the currently experienced anxiety can either slow down or support sports achievement. If achievement inhibits, the person has low achievement motivation, and when the achievement supports, the person has high achievement motivation (Weiss, Ferrer-Caja, 2002).

Except for fear and anxiety, joy, happiness, enjoyment, shame, guilt or anger also play an important role in achievement e motivation. Shame and guilt are often the result of failure in a achievement situation. Shame is the result of the attribution of failure due to low abilities, and guilt is the result of the attribution of lack of effort. Shame is evoked by the public characteristic of the self, which is not controllable by the will. Guilt follows a breach of the norm and is caused by a judgment of one's own responsibility. For this reason, shame leads to hopelessness and secretiveness, and guilt encourages behavior leading to modification of action. There is a relationship between the two emotions, which can be interpreted as the fact that both emotions contain negative self-esteem, which is painful, evokes tension, agitation and depression. Hopelessness occurs when individuals are attributed with a low ability or a task that is too demanding. In despair, the stability of the causes is also important. If an individual anticipates that the failure will recur in the future, hopelessness may occur.

Success, from the psychological point of view, means above all the subjective experiencing of success, which is associated with the predominance of positive emotions over negative ones. Adequately processed emotions lead to trust, pride, commitment and thus to the increase of work productivity (Petrides, Furnham, 2001).

Carefully managed emotions can lead to trust, loyalty and commitment, as well as the increased productivity, innovation and success in the individual, team and organizational sphere. The aim of our paper is to point out the share of trait EI in achievement motivation, leading to the achievement of sport success in physical education students.

## **2. Materials and methods**

*Participants:* The research group was made up of Matej Bel University students who voluntarily participated in our research and were acquainted with its purpose, processing or use of data. The research group consisted of 183 physical education students of various sports specializations with an average age of 22 years old (min. 18 years, max. 26 years). The gender representation was 108 women (59 %) and 75 men (41 %).

*Procedure:* The main goal of the paper is to examine the achievement motivation and emotional intelligence of adolescents, therefore we look at achievement motivation in terms of the share of personality in their own achievement, which presupposes a broader understanding of achievement motivation, integrating existing knowledge in this area.

Therefore, we decided to use the LMI Questionnaire (Schuler & Prochaska, translated and edited by Hoskovcová, 2003), which allows us to determine the overall value of motivation to achievement in a sports context. However, it is not limited to sports only, but can be used in all directions where monitored effort to deliver achievement e occurs. The LMI questionnaire contains 170 items, which are assigned to 17 dimensions: perseverance, dominance, commitment, confidence in success, flexibility, flow, fearlessness, internality, compensatory effort, pride in performance, willingness to learn, independence, self-control, status orientation, preference for



complexity, competitiveness and determination. Each dimension consists of 10 items (10 statements), the respondent's task is to indicate the degree of agreement with specific statements on a scale of 1-7 (1 = complete disagreement - 7 = complete agreement). In individual scales, the gross score ranges from min. 10 to max. 70. The gross score of individual 17 scales forms the overall level of performance motivation min. 70 to max. 1190. The reliability of the questionnaire measured by Cronbach's alpha for individual dimensions takes the values .823 - .858, for global performance motivation it is .956.

Because we start from the Model of Trait Emotional Intelligence (Petrides, Furnham, 2001), emphasizing the subjectivity of emotional experience to identify the level of EI as well as its 4 components (well-being, emotionality, sociability and self-control), we used the TEIQue-SF/TEIQue-ASF Questionnaire (Petrides, translated and edited by Kaliska, Nabelkova & Salbot, 2015), which is a short form of the basic TEIQue version. It consists of 30 items, where respondents are asked to answer by indicating the intensity of their agreement (7 – strongly agree) – disagreement (1 – strongly disagree) on a 7-degree liqueur scale. According to its authors, the short form of the questionnaire works as an indicative assessment of the degree of self-perceiving abilities and behavioral dispositions of a person related to emotions. The reliability of the questionnaire measured by Cronbach's alpha for the global EI is .973 and ranges in values from .932 - .974 for the individual components.

**Informed consent:** Informed consent has been obtained from all individuals included in this study.

**Ethical approval:** The research related to human use has been complied with all the relevant national regulations, institutional policies and in accordance with the tenets of the Helsinki Declaration (WMA Declaration of Helsinki, 2016).

**Statistical analysis:** The research data were processed using the SPSS Statistics program, version 19. The univariate and bivariate descriptive analysis were followed by inferential statistical procedures. We evaluated the normality of variables distribution based on the description of the distribution form (skewness, kurtosis) and, as seen on chart 1, none of the coefficients indicates significant deviations from the normal distribution. We used Pearson's correlation coefficient to analyze the interrelationships.

### 3. Results and discussion

Table 1 presents descriptive statistics of trait EI variables and dimensions of achievement motivation students of physical and sports education.

**Table 1.** Descriptive statistics of trait EI variables and dimensions of achievement motivation students of physical and sports education

	AM	Mdn	SD	Min	Max	Skewness	Kurtosis
wellbeing	5.31	5.0	.84	2.8	7.0	-.574	-.081
self-control	4.26	4.0	.45	2.5	6.9	.083	-.541
emotionality	5.62	5.5	.38	2.4	7.0	-.385	-.034
sociability	4.76	4.5	.67	2.2	7.0	-.046	.298
TEIQ	4.32	4.0	.55	2.2	6.9	.014	-.119
endurance	4.11	4.0	.69	2.9	6.8	.132	.502
dominance	4.26	4.0	.84	3.2	6.5	.155	-.191
commitment	3.28	4.0	.99	2.4	6.9	.197	.536
confidence in success	4.16	4.0	.43	2.8	6.7	.035	.421
flexibility	4.48	4.5	.67	1.6	6.7	.351	.246
flow	4.83	4.0	.74	2.5	6.8	.185	-.397
fearlessness	3.97	4.0	.89	1.0	6.8	.239	-.221
internality	4.86	4.0	.46	3.5	6.3	.214	-.049
compensatory effort	4.33	4.0	.75	1.5	6.9	-.118	-.055

pride of achievement	5.16	4.5	.38	3.8	7.0	-.229	-.417
willingness to learn	4.95	4.5	.58	2.8	6.5	.142	-.177
difficulty preference	3.14	3.5	.64	1.7	6.3	-.025	.395
self-activity	4.25	4.5	.36	2.9	6.4	.264	.231
self-control	4.12	4.0	.83	2.6	6.6	.213	-.487
status orientation	4.81	4.0	.21	2.3	6.9	.161	-.384
competition	4.69	4.0	.98	3.9	6.8	-.285	-.155
sense of purpose	4.74	4.0	.65	4.4	6.4	-.095	-.413
achievement motivation	4.89	4.5	.49	6.4	7.0	.423	.041

As we can see, we found significant relationships between the global level of trait EI and almost all categories involved in achievement motivation. The only exceptions were the categories of commitment and competition. We found moderately close relationships between trait EI and endurance ( $r = .494^{***}$ ), dominance ( $r = .467^{***}$ ), fearlessness ( $r = .442^{***}$ ), internality ( $r = .375^{**}$ ), pride of performance ( $r = .444^{***}$ ), willingness to learn ( $r = .396^{***}$ ), self-control ( $r = .345^{***}$ ). We found a strong relationship between the trait EI and confidence in success ( $r = .528^{***}$ ), flexibility ( $r = .511^{***}$ ) and the global level of achievement motivation ( $r = .541^{***}$ ).

Table 2 presents correlations between the variables of trait EI and dimensions of achievement motivation students of physical and sports education.

**Table 2.** Correlations between the variables of trait EI and dimensions of achievement motivation students of physical and sports education

	wellbeing	sebakontrola	emocionalita	sociabilita	TEIQ
endurance	.240**	.225*	.264*	.390***	.494***
dominance	.329***	.119*	.105*	.596***	.467***
commitment	.169	.049	.184	.076	.149
confidence in success	.522***	.312***	.247**	.414**	.528***
flexibility	.423***	.398***	.124***	.211***	.511***
flow	.118	.125	.149	.054	.178*
fearlessness	.169*	.332**	.155	.134**	.442***
internality	.243**	.214*	.317***	.025	.375***
compensatory effort	.189*	.084	.192	.114	.222**
pride of achievement	.322**	.027	.353***	.284	.444***
willingness to learn	.282*	.214*	.375**	.295*	.396***
difficulty preference	.012	.174	.218	.137**	.230**
self-activity	.076	.259	.139	.376***	.276**
self-control	.111**	.215**	.345***	.264**	.345***
status orientation	.243*	.155	.125	.038	.193*
competition	-.048	-.267*	-.091	.084	-.064
sense of purpose	.227**	.017	.171	.111	.249**
achievement motivation	.327**	.234**	.331**	.377***	.541***

Table 3 presents the results of a linear regression analysis where the global level of achievement motivation was the dependent variable and the global level of trait EI was the independent variable.

**Table 3.** Regression analysis of trait EI as a predictor of achievement motivation of students physical and sports education

Model	Coefficient determination R <sup>2</sup>	Adj.R <sup>2</sup>	β	F
1	.291	.283	.741	69.219***

As part of our research goal, we decided to explore the causal influence of the global level of trait EI on the global level of achievement motivation in active achievement athletes studying physical and sports education at university, where we found several significant, variously strong relationships between its specific categories and trait EI.

Therefore, we decided to subject them to a regression analysis, aiming at examining how the variability of one variable (Y, predictor) is explained by the variability of another/other variables (explanatory variables). In our case, we created one regression model, where the global level of achievement motivation was a dependent variable and the global level of trait EI was the independent variable.

After checking the assumptions (normality of the residue distribution, testing of multicollinearity, homoscedasticity, removal of outliers, etc.), we decided on the method of multiple linear regression. Analysis of variance shows that the regression result is statistically significantly different from zero (F 69.219 \*\*\*).

Therefore, our findings are not the result of chance and are consistent with the alternative hypothesis that the trait EI is a significant predictor of achievement motivation. Chart 3 presents the values of *R Square* ( $R^2$ ) and *Adjusted R Square*.  $R^2$ , which tell how much variance of the dependent variable is explained by the independent variables. In our case,  $R^2 = .291$ , i.e. 29.1 % of the dependent variable variance is explained by independent variables, and thus the remaining 71.9 % of the variability should be sought in different factors.

However, we take into account the *Adjusted R Square* data, because the value of  $R^2$  can be artificially increased by the number of variables entering the analysis (the more independent variables, the higher  $R^2$ ). *Adjusted R Square* takes into account the number of variables and adjusts the value of  $R^2$  accordingly. In our case, the independent variables explain 28.3 % of the dependent variable. The beta coefficient reaches .741, which means that increasing the score by one unit in trait EI will increase the score in achievement motivation by .741 points.

The impact of emotions on any human activity is undeniable. All people long for success, but they differ in the strength of the achievement motive, which is given by the ratio of the desire for success and the fear of failure (the greater this fear, the weaker the motive of achievement).

The role of emotions in choosing the difficulty of the goal is described by Goleman (2017) according to whom, emotional intelligence not only helps to achieve ever better achievement, but also inspires to start an activity with enthusiasm, even if it is an extremely challenging task.

An interesting point of view is brought by Ruiz and Casado (2012), who consider the so-called balance of life areas very important, which reports on the ability to simultaneously balance the time demands of work and personal life. The above-mentioned author carried out research, whose aim was to examine and specify the relationship between the balance of life areas, life satisfaction and stress.

#### 4. Conclusion

The study confirmed a presumed positive relationship between the balance of life areas and life satisfaction. The balance of life areas stood in a positive relationship with life satisfaction, while the fulfillment of achievement needs and affiliation mediated this relationship. In addition, a negative relationship between balance and stress was found. The results point out the importance of time balance and the fulfillment of this time in terms of meeting the social needs associated with individual areas of life.

Our research findings clearly show the key role of human emotionality – not only at the level of perception and orientation in one's own emotions, but also their management or management for

achieving sports success. If a person is unable to process his emotions properly, he does not have the opportunity to focus on the implemented activity for a long time, he cannot constructively solve the problems that have arisen, which affects his further decisions and the overall quality of life.

#### 4. Conflict of interest

The authors declare that there is no conflict of interest.

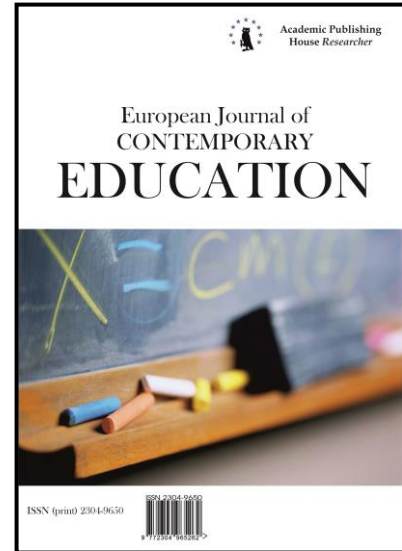
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## Competencies of Physical Education Teachers for Injury Prevention

Sarunas A. Sniras <sup>a</sup>, Aiste Barbora P. Uspuriene <sup>a</sup>, Romualdas K. Malinauskas <sup>a, \*</sup>

<sup>a</sup> Lithuanian Sports University, Lithuania

### Abstract

The main attention in the publication is paid to the competencies of physical education teachers for sport injuries and their prevention. The scientific newness is characterized by the felt lack of scientific works for the analysis of these issues. The sample of the research consisted of 126 physical education teachers (54 women (43 per cent) and 72 men (57 per cent)). The teachers were also divided into groups according to the experience of pedagogical work: 57 teachers (45 per cent) had the pedagogical experience of up to 10 years and the pedagogical experience of 69 teachers (55 per cent) exceeded 10 years. For the revelation of this issue, the Questionnaire of the competencies of physical education teachers for injury prevention was used that had been compiled on the basis of scientific literature (Raižienė, 2014; Vercruyssen et al., 2016). The data of the research showed most competencies of physical education teachers for sport injuries of students and their prevention differed statistically significantly depending on the gender among teachers and their pedagogical experience. Teachers with the pedagogical experience of up to 10 years state that students encounter injuries during their lessons more often. The direction of further research should be modelling of programs about the competencies in the field of injury prevention.

**Keywords:** sports injuries, teachers, competence, education, prevention.

### 1. Introduction

Students are an important part of the society, so more attention should be paid to the nurturance of health because most of them do not reach the recommended level of physical activity. Constantly growing encouragement of the healthy way of life in the society also increases the need of physical education teachers to hold physical education lessons more effectively. The school environment is one of the places where students have a big likelihood of injuries. Regular physical activity affects positive physical, psychological and social changes in students, increase their self-confidence and decrease the symptoms of stress or depression (Starc, Strel,

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\* Corresponding author

E-mail addresses: [Romualdas.Malinauskas@lsu.lt](mailto:Romualdas.Malinauskas@lsu.lt) (R.K. Malinauskas)



2012). However, every serious injury of a student is related with possible psychological and social problems or economic factors (Carmeli et al., 2003; Costa e Silva et al., 2017).

A physical education teacher has a big influence in the life of a healthy and active student (Barnes et al., 2019); it is also indicated physical education specialists play an important role in injury prevention (Bianchi et al., 2019). The research shows (Strukčinskienė et al., 2015) every fifth child suffers injuries at school. One of the main reasons is that students spend much time at school, so it is important to create and ensure safe and healthy environment of learning (Collard et al., 2010; Costa e Silva et al., 2017).

The newest research (Bissett et al., 2020) notices a big problem in injury prevention, i.e., physical education specialists have an insufficient competency in order to ensure stable physical health of a student and provide him/her with psychological assistance if necessary.

Sport injuries can be foreseen, but it is impossible to avoid them in the activity of physical education; however, the risk and seriousness of injuries can be reduced if the strategies of injury prevention are known (Emery, Pasanen, 2019; Räisänen et al., 2018). According to Strukčinskienė et al., (2015), even 68 per cent students mostly suffer injuries during physical education lessons. If a student suffers this kind of injury, it can affect his/her health, so both physical education teachers and the society must pay attention to it and take effective programs of injury prevention during lessons. Although there is no teacher that wants his/her students to suffer injuries during physical education lessons, it occurs and can cause negative consequences on a student's health or even life. Scientists Gutiérrez-Castañón et al. (2018), Göpfert et al. (2018), Strukčinskienė et al. (2015) analysed the kind of injuries and ways of their prevention during physical education lessons, but the number of this kind of studies is not sufficient.

For example, Jankauskienė and Miežienė (2011) state the main fields, which teachers mostly accentuate and speak about them with their students, are encouragement of bad habit prevention, healthy nutrition as well as communication and cooperation. Just 4.3 per cent respondents state they lack knowledge about accident prevention (including injuries). For these reasons, taking into account the problem of students' injuries during physical education lessons, it is important to examine their spread, analyse the reasons, which cause injuries during lessons, in order to avoid them or reduce their number. Thus, the role of physical education teachers is important because a competent teacher can assess the athletic preparation of students, choose exercises and proper inventory and foresee a possible risk of injuries (Vercruyse et al., 2016).

A modern physical education teacher is responsible for effective and safe participation of students in lessons, so it is relevant to pay more attention to these issues. For this reason, it is especially important for physical education specialists to be able to provide qualitative services, which would ensure their safety and effectiveness (Craig, Eickhoff-Shemek, 2009).

*Study hypothesis* – physical education teachers lack competencies for sport injuries and their prevention.

*The aim of the study* was to assess the competences of physical education teachers related with injury prevention.

*The significance of research.* It can be stated there have been no works to date, which aim would have been to reveal the way physical education teachers assess their competencies in the field of injury prevention. Thus, the aim of this work is to assess if physical education teachers provide enough information to their students about injuries during lessons and if they feel a need for this kind of knowledge.

## 2. Methods

*Sample and Procedure.* As the aim of the research was to ascertain the competencies of physical education teachers from different Lithuanian schools for injury prevention, a sample was compiled that consisted of pedagogues from Lithuanian cities. The researched were selected randomly according to tables of random numbers from the total list of comprehensive schools of Lithuanian cities.

126 physical education teachers participated in research and their age ranged between 22 and 65 (age mean –  $39.4 \pm 10.3$ ). 54 women (43 per cent) and 72 men (57 per cent) participated in the research. All the researched had higher university education.

Physical education teachers were also divided into groups according to the pedagogical experience: adapting physical education teachers with the pedagogical experience of up to 10 years belonged to the first group and the pedagogues, who were self-confident and were able to make responsible work activity-related decisions independently and whose pedagogical experience exceeded 10 years, belonged to the group of experienced physical education teachers. 57 teachers (45 per cent) had the pedagogical experience of up to 10 years and the pedagogical experience of 69 teachers (55 per cent) exceeded 10 years.

Before the survey, the research participants were familiarized with the research and its aim personally, the importance of each participant and the anonymity of the research data were explained. The following principles of the research ethics were observed during the survey: voluntary agreement to participate in the research, anonymity with that it was tried to get answers from each respondent and efforts to avoid any answers affected by outsiders or their attitudes. The research was organized after agreeing and coordinating with the administration and physical education teachers of each school in advance. Oral agreements with the research were obtained. The teachers were surveyed at the educational institutions, in separate quiet rooms (for example, in classrooms or sport halls), after physical education lessons.

*Instruments.* In order to assess the competencies of physical education teachers for injury prevention, suffered injuries and their type, the Questionnaire of the competencies of physical education teachers for injury prevention was used. This questionnaire was compiled on the basis of scientific literature (Raizienė, 2014; Vercruyse et al., 2016). The contents of the questionnaire consisted of social, demographic and research object questions. The social and demographic questions reflected the age and gender of the researched as well as experience of pedagogical work.

The diagnostic part of the research consisted of 19 statements, which were divided into 4 subscales (Table 2):

- Ability of physical education teachers to avoid students' injuries;
- Ability of physical education teachers to work with students;
- Theoretical knowledge of physical education teachers about injury prevention;
- Skills of physical education teachers in the field of injury prevention.

The statements of the questionnaire were assessed in the 5-point Likert scale, from 1 – absolutely disagree to 5 – absolutely agree. For the assessment of internal consistency of the questionnaire scales, the Cronbach alpha coefficient was used that is based on the correlation of independent questions and helps to assess if all the questions of the scale reflect the researched sample sufficiently and enables specifying the number of necessary questions in the scale (Pukėnas, 2009). If the questionnaire is compiled correctly, the meaning of the Cronbach alpha coefficient must exceed .60. The Cronbach alpha of this questionnaire is - .684 and it complies with the desirable internal consistency of the questionnaire.

**Table 1.** Characteristics of the factor analysis

	<b>Statements</b>	<b>F1</b>	<b>F2</b>	<b>F3</b>	<b>F4</b>
7	Students often suffer complicated injuries during the physical education lessons, which are held by me	.889			
8	Students often suffer dislocations during the physical education lessons, which are organized by me	.881			
11	Students often suffer bone fractures during the physical education lessons, which are organized by me	.867			
9	Students often suffer contusions during the physical education lessons, which are held by me	.741			
6	Students often suffer injuries during the physical education lessons, which are held by me	.582			
10	Students often suffer tendon and muscle strains during the physical education lessons, which are organized by me	.465			
13	I perform/demonstrate the main warming-up exercises together with students		.764		

14	I constantly accentuate why it is important to perform warming-up exercises		.740		
12	I speak with students about the most frequent sport injuries		.655		
15	I answer willingly to all the students' questions that are related with injury prevention		.650		
17	I always make sure a student performs a certain exercise/act correctly		.593		
2	I lack knowledge about sport injury prevention in the training of students			.794	
16	I often give examples why it is important to perform exercises for injury prevention			.652	
1	During the studies, I obtained knowledge and skills about injuries and their avoidance			.612	
5	If I held classes, the likelihood of injuries during physical education lessons would be lower			.444	
19	I think students' injuries during physical education lessons are affected by poor material-technical facilities of the school				.787
4	When I started working at school as a physical education teacher, I took additional interests in the ways of sport injury prevention				.665
3	When I started working at school, I thought I should get more knowledge about sport injuries and their prevention				.624
18	I think students' injuries during physical education lessons are affected by irrational organization				.589

In order to determine the internal reliability of the subscales, the internal compatibility index (Cronbach  $\alpha$ ) was calculated. It was determined the meanings of the questionnaire subscales ranged between .658 and .879 (Table 2).

**Table 2.** Internal compatibility of the statements of the subscales

Subscale	Quantity of statements	Statement serial number	Cronbach $\alpha$
Ability of physical education teachers to avoid students' injuries	6	6, 7, 8, 9, 10, 11	.879
Ability of physical education teachers to work with students	5	12, 13, 14, 15, 17	.797
Theoretical knowledge of physical education teachers about injury prevention	4	1, 2, 5, 16	.684
Skills of physical education teachers in the field of injury prevention	4	3, 4, 18, 19	.658

*Statistical Analysis.* For the statistical analysis of the research data, the version of program SPSS 24.0 (*Statistical Package for Social Science*) was used. As the research data complied with the normal distribution (checked according to the Kolmogorov – Smirnov test) and the Student's *t* criterion was chosen that enabled comparing the differences of means between the groups for independent samples; the differences between the variables of the research were considered statistically significant unless the error exceeded 5 per cent ( $p < .05$ ). On assessing the results of this research, the effect size of the *Cohen's d* criterion coefficient was calculated. Usually, the effect size of *Cohen's d* between 0.2 and 0.5 is considered low, between 0.5 and 0.8 – average and above 0.8 – large. The arithmetic mean (*M*) and the average standard deviation (*SD*) were also calculated.

### 3. Results

On presenting the results of this research, we analysed the following components of the subscales of physical education teachers: “Ability of physical education teachers to avoid students’ injuries”, “Ability of physical education teachers to work with students”, “Theoretical knowledge of physical education teachers about injury prevention” and “Skills of physical education teachers in the field of injury prevention”.

In order to compare the competencies of physical education teachers in the aspect of gender, means and standard deviations were calculated and the Student’s *t* test was applied for the determination of the reliability of differences between the independent samples. It is to mention the competencies of physical education female and male teachers have statistically reliable differences according to the obtained indexes of the analysed components of the subscales (Table 3).

**Table 3.** Assessment of the competencies of physical education teachers about injury prevention according to gender ( $M \pm SD$ )

Subscales	Physical education teachers	n	M	SD	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
Ability of physical education teachers to avoid students' injuries	Women	54	2.76	.44	-3.11*	.002	.54
	Men	72	3.00	.44			
Ability of physical education teachers to work with students	Women	54	3.30	.51	-7.34*	.001	1.29
	Men	72	3.91	.43			
Theoretical knowledge of physical education teachers about injury prevention	Women	54	2.73	.65	-4.21*	.001	.76
	Men	72	3.26	.75			
Skills of physical education teachers in the field of injury prevention	Women	54	3.11	.84	-5.54*	.001	.98
	Men	72	3.84	.64			

Notes: ( $M \pm SD$ ) – mean and standard deviation; Cohen's *d* – effect size; \* -  $p < .005$

On the basis of the Student's *t*-test, it was determined for the independent samples that students suffered different injuries during the physical education lessons held by male teachers more often:  $t(124) = -3.11$ ;  $p < .005$ ; Cohen's  $d = .54$ . The following means of the effect size were determined in the subscale “Ability of physical education teachers to avoid students’ injuries:  $2.76 \pm .44$  points for female teachers and  $3.00 \pm .44$  points for male teachers.

After assessing the means of the subscale “Ability of physical education teachers to work with students” in points, a statistically significant difference was determined between female and male teachers; it shows male teachers pay more attention to warming-up and correct performance of exercises during physical education lessons –  $t(124) = -7.34$ ;  $p < .001$ ; Cohen's  $d = 1.29$ . On assessing the statistical indexes of this subscale, the following means were determined:  $3.30 \pm .51$  points for female teachers and  $3.91 \pm .43$  points for male teachers.

On analysing the statistical indexes of the subscale “Theoretical knowledge of physical education teachers about injury prevention”, a statistically significant difference was determined between different groups of the researched: male teachers had better theoretical knowledge about injury prevention during physical education lessons compared with female teachers:  $t(124) = -4.21$ ;  $p < .001$ ; Cohen's  $d = .76$ . The following means of these indexes are provided:  $2.73 \pm .65$  points for female teachers and  $3.26 \pm .75$  for male teachers.

We also tried to compared the statistical indexes of the subscale “Skills of physical education teachers in the field of injury prevention” and the data of our research shows a statistically significant difference between the groups of physical education teachers: male teachers had better skills in the field of injury prevention during physical education lessons ( $3.84 \pm .64$  points) compared with female teachers ( $3.11 \pm .84$  points): respectively, -  $t(124) = -5.54$ ;  $p < .001$ ; Cohen's  $d = .98$ .

Table 4 shows the assessment of the competencies of physical education teachers for injury prevention in the aspect of pedagogical experience. The analysis of the results of this research shows the statistical indexes between the groups of teachers with the pedagogical experience of up to 10 years and teachers, whose pedagogical experience exceeds 10 years, are significantly different in the subscale “Ability of physical education teachers to work with students”:  $t(124) = 13.88$ ;  $p < .001$ ; Cohen's  $d = 1.28$ . It can be noticed from the statistical indexes provided in Table 4 that students suffer from different injuries in the group of teachers with lower pedagogical experience ( $2.58 \pm .36$ ) compared with the lessons of teachers with higher experience.

**Table 4.** Assessment of the competencies of physical education teachers for injury prevention according pedagogical experience ( $M \pm SD$ )

Subscales	Pedagogical experience	n	M	SD	t	p	Cohen's d
Ability of physical education teachers to avoid students' injuries	up to 10 years	57	2.58	.36	13.88*	.000	1.28
	exceeding 10 years	69	1.81	.27			
Ability of physical education teachers to work with students	up to 10 years	57	2.95	.48	-13.46*	.000	2.40
	exceeding 10 years	69	3.97	.36			
Theoretical knowledge of physical education teachers about injury prevention	up to 10 years	57	2.82	.54	-2.21*	.003	.39
	exceeding 10 years	69	3.03	.52			
Skills of physical education teachers in the field of injury prevention	up to 10 years	57	3.07	.31	1.58	.11	.28
	exceeding 10 years	69	2.95	.53			

Notes: ( $M \pm SD$ ) – mean and standard deviation; Cohen's  $d$  – effect size; \* -  $p < .005$

It was also tried to determine and compare the indexes of the assessment of teachers with different pedagogical experience in the subscale “Ability of physical education teachers to work with students”.

On analysing the results of teachers with different pedagogical experience, a statistically significant difference was determined: it means teachers with the pedagogical experience of up to ten years pay more attention to warming-up and correct performance of exercises during physical education lessons –  $t(124) = -13.46$ ;  $p < .001$ ; Cohen's  $d = 2.40$ . The following indexes of means are provided:  $2.95 \pm .48$  points for teachers with the pedagogical experience of up to ten years and  $3.97 \pm .36$  points for teachers with the pedagogical experience that exceeds ten years.

On assessing the statistical indexes of the subscale “Theoretical knowledge of physical education teachers about injury prevention” in the aspect of pedagogical experience of the researched, it was determined teachers with higher pedagogical experience had better theoretical knowledge about injury prevention than teachers with lower pedagogical experience:  $t(124) = -2.21$ ;  $p < .005$ ; Cohen's  $d = .39$ . Respective means of the indexes of this subscale – ( $3.03 \pm .52$  points and  $2.82 \pm .54$  points).

Although the teachers with lower pedagogical experience in the subscale “Skills of physical education teachers in the field of injury prevention” were assessed with higher points ( $3.07 \pm .31$  points) than those with the pedagogical experience that exceeds ten years ( $2.95 \pm .53$  points), there was no statistically significant difference between the researched of these groups on applying the Student's  $t$  criterion:  $t(124) = -1.52$ ;  $p > .11$ ; Cohen's  $d = .28$ .

#### 4. Discussion

During the research, we paid special attention to the dependence of the competencies of physical education teachers for injury prevention on the age of the researched and their pedagogical experience. Thus, we will define the data of the research about the knowledge of teachers with different sexes (women and men) and different pedagogical experience (up to 10 years and exceeding 10 years) about injury prevention as well as frequency and type of injuries during physical education lessons.



On discussing the results of the research, we will analyse the indexes of the statements from different subscales: “Ability of physical education teachers to avoid students’ injuries”, “Ability of physical education teachers to work with students”, “Theoretical knowledge of physical education teachers about injury prevention” and “Skills of physical education teachers in the field of injury prevention”.

To review the results, it can be noticed male teachers agree more often statistically significantly that students often suffer injuries, tendon and muscle strains, different contusions during the lessons held by them than during the lessons held by female teachers. These results are also supported by similar research of other authors (Waryasz et al., 2016) and they showed that customers of personal trainers suffered tendon and muscle strains, different contusions as well as frequent lumbar muscle and tarsal strains and tendon inflammations more often. However, Mikalonytė, Kemerytė-Riaubienė (2017) and Cai et al. (2020) state sport-doing students suffer complicated injuries, such as bone fractures or different dislocations, during trainings much more seldom. Nevertheless, Emery and Pasanen (2019) state the risk of muscle and bone injuries is higher in sport both for younger and older adolescents. These results coincide with our results according to the type of injuries, but we failed to find any scientific studies analysing the attitude of female and male teachers to the frequency and type of students’ injuries during physical education lessons.

Other results reveal that although male teachers perform the main warming-up exercises together with students more often than female teachers, accentuate the importance of warming-up constantly and try to make sure their students perform a concrete exercise/act correctly, it enables supposing that physical education teachers must improve their knowledge in the field of injury prevention. According to Coles (2017), there are many of reasons that can cause sport injuries and it is necessary to know preventive measures of injuries in order to avoid them or at least reduce the risk of occurrence. Taking into account the conclusions of further research, correct warming-up is a popular choice among sport pedagogues in order to reduce the risk of injuries (Mikalonytė, Kemerytė-Riaubienė, 2017).

The research revealed male teachers gave examples more often why it was important to perform exercises for injury prevention, so the likelihood of injuries was lower during the physical education lessons held by them; moreover, they agree more often they obtained knowledge and skills about sport injuries and their avoidance during the studies. However, female teachers state more often statistically significantly they lack knowledge about sport injury prevention in the education of students. Nevertheless, similar conclusions about this aspect are also made by Bissett et al. (2020): most sport pedagogues do not have any competencies to provide necessary assistance to a sport-doing person and it increases the likelihood of injuries during the practice.

During the analysis of statistical indexes of the subscale “Skills of physical education teachers in the field of injury prevention”, we revealed male teachers agreed more often that injuries of students during physical education lessons are affected by irrational organization and poor material-technical facilities of the school. During the analysis of scientific literature, it was noticed the competency of sport pedagogue in the aspect of gender was not analysed sufficiently, but Boerner et al. 2019, notice in their works customers recognize they trust women’s competency and knowledge in the field of injury prevention more often. Meanwhile, Ivarsson et al. (2016) proved it was recommended to practice the stress management-oriented training of psychological skills additionally in order to avoid any risk of sport injuries that could be caused by suffered psychological stress. Moreover, it is emphasized stress-caused reactions have a statistically significant impact on the suffering of a sport injury. It is also stated in the works of Bissett et al. (2020) sport pedagogues encounter injuries of sportspeople more often and they do not usually have any proper competencies to help them, so it is suggested paying more attention to the development of the competency of sport pedagogues in the field of injury prevention.

During the research, we also tried to assess the indexes of statements of the subscales of the competencies of physical education teachers for injury prevention in the aspect of pedagogical experience. Nevertheless, it was determined during our research the knowledge of teachers about injury prevention and their frequency and type among students depended on their pedagogical experience.

Physical education teachers with higher pedagogical experience agree more often that students suffer complicated injuries, such as tendon or muscle strains, contusions or bone fractures, during their lessons more seldom. These teachers also state they perform the main

warming-up exercises with students more often, accentuate constantly why warming-up is important and they try to make sure almost constantly that a student performs a certain exercise or act correctly. Meanwhile, the indexes obtained with teachers with lower pedagogical experience enable stating that they lack knowledge about sport injury prevention, recognize they did not obtain sufficient knowledge and skills about sport injuries and agree students have a bigger possibility to suffer an injury during their physical education lessons compared with the group of respondents, who have been doing pedagogical work for over ten years.

During the analysis of statements of the subscale “Skills of physical education teachers in the field of injury prevention”, it was determined that teachers with lower pedagogical experience that started working at school thought more often they needed more knowledge about sport injuries and their prevention; they also state they take additional interests in the ways of sport injury prevention compared with teachers with higher pedagogical experience, but there are no statistically significant differences.

*Limitations and future prospects.* We think the performed research defined some directions about the competencies for sport injuries and their prevention for future researchers in order to supplement the available knowledge. Our research was only limited with the results of physical education teachers and they were analysed in the aspect of gender and pedagogical experience. This analysis did not include any teachers of other fields, so the conclusions only include the competencies of this concrete group of teachers for injury prevention. It would be purposeful to perform similar research in the future with physical education teachers from cities and districts. This research is descriptive, but not experimental, so the type of the research prevents from making more exact conclusions, i.e., what reasons affect the differences of competencies in the field of injury prevention depending on the gender and pedagogical experience. Some studies could also be performed in the future in what way students assess the competencies of their physical education teachers in this field, in what way these indexes change or do not change in their opinion. The direction of further research should be modelling of programs about the competencies in the field of injury prevention and check of their effectiveness; additional research about the effect of these programs is also necessary. To sum up, it can be stated that the application of similar research should be developed even more.

## 5. Conclusion

The statistical data analysis of our research showed the competencies of physical education teachers for injury prevention were different depending on the gender and pedagogical experience. It was determined the points of male teachers in the subscales: “Ability of physical education teachers to avoid students’ injuries”, “Ability of physical education teachers to work with students”, “Theoretical knowledge of physical education teachers”, “Skills of physical education teachers in the field of injury prevention” were higher than those of female teachers. It means the competencies of male teachers for injury prevention are assessed better statistically significantly compared with female teachers. However, students suffer different injuries during the lessons held by male teachers more often. Meanwhile, the indexes of teachers with higher pedagogical experience in the subscales: “Ability of physical education teachers to work with students”, “Theoretical knowledge of physical education teachers” are better compared with teachers with lower pedagogical experience. Nevertheless, teachers with the pedagogical experience of up to 10 years state that students encounter injuries during their lessons more often.

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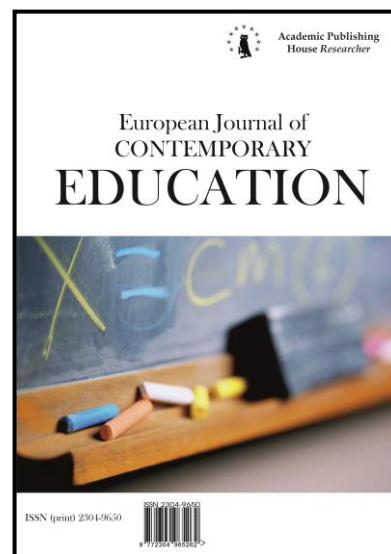
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## **Effectiveness of Development of Spatial Thinking in Schoolchildren of Junior Classes by Application of Plane and Spatial Modeling of Geometric Figures in Didactic Games**

Guldana A. Totikova <sup>a</sup>, Aidarbek A. Yessaliyev <sup>a,\*</sup>, Nurlybai K. Madiyarov <sup>a</sup>, Nurgul Medetbekova <sup>a</sup>

<sup>a</sup> M. Auezov South Kazakhstan State University, Shymkent, Kazakhstan

### **Abstract**

The use of planar and volumetric geometric figures in the form of didactic games and exercises, the participants in the experiment showed a significant improvement in the results of the level of spatial representation compared with the control group.

The methodology of the use of didactic games and exercises with geometric figures showed the statistical significance of differences in students in the control and experimental groups and significantly improved the quality of their knowledge and skills.

The study proves that didactic games can be used at different stages of learning, starting with an explanation of new material, its consolidation, repetition, control. Didactic games on plane modeling allow you to fully solve the educational tasks of the lesson, activate mental activity, increase the cognitive interest of students. The technique helps to convey difficult material in an accessible form.

We believe that in the process of research, the neurophysiological abilities of mental activity increased, holistically perceive objects, operate with a large number of signs, abstract certain properties of objects of the surrounding world, the ability to represent three-dimensional figures, perform actions with them (Madiyarov et al., 2017).

**Keywords:** spatial representation, mathematics, primary classes, methods of development spatial representation.

### **1. Introduction**

#### **1.1. The relevance of the problem**

The possession of spatial representations and the presence of spatial imagination is one of the problems of mathematical education associated with the study of geometric material. In the process of studying the mathematical content of elementary schoolchildren, methods of mental activity are formed: analysis and synthesis, comparison, classification, abstraction and

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\* Corresponding author  
E-mail addresses: [aidar.esali@mail.ru](mailto:aidar.esali@mail.ru) (A.A. Yessaliyev)



generalization (Arginskaya, 2003; Bantova, Beltjukova, 1984; Istomina, 2001, Totikova et al., 2019; Madiyarov et al., 2017). The success of spatial ability building is largely developed through spatial activity and training (Baenninger, Newcombe, 1989).

A multiple increase in the information load in the modern world gives an impetus to the development of interest in the problem of development the spatial representations in mathematics lessons with primary school children. Since the period of primary school age, mathematics provides real prerequisites for the development of spatial representations, contributes to the development of memory, thinking, attention, imagination, the of development of reasoning ability, and the sufficiency of the volume of mathematical material and well-chosen special tasks contributes to the full development of the intellectual sphere of students.

According to E.S. Trotskaya (Trotskaya, 2017) at present, the modern people are required to have high social activity, the ability to analyze continuously incoming information, to think in abstract concepts. Spatial thinking goes beyond its original evolutionary function and ceases to be just an instrument of orientation on the ground. It allows a person to develop his intellectual abilities and improve in the professional sphere, for example, to understand diagrams, read and create maps, build visual models of phenomena and abstractions (Dvoynin, 2008; Dvoynin, 2012; Ponomarenko et al., 2016).

J.M. Blaut & D. Stea (Blaut, Stea, 1974) note that this kind of thinking begins to from the age of three. Already at this age they are able to distinguish between simple images and create their own. Therefore, it is advisable to develop spatial thinking in a child during the period of active formation of cognitive processes such as perception, memory, thinking, speech, imagination (Trotskaya, 2017).

H.J. Kell, D. Lubinski, C.P. Benbow & J.H. Steiger (Kell et al., 2013) describe the fundamental role in the scientific discoveries and innovations of spatial thinking and skills necessary for everyday activities such as remembering the location of objects and events, also when moving from one place to another.

The questions of the study of spatial thinking were raised by scientists many times and have different directions. Scientists B.B. Velichkovsky (Velichkovsky et al., 2019); O.I. Galkina (Galkina, 1961); N.Ya. Semago, M.M. Semago (Semago, Semago, 2004); Vânia Carlos (Vânia et al., 2017), T. Bartoschek (Bartoschek, 2013) studied the ways of forming spatial representations. S. Olkun, G.G. Smith, H. Gerretson, Y. Yuan, J. Joutsenlathi (Olkun et al., 2009) investigated the dependence of the mathematical abilities of students on their level of development of spatial thinking. T. Goksun, S. Goldin-Meadow, N. Newcombe, T. Shipley (Goksun et al., 2013), studied the role of gestures and language in solving spatial problems. The structure and foundations of the development of spatial thinking were widely considered in the works of I.Ya. Kaplunovich (Kaplunovich, 1980), I.S. Yakimanskaya (Yakimanskaya, 1980). A. Frick, M.A. Hansen and N.S. Newcombe (Frick et al., 2013).

Research Results M.S. Terlecki, N.S. Newcombe & M. Little (Terlecki et al., 2008), Frick, Mohring & Newcombe (Frick et al., 2014); Hawes, LeFevre, Xu & Bruce (Hawes et al., 2015); Levine, Huttenlocher, Taylor & Langrock (Levine et al., 1999) show that preschool children are able to demonstrate spatial thinking, visualization, and mental transformations.

Ensuring the creation of spatial images and operating them in the process of solving various practical and theoretical problems is an indicator of intellectual development and the level of development of human spatial thinking (Rozov et al., 2007; Yakimanskaya, 1980).

The skill of spatial visualization can be improved through training and provide evidence of the usefulness of interactive computer visualizations in this training (Cohen, Hegarty, 2007).

Many studies have shown that dynamic software and model-specific activities can provide many opportunities for improving spatial skills (Uygan, Kurtulus, 2016; Baki et al., 2011; Cohen, Hegarty, 2007; Güven, Kösa, 2008; Sundberg, 1994; Weidemann, 1990; Yessaliyev et al., 2018). Therefore, to improve spatial capabilities began to be widely used activity-target designs, including virtual dynamic models, made manually or programmatically.

The effectiveness of planar modeling in working with children was studied by G.A. Repina (Repina, 2008) and L.V. Wenger (Wenger, 1982). Using this technique, in a short time, you can create many different models or come up with different assembly options for one model. The method helps the child learns to reason and strive to independently find ways to solve problems. Children by this age already have ideas about geometric shapes and the possibilities of



their transformation, create mental images of geometric shapes using spatial memory and spatial visualization, recognize and represent shapes from different positions, mentally combine and separate two- and three-dimensional shapes (spatial visualization) (Hawes et al., 2017). They develop visual-figurative thinking, which is why it is very important to further develop the geometric representations of children in space and on the plane, to generalize the signs of geometric shapes, to divide them into parts, to project in space. The construction on the plane of modified images of objects from various flat geometric figures contributes to the development of geometric representations in children, it is aimed at the development of figurative thinking with the help of spatial images and volumetric figures. In the process of development and developing of spatial representations in younger schoolchildren, purposeful mastery of objective actions takes place. The student learns to independently solve problems in stages from simple to complex.

Actions aimed at improving spatial thinking and children's academic achievement in mathematics can be especially important given the fundamental importance of spatial thinking and mathematics for subsequent academic and professional success (Battista, 1990; Guay, McDaniel, 1977).

### **1.2. The objectives and tasks of the research**

Given these prerequisites, this study was carried out, the purpose of which was to promote the development of spatial thinking and visualization during the experimental introduction of the method of planar and volumetric modeling, as a means of forming a spatial representation in younger students in the process of teaching mathematics.

To achieve this goal, the following research objectives were identified:

1. Identification of the level of forming the spatial representations in primary school students.
2. To study the dependence of the success of development the spatial representations of elementary schoolchildren on the use of didactic games of planar and 3D modeling of geometric figures.
3. Experimentally check the effectiveness of the developed methodology of development and development of spatial representations in the practice of teaching mathematics to primary school students.

### **1.3. Object of study**

To conduct experimental work to identify the level of development of spatial representations of younger schoolchildren, children from grades 1 to 3 of the school-gymnasium № 47 in Shymkent and the secondary school № 49 of the village Konyr Tobe in the Saryagash district of the Turkestan region were chosen as an object of the study. A total of 363 students from grades 1 to 3 were enrolled, including 184 in experimental and 179 in control classes.

The choice of schools was based on the principle of determining localization in urban and rural areas.

The experimented students were selected according to the observation criteria: an age, an academic performance, and school curriculum development. The experimented students were selected as average matching among students of the same general education schools. The experimented students were also randomly assigned to experimental or control groups. This determined the limitations of the samples. All parents gave informed consent for their children to participate in the current study.

In order to exclude significant differences between the experimental and control groups, the preliminary independent T-tests were performed to identify the levels of spatial representation.

To study the features of the forming the spatial representations of students during the experiment, the indicators of younger students were compared. The control groups continued to study according to the traditional program and in the experimental group according to the system of developing training.

The teachers of mathematics with long experience and high qualifications in teaching mathematics in primary grades were selected for participating in the study. Having practical experience with educational materials for the development of spatial representation of children of primary school age. Teachers were additionally acquainted with the psycho-physiological process of the forming the cognitive skill and the manipulation of mental images as a means of a more thorough study of the spatial thinking of children.

Teachers of the experimental groups underwent advanced training in teaching spatial thinking.

Talks were held with the parents of schoolchildren from experimental groups about the study and written consent was obtained for their child to participate in the study.

#### **1.4. Research methods**

For the diagnostics of forming the spatial representations the followings were used:

- Test of spatial representations – to identify the level of development elementary spatial representations (Semago, Semago, 2005);
- Identification of the level of development of spatial representations using the methodology of M.A. Gabova (Gabova, 2016);
- Test of spatial thinking – to identify the ability to create a spatial image and operate in a way (Yakimanskaya et al., 1991);
- To assess the degree of reliability of differences between the studied parameters in the control and experimental groups, a mathematical statistics method such as the student's paired t-test was used;
- The Spearman correlation coefficient was used to identify the relation between the indicators of the level of forming the spatial representations of students and the success of mastering knowledge in mathematics;
- Statistical analysis was performed using SPSS version 19.0 (IBM, SPSS Software, Armonk, new York, USA). StatSoft Statistica 10;
- All values of quantitative variables in each group were expressed as mean values and standard deviations ( $M \pm SD$ ). The differences were considered significant at  $p > 0.05$ ;
- When studying the test results, the standard normal distribution of the obtained data was revealed.

#### **1.5. Development of tasks for the forming of spatial representation**

When developing tasks for the development of formations and the development of spatial representation, the methods of I.S. Yakimanskaya, I.Ya. Kaplunovich, A.E. Simanovsky, A.I. Savenkova.

The program developed 15 tasks, which consisted of:

- image objects (flat and three-dimensional geometric figures, images of geometric figures and their images, images of figures in space and on the plane, an image (drawing), which includes several geometric figures, images of a three-dimensional object, structures from two geometric bodies, drawings in three types);
- The spatial arrangement of the figures (in a row, rotated relative to the usual arrangement in the images, relations and directions such as to the left of, to the right of, above, below, between, under, inside, outside, etc.);
- Geometric figures;
- The tasks were set (definition, generalization, construction, etc.)
- Graphic skills (building a graphic image by hand or using graphic tools, reading a graphic image, building according to the model, according to a given condition).

Assessment of the development levels of spatial representations of primary school children was carried out according to the following criteria:

- determination by the student of the spatial direction;
  - relations between objects in both real and imaginary three-dimensional and two-dimensional space;
  - difficulties in determining and naming the shape of objects and their parts, in dismembering objects and reconstructing them from parts in real and mental terms, in generalizing objects according to their shape and spatial arrangement;
  - freedom of expression in speech of the result of the activity and the way to achieve them;
- Low level – with difficulties;  
The average level – with minor difficulties;  
High level – not experiencing difficulties.

As indicators of the success of younger students in mastering academic knowledge and skills, each question was rated at 1 point and recalculated into the arithmetic average grade point.

To reveal the connection between the success of mastering knowledge and skills in mathematics by younger students and the development of spatial representations, the Spearman correlation coefficient was used.

In order to avoid the effect of consistency when applying these techniques, the method of their positional equalization was used.

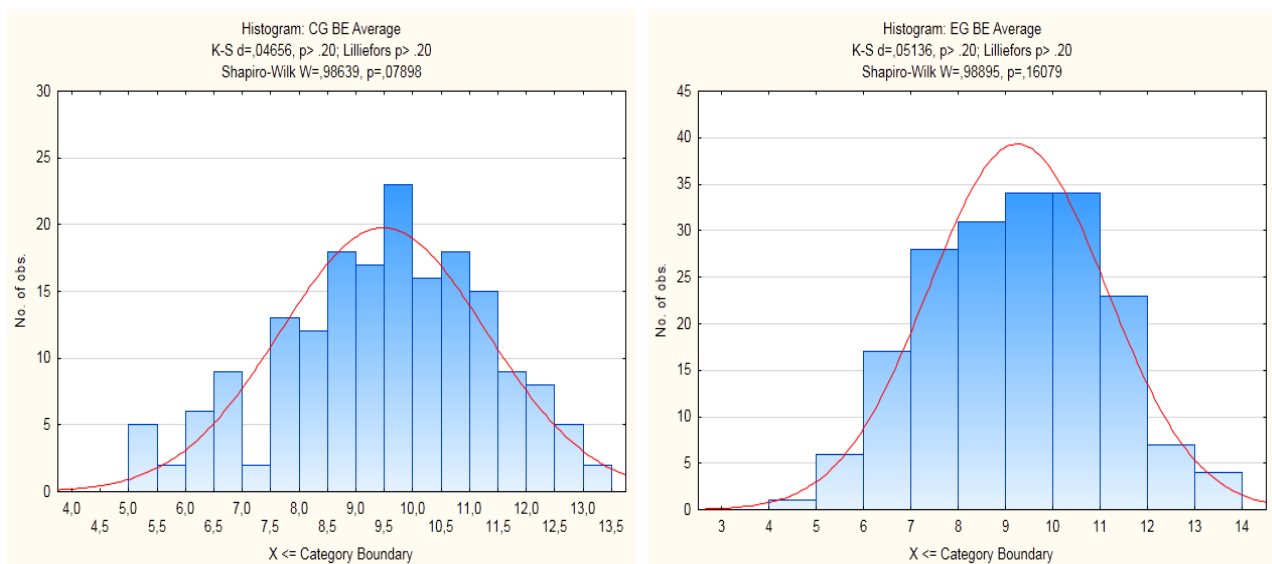
**2. Discussion and results**

Assessment of the formation of spatial representations is one of the basic prerequisites for the child's mental activity. It was evaluated in the framework of a general psychological study of primary school children, where the level of spatial thinking provides orientation in the visible or imaginary space.

To identify the formation of spatial representations in younger schoolchildren, a pre- and post-test of spatial thinking was used (Yakimanskaya et al., 1991). The test is based on operating with spatial images and their initial content (reflection in the image of the geometric shape, size, spatial distribution of objects). Each student from the experimental group was given two types of tasks to identify the process of creating an image (tasks in which it is necessary to create an image of work with the sizes of objects and their shape), and three types – to fix the types of operating the image (leading to a mental modification of the position of the object, its structure, to a simultaneous change in the spatial position and structure of the image).

**Preliminary selection and analysis of data**

To determine the absence of significant differences between the experimental and control groups, preliminary independent T-tests were conducted by groups of revealing the levels of spatial representation. The test results of the control and experimental groups showed a standard normal distribution of the obtained data (Figure 1).



**Fig. 1.** Graph of the density of the standard normal distribution of data from the control and experimental groups before the experiment

**Table 1.** Descriptive statistics of preliminary testing of the control (CG) and experimental (EG) groups

		N obs.	Average	Minimum	Maximum	Stand. deviation	Stand. error
REO	CG	179	9.397	5.100	13.900	2.572	0.192
	EG	184	9.173	5.000	13.800	2.435	0.179
WS	CG	179	9.508	4.100	14.400	3.078	0.230
	EG	184	9.249	4.000	14.600	3.004	0.221
MR	CG	179	9.542	4.000	14.900	3.152	0.236
	EG	184	9.313	5.000	13.800	2.459	0.181

Average	CG	179	9.482	5.200	13.500	1.821	0.136
	EG	184	9.245	4.800	13.200	1.882	0.139

**Note:**

REO – The relationship of external objects

WS – Work with symbols

MR – Mental rotation

**Table 2.** Criterion of paired samples before the experiment

		Paired differences					t	Degree of freedom
		Average	Average. deviation	Average. error of the average	95 % confidence interval for the difference			
					Lower	upper		
REO	CGBE - EGBE	.2045	3.3848	.2530	-.2948	.7037	.808	178
WS	CGBE - EGBE	.2877	3.9997	.2990	-.3022	.8777	.962	178
MR	CGBE - EGBE	.2061	3.9615	.2961	-.3782	.7905	.696	178
AV	CGBE - EGBE	.2328	2.4806	.1854	-.1331	.5987	1.255	178

Tables 1 and 2 show the average values and standard deviations of both groups.

The overall average test results showed  $t_{0.05} = 1.255$ ,  $p > 0.05$ . Tables 1 and 2 show the mean values and standard deviations of both groups.  $M \pm SD$  of control group (CG) is  $9.482 \pm 0.136$ ,  $M \pm SD$  of experimental group (EG) is  $9.245 \pm 0.139$ .

With a detailed distribution of preliminary testing tasks into groups, the following results were obtained: an assessment of the spatial representation of the relationship between external objects and the body (BBO)  $t(178) = .808$ ,  $p > .05$ ; control group (CG)  $N(179)$  ( $M = 9.397$ ,  $SD = .192$ ), experimental group (EG)  $N(184)$  ( $M = 9.173$ ,  $SD = .179$ ). Work with symbols,  $t(178) = .962$ ,  $p > .05$ ; CG  $N(179)$  ( $M = 9.508$ ,  $SD = .230$ ), EG  $N(184)$  ( $M = 9.249$ ,  $SD = .221$ ). Mental rotation  $t(178) = .696$ ,  $p > .05$ ; CG  $N(179)$  ( $M = 9.542$ ,  $SD = .236$ ), EG  $N(184)$  ( $M = 9.313$ ,  $SD = .181$ ).

Comparing the overall average results of preliminary testing, the test showed  $t_{0.05} = 1.255$  and when comparing the obtained value of the student's t-test with the table value ( $t_{0.05} = 1.990$ ) with the number of degrees of freedom 178 and the significance level  $p > 0.05$  ( $t < t_{0.05}$ ;  $1.255 < 1.990$ ) shows the statistical insignificance of differences between the compared values and the forecast  $H_0$  is accepted, that is, the degree of knowledge in the experimental and control classes at the initial stage is the same. Therefore, the difference in the level of knowledge of students in the experimental and control groups is insignificant.

Only those children who participated in both pre- and post-tests for each group of tasks were included in the data for the calculation.

When summarizing the test results, no significant differences were found between the experimental and control groups. Thus, at the initial stage of our study, both groups were not randomly selected, but had the same levels of spatial representation. Thus, we exclude any systematic differences between the groups at the beginning of the study, which could affect the results of the study.

At the next formative stage of the study, our task was to increase the level of spatial representations by applying the selected methods to the learning process. With this approach, children gain knowledge about geometric shapes and they develop spatial thinking.

For the development of spatial representation in children, the main condition is the use of special exercises and techniques in the learning process.

To achieve this goal, teachers of mathematics of the experimental groups for half a year used the technique of planar and spatial modeling of geometric figures (visualization and description of geometric transformations using volumetric and virtual geometric figures in didactic games and

exercises). This methodology was supposed to provide flexible education, preservation and ability to manipulate visual-spatial information in younger schoolchildren.

As a result of studying the course of mathematics, schoolchildren must learn to recognize, name, depict geometric figures and bodies, be able to build geometric figures, be able to use geometric figures to solve mathematical problems, navigate the locations of objects on the plane and in the surrounding space, the children's ability to independently solve the set educational and practical tasks, instilling independence and initiative.

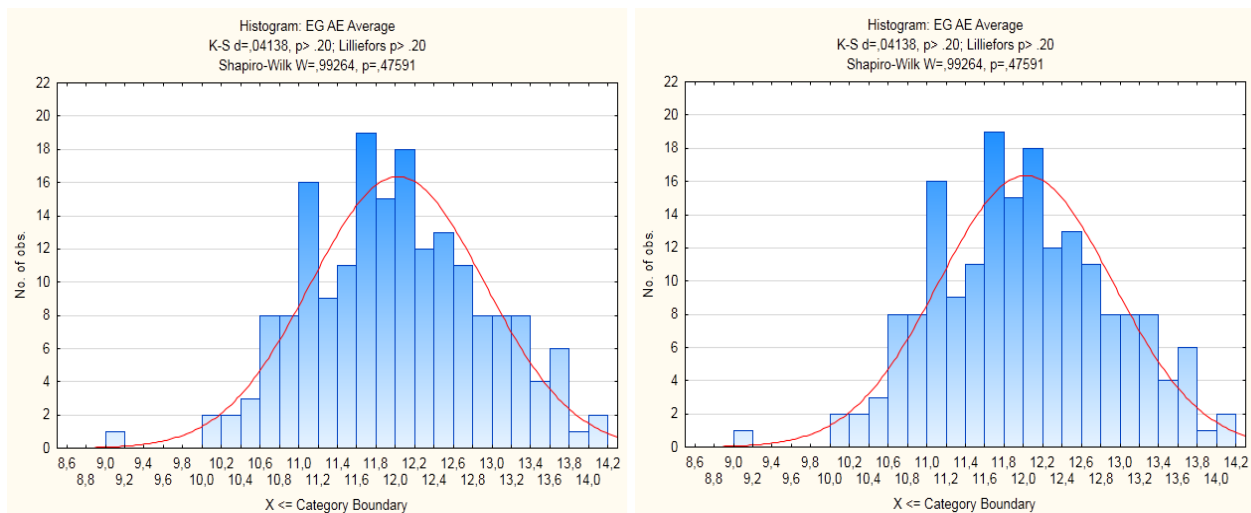
The game is aimed at developing spatial representations, elements of geometric imagination in children, developing practical skills in drawing up new figures by attaching one of them to another, teaching children to analyze the sample and verbal expression of how to connect the spatial arrangement of the parts.

When playing, children remember the names of geometric shapes, their properties, distinguishing features, examine forms visually and tactile motor, freely move them to get a new shape. Children develop the ability to analyze simple images, to distinguish geometric shapes in them and in surrounding objects, to practically modify the figures by cutting and making them out of parts.

Various exercises with geometric material, exercises for constructing 2D and 3D figures were selected. These exercises were used in lessons on various topics at the stage of summarizing the material studied. The purpose of these tasks is not only to generalize the knowledge gained in the lesson, to get acquainted with new geometric figures, but also to develop spatial representations, logical thinking, the ability to construct, and form the integrity of perception on their basis.

At the end of the formative stage of the experiment, we once again tested the levels of development of spatial representations using previously performed methods.

The results of the obtained data from the control and experimental groups showed a standard normal distribution (Figure 2).



**Fig. 2.** Graph of the density of the standard normal distribution of data from the control and experimental groups after the experiment

**Table 3.** Descriptive statistics of post-testing of the control (CG) and experimental (EG) groups

		N obs.	Average	Minimum	Maximum	Stand. deviation	Stand. error
REO	CG	179	9.806	5.100	14.800	2.885	0.216
	EG	184	11.534	8.000	14.900	1.956	0.144
WS	CG	179	9.542	4.200	15.000	3.071	0.230
	EG	184	12.007	8.900	14.000	1.189	0.088
MR	CG	179	9.684	5.000	13.900	2.511	0.188



	EG	184	12.534	8.900	15.000	1.393	0.103
Average	CG	179	9.677	5.933	13.900	1.674	0.125
	EG	184	12.025	9.133	14.100	0.905	0.067

Note:

REO – The relationship of external objects

WS – Work with symbols

MR – Mental rotation

**Table 4.** Criterion for paired samples after the experiment with data obtained before the experiment

		Paired differences						
		Average.	Average.	Average.	95 % confidence interval for the difference		Degree of freedom	
		Average	deviation	the average	Lower	upper	t	
REO	CGBE-CGAE	-.4089	3.5348	.2642	-.9303	.1124	-1.548	178
	EGBE-EGAE	-2.3607	3.0992	.2285	-2.8114	-1.9099	-10.332	183
WS	CGBE-CGAE	-.0341	4.3344	.3240	-.6734	.6052	-.105	178
	EGBE-EGAE	-2.7574	3.2503	.2396	-3.2301	-2.2846	-11.508	183
MR	CGBE-CGAE	-.1425	4.0314	.3013	-.7371	.4522	-.473	178
	EGBE-EGAE	-3.2213	2.7303	.2013	-3.6184	-2.8242	-16.004	183
Av	CGBE-CGAE	-.1952	2.3363	.1746	-.5398	.1494	-1.118	178
	EGBE-EGAE	-2.7798	2.0249	.1493	-3.0743	-2.4853	-18.622	183

When analyzing the dependent samples obtained during repeated measurements, the parameters of the pre- and post-T tests were shown in the experimental group  $t_{0.05} = 18.622$ ,  $p > 0.05$ , N (184) (M = 12.025, SD = 0.067), while in the control group  $t_{0.05} = 1.118$ ,  $p > 0.05$ , N (179) (M = 9.677, SD = 0.125) (Tables 1, 2).

When analyzing the spatial representation level by task groups, the results of pre- and post-testing of the relationship between external objects and the body (BBO) in the experimental group (EG)  $t(183) = 10.332$ ,  $p > .05$ ; N (184) (M = 11.534, SD = .144), Work with characters  $t(183) = 11.508$ ,  $p > .05$ ; N (184) (M = 12.007, SD = .088), Mental rotation  $t(183) = 16.004$ ,  $p > .05$ ; N (184) (M = 12.534, SD = .103).

For the same groups of tasks, the results of pre- and post-testing testing in the control group are as follows: estimates of the level of spatial representation of the relationship between external objects and the body (REO) at CG  $t(178) = 1.548$ ,  $p > .05$ ; N (179) (M = 9.806, SD = .216), Work with symbols  $t(178) = .105$ ,  $p > .05$ ; N (179) (M = 9.542, SD = .229), Mental rotation  $t(178) = .473$ ,  $p > .05$ ; N (184) (M = 9.684, SD = .187).

When comparing the obtained total average result obtained in repeated measurements of the conducted pre - and post T-tests showed in the experimental group  $t_{0.05} = 18.622$ ,  $p > 0.05$  and when comparing the obtained values of student's t-test with the table value ( $t_{0.05} = 1.973$ ) in the number of degrees of freedom of 183 and the significance level of  $p > 0.05$  ( $t > t_{0.05}$  ;  $18.622 > 1.973$ ). Whereas in the control group  $t_{0.05} = 1.118$ ,  $p > 0.05$  and when comparing the obtained value of the student's t-test with the table value ( $t_{0.05} = 1.990$ ) with the number of degrees of freedom 178 and the significance level  $p > 0.05$  ( $t < t_{0.05}$  ;  $1.118 < 1.990$ ).

This circumstance shows the statistical significance of the differences between the compared values and an alternative forecast H1 is accepted, i.e. it is established that the level of knowledge prevails in the experimental groups in relation to the control group, and the conclusion is made about the effectiveness of the experimental influence.

**By difficulty levels**

At this stage of the experiment, we found that the level of development of spatial representations of students in the control and experimental groups is insufficient and there is a

need for focused work on the development of spatial representations by means of various tasks in the educational process.

The preparation of assignments according to the classification of educational goals according to Bloom's taxonomy were planned at 3 levels.

The 1st level (low level of development of spatial representations) was based on the memorization and reproduction of the studied material from specific geometric materials to a holistic representation. The ability to reproduce terms, names of geometric shapes, the basic concepts of the location of one's own body relative to space, the principles of their construction.

The 2nd level (the average level of spatial representation formation) consists of the transformation of materials from one form to another, interpretation of the material, an assumption about the further course of phenomena, events. Presumably describes future transformations of geometric shapes from existing data. Ability to apply the studied material in specific conditions and new situations.

Level 3 (a high level of spatial representation development) of tasks is designed to develop the skills to break down material into components so that it can distinguish the relationships between geometric objects, combine elements to get new ones. To develop the ability to evaluate the value of a particular geometric material, the logic of building objects. Estimates the significance of a particular geometric object.

Analysis of the results of the answers by the difficulty levels of the tasks at the end of the formative stage of the experiment, we obtained the following results:

The share of the development of spatial representations at the first level of the total in both groups decreased. In the control group from 38.55 % to 21.79 %, in the experimental group from 37.43 % to 6.15 %. The number of students with an average level of spatial representation development indicators in the control and experimental groups increased from 50.84 % to 63.13 % and from 45.25 % to 49.72 %, respectively. The number of owners of the third level of spatial representations in the control group changed from 13.41 % to 17.88 %, and in the experimental group 17.32 % to 44.13 %.

The results of the study show that spatial representations in the control groups are formed more slowly than in students of the experimental group who were trained according to a specially developed program. The indices of the development of spatial representations of the third level in the control group remained at the same level as at the beginning of the experiment, and the same level among the students of the experimental group showed a significantly increased result, which suggests that the development of spatial representations increased to a high level, i.e. e. Developed the ability to break down the material into components so that they can distinguish the relationship between geometric objects, combine elements to get new geometric objects and the ability to evaluate their location in the surrounding space relative to a specific geometric object.

Indicators of the development of spatial representations in students of the control and experimental groups are presented in the form of a diagram ([Figure 3](#)).



**Fig. 3.** Indicators of the level of development of spatial representations of students in control and experimental groups according to the level of difficulty of tasks (%).

This stage of the experiment allows us to conclude that the level of spatial representations of students in experimental groups increased compared with the initial level before the start of the study. When comparing the results of the control group in which the level of development has not changed.

Analysis of the given indicators shows that a significant increase in the share of the level of spatial indicators among representatives of the experimental group gives reason to judge the effectiveness of the use of didactic games of plane and spatial modeling of geometric figures in mathematics. There is reason to believe that the ability to distinguish a given object of geometric materials from other objects has changed, the ability to freely recognize and imagine a given object from the drawing, but the percentage of correct answers that allow errors in assigning connections between the expressed characteristic and the image of a spatial object, the ability to reproduce terms, names of geometric shapes, basic concepts of the location of one's own body relative to space, the principles of their construction. The second indicator is the percentage of students who are able to transform materials from one form to another, the interpretation of the material. Presumably describes future transformations of geometric shapes from existing data. The ability to independently compose the studied material in specific conditions and new spatial objects. The third indicator is the result of the level of development of skills to break down the material into components so that it can distinguish the relationships between geometric objects, combine elements to get new kinds of objects. The ability to evaluate the value of a particular geometric material, the logic of building objects. Assessment of the significance of a particular geometric object.

Of course, not all students of the experimental classes have spatial concepts of the second and third levels, but the relative proportion of participants in the experiment has the opportunity to form a spatial representation. This explains the high rates of spatial representation development in the experimental groups. Thus, one can affirm the positive impact of the proposed methodology.

Let us turn to the consideration of the results of the study. To identify the relationship between the level of development of spatial representations of students and the success of mastering knowledge in mathematics, we used the Spearman correlation coefficient (nonparametric criterion), since the distribution of the results in the sample under study only tends to normal.

A positive statistically significant correlation was found between the development of spatial representations and the success of mastering knowledge in mathematics ( $R = 0.734$ ) in the experimental group and a positive significant correlation ( $R = 0.342$ ) in the control group.

We see that the correlation indicators in the experimental group are quite high than in the control group, which allows us to argue that the development of spatial representations of students has a significant impact on the success of mastering knowledge in mathematics. Moreover, the

connection between the development of spatial representations and the success of mastering knowledge is strong.

Consequently, the development of spatial representations in the students examined by us was formed at a fairly high level.

A qualitative analysis of the tasks performed by the subjects leads us to the conclusion that students are easier to cope with tasks that reveal the development of ideas about the shape of objects, changing the spatial position of the image. And much more difficult for them is the task of transforming the structure of the image, changing the position and structure of the image at the same time, that is, to identify the development of spatial thinking.

### 3. Conclusion

Thus, the results of the study gave us reason to believe that the success of mastering knowledge by younger students is, in fact, determined by the development of their spatial representations. The analysis of typical difficulties experienced by students in the implementation of the methods and the peculiarities of the development of their spatial representations became the basis for the development of a more focused training program.

The experiment provides additional evidence that spatial visualization skills can be improved by introducing didactic games using planar and spatial modeling.

The results obtained emphasize the importance of the choice of tasks for the development of cognitive mechanisms in the development of spatial representation, which are closely related both conceptually and cognitively with the design of spatial visualization.

Thus, we came to the conclusion that in order to effectively improve the performance of children in these fields of geometry, the development of spatial thinking skills will be required; it is necessary to use didactic games of plane and volume modeling of geometric figures in mathematics lessons. This method, unlike other programs of spatial learning, contributes to the development of medium and high levels of spatial representation, characterized by the development of the neurophysiological ability of the child's mental activity. The method contributes to the development of skills to distinguish the relationship between geometric objects, combine elements to get new ones. To develop the ability to evaluate the value of a particular geometric material, the logic of constructing objects, operate with a large number of signs, abstract and mentally rotate volumetric figures.

### 4. Limitations

This study has the following limitation: These are restrictions related to the number of experimented students in both the control and experimental groups, which do not allow us to extend the research data to other students of secondary schools in the region, applying it only to primary school students of our chosen schools.

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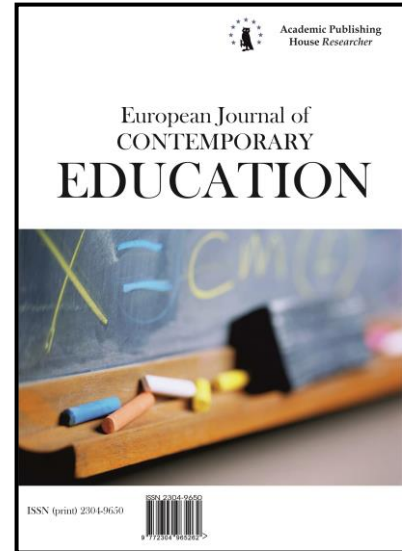


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## **Methodological Guidelines for Defining a Complex Psycho-Pedagogical Concept: A Case of the Definition of the Research Capacity of a Teacher in the Vocational Education System**

Yuri S. Tyunnikov <sup>a, \*</sup>

<sup>a</sup>Institute for Education Development Strategy of the Russian Academy of Education, Moscow, Russian Federation

### **Abstract**

The historical landscape of science reminds us that researchers have always faced the challenge of defining the subject matter of the object of inquiry. If we expand the map of our journey across the fields yielding scientific knowledge, we will discover a largely similar picture. It is quite obvious that the definition design objective will always remain relevant for researchers. The authors of many works see the main value of any definition in its Capacity to deliver two objectives: to tag the category of objects of a certain type; to highlight the object's essential attributes that reveal its specific subject matter. Realization of these objectives results in the assignment of the object's basic taxonomic rank with the methodological reference signifiers that include, on the one hand, the coherent integrity of the object's intrinsic attributes, and, on the other hand, the object's specifically discrete features. Alongside, there arise methodological difficulties directly related to the justification of the logic and procedures for determining the object's essential attributes and their reflection in the definition of the subject matter. This article is an attempt to expand the methodological scope of the psycho-pedagogical paradigm for definition design through the study of the concept of the Research Capacity of a Teacher in the Vocational Education System. The definition design methodology is presented hereby as a correlation of descriptive, explanatory, and concept models of a given phenomenon and as a consistent transition from one information structure to another. This process results in the assembly of the semantic construct for the definition, which allows to expand it through the synergy of integral features.

**Keywords:** psycho-pedagogical concept, definition design methodology, research capacity, descriptive model, explanatory model, concept model, integral features, definition concepts.

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\* Corresponding author  
E-mail addresses: [tunn@yandex.ru](mailto:tunn@yandex.ru) (Yu.S. Tyunnikov)

## **1. Introduction**

Definition design has always been and will remain a challenge for researchers. It is approached differently for different types of a definition. An intentional definition, for example, involves the description of qualities and features of an object that attribute it to all allies in the class to which it refers; explanation of the connotation of the term; the indication of the distinguishing features of the object and the most relevant concept (Cook, 2009). In the case of an implicit definition, it is substituted with a designed context or a set of certain axioms (Opredelenie (logika) et al.). In the case of an explicit definition, some distinct attribute of the (real or abstract) object helps to distinguish it from the allied objects (Logika dlya menedzherov, 2019).

Despite the variety of approaches to definition design, they usually come down to two objectives: 1) to tag the category of objects of a certain type; 2) to highlight the essential attributes of the object that reveal its specific subject matter (Opredelenie (logika)). In particular, these very objectives prominently validate the most extensive use of the basic taxonomic ranking, including attribution of the given concept to the most relevant genus and the subsequent detailed study of its differentia. Researchers acknowledge the challenging nature of the latter objective since the study of the objects' essential attributes takes a long comprehensive scientific inquiry (Ruzavin, 1997).

There is yet another eventual complication that is worth mentioning here. It occurs virtually at all stages of the definition design. It occurs even when the main attributes of the object are detected and studied sufficiently well. This obstacle is methodological in nature because it is directly related to the rationale behind the logic and procedures for selecting the essential attributes and their subsequent inclusion into the content of the definition. Indeed, if we consider the modalities of the definition design, we will have to agree that many of them are arranged as sets of vaguely linked operations. They do not actually reflect on the process of transition from one information structure to another, they do not explain how exactly this can be done, within which framework of parameters, and in which sequence. And most importantly, they do not explain why it should be done this or that way, and not otherwise.

How, for example, can the object's attributes or distinguishing features be described without any advance input about the baseline criteria and necessary procedures for displaying the initial information about the object in the structure of the definition? Or, what is the distinguishing feature by which a real or abstract object is supposed to be distinguished from a multitude of allied objects? In particular, what level of meaningful generalization corresponds to the explicative function of a distinctive feature in the case of a real definition? There are also questions about the reasons for recommendations to substitute an implicit definition with a context or a set of axioms (Opredelenie (logika)). Is it really sufficient to merely present axioms as compactly and conveniently as possible for further use? Or, should not we rather, with reference to the given object, somehow work out in advance, the logic-and-content framework for the definition design, the functions and essence of such axioms, and the requirements for their selection?

Some additional efforts are obviously needed to explore the methodological background for the logic and the standard procedures that would be appropriate in designing definitions of a particular type. This article discusses such challenges and outlines the methodology for overcoming them. As a relevant exercise in methodological guidelines, let us consider the case of the taxonomic definition of the Research Capacity of a Teacher in the Vocational Education System.

## **2. Methodology**

The methodology is based on phenomenological, system, and integrative approaches and is oriented towards designing a concept definition for the psycho-pedagogical concept through the consistent deployment of the three interrelated models: the descriptive, explanatory, and concept models. The phenomenological approach meets the objective of finding the basis for a comprehensive description of the given phenomenon. The system approach is used to generalize the system-specific attributes of the psycho-pedagogical phenomenon and to define their content.

By means of the integrative approach, the binary correlations of the system's functional variables are set, thus creating the grounds for identifying the integral attributes of the phenomenon in order to build its explanatory model. The transition from an explanatory model to a concept model, as well as the conceptual interpretation of the phenomenon, are carried out by reducing the integral attributes to some key concepts in the target definition.

### **3. Discussion and results**

Once we consider a definition as a set of data reflecting the subject matter of the phenomenon, the design of the definition of a Teacher's Research Capacity seems quite clear and easy: it is necessary to obtain information about the attributes of the Capacity and transform this information into a definition. However, a closer look at the situation makes it somewhat more complicated. In particular, it is necessary to detect the attributes that would help to describe the Capacity as a comprehensive phenomenon of a certain type; detect some features that would allow the generalized expression of the essential attributes of the Capacity; the concept framework of the Capacity, and, finally, the design construct of the target definition.

As a result, the methodological scheme for designing the definition takes the form of a step-by-step modeling of a defined phenomenon, as the information about the Research Capacity undergoes a sequence of structuring and generalization transformations: a descriptive model – an explanatory model – a concept model – the definition concept.

The definition design begins with a general description of the phenomenon without its details. For this purpose, a descriptive model of the phenomenon is constructed, which states its invariant value, in other words, its register within the boundaries of a class of similar phenomena. In this sense, the descriptive model is a logical framework of abstract concepts that together denote what the given phenomenon essentially is. In our case, this class of phenomena is represented by a Teacher's Research Capacity. This class of phenomena includes the Teachers' Research Capacity in the framework of Higher Education, Secondary Vocational Education (VET), General Education, Further Vocational Education, etc.

The description of a phenomenon can be carried out in different projections, but the projections must meet the objectives of highlighting the three consistent attributes that are necessary for its comprehensive presentation.

In our view, the phenomenology of the Research Capacity includes at least three components: 1) the general conception of the Research Capacity (the mental image of the Capacity ); 2) the attitude towards the object, process, and result of the Capacity realization; 3) the right conditions for the Capacity realization and self-development. Therefore, the Research Capacity as a comprehensive phenomenon should be analyzed in terms of the following three projections: substantiality, intentionality, and situationality.

The substantial projection allows us to consider the Research Capacity as the structural and functional conception of human cognitive capabilities. The Capacity description is performed in terms of the attributes that are invariant within this class of phenomena.

Intentionality is understood as the attribution of some meaning to some activity which expresses the object orientation, its attitude towards the ongoing process, and the result achieved. That is why in terms of the Intentional projection, the Research Capacity manifests itself as a system of axiological relations to the object, process, and result of research activities.

The situational projection makes it possible to record the variability in the functioning of the Research Capacity in a particular situation.

With reference to the given projections, the descriptive model includes attributes of three types: substantial (system, objectives, abilities, structure, forms, mechanisms, processes, results); intentional (orientation, meaning, attitudes, roles, functions); situational (situations, types of activities, determinants, regulators, degree of distinction).

The next important step in the design of the definition of a Teacher's Research Capacity is the transition from individual attributes of the phenomenon to integral features. It should be noted that, despite a certain degree of systematization of the attributes and a comprehensive mapping of the Research Capacity, the descriptive model is not structurally rigorous, which to some extent blurs the perception of the phenomenon. The fact is that the descriptive model, as it has already been noted above, is built in different projections and therefore includes heterogeneous data that is subject to different types of logic. In this situation, integral attributes must be used in order to continue the analysis and definition design of the Capacity.

The heuristic value of the integral attributes is that they allow to expand the study of the Capacity for the sake of gaining insights into its subject matter, main vectors, and features of its development under the specific conditions required for its practical realization. In order to blend the attributes, thus growing them bigger and integrated, there is a need to build among them some functional interrelationship and thus make them the object of interrelated study. It is important to

emphasize that functional dependencies are not the features of the phenomenon in question. They are binary forms of inter-relation of the system attributes as functional variables that only create prerequisites for identifying the integral attributes of the phenomenon.

The integral attributes acquired through generalization make it possible to construct a logic-and-semantic framework or the otherwise called explanatory model of the Research Capacity. In general, the explanatory model acts as a strategy for the semantic interpretation of the Capacity in its functional sense. In our case, the semantic interpretation of the Capacity is carried out in terms of functional manifestations and features of the practical realization of the Teacher's Capacity in the framework of the VET.

Thus, in order to build an explanatory model, it is necessary to identify the functional dependencies that draw the main vectors for the Capacity analysis and link the key attributes of the descriptive model. In our opinion, the functional dependencies may be as follows:

- system – objectives;
- resources – results;
- function – abilities;
- structure – determinants;
- focus – roles.

Let us consider the functional dependencies in terms of their meanings.

The functional dependence <system – objectives>. The Research Capacity manifests itself in activities that are driven by human needs and aimed at achieving certain goals, becomes a form and a result of the realization of cognitive abilities. The focus of this functional dependence is on establishing relationships and mutual influences between the system and the objectives it faces: what type of objectives are achieved in the process of realizing the Research Capacity? What kind of system of abilities provides for the achievement of objectives of this type?

The Research Capacity is primarily aimed at solving research problems. These are a special type of objectives which, firstly, are of a challenging nature, which involves searching for and processing the necessary information under conditions of its shortage or excess. Secondly, they are a link between the two fundamentally different realities – the realm of the research, and the realm of the functioning of the object (subject matter) of the research activities. Thirdly, they connect these realities as a means and a target in diverse situations (Tyunnikov, 2017).

This allows us to name the main objectives, the achievement of which will determine the level and effectiveness of the Research Capacity:

- the search for and processing of the source information on a given problem;
- detection of functional and structural dependencies in the object/environment relations system;
- identification of development trends in the object of scientific inquiry;
- structural and functional prototyping of the object of scientific inquiry;
- concept modeling of a new object;
- forecasting of the process and the object development outcomes;
- development of criteria to assess the efficiency of the object's performance;
- development of baseline parameters and objects' categorization by them in a given subject area;
- systems planning of the research work;
- organizational design of the research work;
- methodological substantiation of experimental work;
- self-development of competencies in research activities.

Even with a superficial examination of the subject matter of the Capacity, it is clear that well-pronounced research abilities are needed to solve research problems. And if the Research Capacity is perceived not only as personal psychological features of an individual but also as a way of mastering and transforming the reality, then the definition of the Research Capacity correlates with the notion of a research Capacity system. The system of Research Capacities, with its internal subject matter, expresses the syncretic nature of the Capacity and ensures the self-organization of a person by including him/her in the process of setting and solving research objectives, the process of purposeful mastering of various cognitive structures (activities, methods, principles, and algorithms).



Let us emphasize that we do not imply here a local ability or even individual abilities, but rather their system in its integrity alone. It is the system of research aptitudes that serves as the only objective condition for the productive performance of the Research Capacity; only the system can correspond to the given type of objectives and achieve the set goals in a specific way.

Functional relationship <resources – results> expresses the relationship between the resources of a productive activity, its process, and the results achieved. Any Capacity is, above all, a specific mix of resources that define the qualitative and quantitative indicators of the activities performed by a person. Like any other human capacity, the Research and Development Capacity is provided for by the existing capabilities (sources, means, strength, power) that an individual can use in a certain amount for the implementation of some plan or objective (Bol'shaya sovetskaya entsiklopediya; Lubart, Barbot, 2013; Mitrakhovich, 2008; Puttick, 2004 et al.).

Almost all definitions of the Capacity emphasize one main feature – the resourcefulness. At the same time, a significant amount of clarification is required. Since we are dealing with the Research abilities, the resourcefulness of the Research Capacity should be assessed primarily in terms of the productivity of the search for and processing of information implying research methods and principles, i.e. in terms of solving a certain class of objectives, as mentioned earlier, and achieving the planned results.

Thus, by analyzing and evaluating an individual resource of the Research Capacity, we are dealing with variables that, on the one hand, reveal a person's Research abilities, and, on the other hand, determine the productivity of the research activity as a measure of the individual performance of that resource.

The function dependence <function – abilities > establishes the relationship between the Research Capacity functions and the research abilities that allow the realization of these functions. The importance of this type of dependence for understanding the nature of abilities has been observed by psychologists (Kiely, Kim, 2014; Teplov, 1985; Shadrikov, 2010 et al.).

Of course, the functions of the Research Capacity are directly linked to research activities. One might say that the Capacity is 'specialized' in research objectives. And, obviously, it is in its special area that the functions of the Capacity are realized first and foremost. Meanwhile, the area of its productive self-realization is much wider. Research abilities also play a significant role in other activities in such areas as innovation, forecasting, design, organizational, diagnostic, technological, and other fields. That is why we believe that the Research Capacity realizes itself as a multifunctional system in different types, forms, conditions, and modes of operation.

In a first approximation, the main functions of the Research Capacity include the following ones: synthesis, recognition, evaluation, logistics, transformation, prediction, testing, control and correction, and self-education.

In the professional sphere, a Teacher's Research Capacity manifests itself primarily in the productive self-realization of educational, research, and innovation activities and has a significant impact on virtually all stages of the development, integration, and practical application of research structures in vocational education.

Functional dependence <structure – determinants>. The correlation of the available resource of research abilities with the productivity of research and other activities depends on various determinants. It is impossible to imagine the Capacity as a once launched and invariably operating mechanism. The effectiveness of the realization of the Capacity in practice depends on the extent and manner in which an individual's research abilities are triggered. Whatever the situation, an individual's abilities are subject to the influence of internal and external factors, which may vary both by their composition and the power of the impact. As a result of these influences, the structure of the Capacity changes, in other words, it becomes somewhat fluid.

Indeed, in some situations, mobilization of research abilities is more comprehensive and successful, and the performance of the activities is higher; in others, the productivity of the activities is lower and less successful. The transformation of the Research Capacity can take place in a number of ways, from a complete development of the structure to a complete blockage by the factors involved. However, the structure of the Capacity may change dynamically both in preparation for the objective and in the process of achieving it.

In terms of internal factors, it is important to emphasize that the Research Capacity is realized in a system of other Capacities (personal, creative, professional, etc.), which ultimately affects the effectiveness of the activities carried out. For example, the status and level of the

Research Capacity depend to a large extent on self-actualization, concentration of will, moral responsibility, a sense of self-esteem, personal qualities such as independence, perseverance, organization, communication skills, and others. This presupposes that the structure of research abilities is directly based on the personal Capacity, its mental and psychological structure.

It should be noted that, in essence, it is in this context that many aspects of the problem of self-realization of a modern individual in a dynamically developing living environment are discussed. In a similar context, psychologists consider the personal meaning attributed to a situation when a person is able to perceive difficulties as some opportunities for productive self-accomplishment (Verbitsky, Ilyazova, 2011; Sieck, 2020). In this regard, the conceptual idea of the 'boost for creative output' proposed by R. Sternberg and his colleagues is interesting (Sternberg, Kaufman, 2018).

As for the external factors that determine the mobilization of human research abilities, we should note, above all, the impacts of material support, physical environment, information, and communication environment. In this respect, researchers emphasize the role of factors and parameters of the environment which prompt a human's self-accomplishment and development (Lubart, Barbot, 2013; Mitrakhovich, 2008; Sachs, 2005 et al.).

Functional dependence <orientation – roles>. At this point of the methodological analysis, we deal with the question of the mutual dependence of the Capacity focus on a particular area of practice and the functional roles typical of these areas. This relationship is fundamental to many professional objectives since it provides a relatively stable structure for research activities, including the following elements: objectives, means, roles, and functions that are currently relevant for a particular activity.

It is important to stress out that in this case the practical orientation of the Capacity is only seen from the perspective of those functional roles of the individual which effectiveness in the process of active and targeted action depends on the internal resources of the research activity.

L.I. Abalkin points to the need for the Capacity specification, believing that the Capacity, irrespective of its genus and species, is a 'generalized, collective resource attribute tied to the place and time' (Abalkin, 1987). Therewith, it should be noted that the Research Capacity acquires some subjective certainty in the real time-and-place relationship by being integrated into an activity with a specific set of regulated functions and roles. This integrated attributes of the Research Capacity indicate the professional functions and roles of the employee who owns this the Capacity and is its holder. In the VET system, these are administration staff of educational establishments, teachers of social and humanitarian disciplines, general professional and special disciplines, teachers of vocational training, curriculum developers, and supervisors. The definition elements for the Capacity, the source of which is the professional activity, suggest consideration of the features of the function-and-role integration of a particular employee in the system of professional activity.

The analysis of functional dependencies makes it possible to form an explanatory model of the Capacity, which includes the mutually complementary integrative attributes of Systematicity, Resource Productivity, Multi-Functionality, Structural Mobility, Function-Role Determinancy.

As we have explored the logic-and-semantic definition of the Capacity at large, we can move on to a concept model. The concept model is a set of concepts. Each individual concept contains a statement regarding the attributes and functional features of the Capacity. To form the necessary set of statements, the integral attributes of the Capacity are transformed into complementary concepts. While establishing a meaningful correspondence between the integral attributes of the phenomenon and the concepts, we should follow the following basic requirements: Identification, Differentiation, Specification, Generalization.

Identification: the concepts included in the concept model make it possible to recognize the Research Capacity as a comprehensive phenomenon allied with similar phenomena.

Differentiation: the concepts of the concept model make it possible to identify the following constituent parts of the Capacity: types, forms, mechanisms, modes of manifestation.

Specification: the concepts of the concept model reflect the following specific features of the Capacity: directions, areas of application, function-and-role content.

Generalization: the concepts reflect the main common aspects in its class.

With these requirements in mind, a concept model of the Research Capacity can be designed as a set of the following elements:

- the Research Capacity is a system of research abilities (the integral attribute is the Systematicity)
  - the Research Capacity has an individual degree of distinction (the integral attribute is the Resource Productivity)
  - the Research Capacity is a multi-functional system of research abilities compatible with various activities (the integral attribute is Multi-Functionality)
  - the Research Capacity is a system with a deterministic structure (the integral attribute is the Structural Flexibility)
  - the practical orientation of the Research Capacity is influenced by the functional and role-specific features of professional activity (the integral attribute is the Functional and Role-Specific Certainty).

The final step in the definition design involves the final arrangement of concepts. Different modifications of the definition design are possible, which does not override the basic rules for the text design of a definition: balance, lack of tautology, clarity, and lack of negation (Logika dlya menedzherov, 2019); definitions need to be applicable in the broadest sense, establish definition-related links with other terms, and draw attention to the analytically important aspects of the object (Oppenheim, 1975).

So, to conclude the discussion of the hereby approach, may we suggest the following definition: *the Research Capacity of a Teacher in the Vocational Education System* is a multi-functional system of research abilities with a flexible structure and an individual degree of distinction of mechanisms and processes of productive self-realization, development, integration and practical application of cognitive structures of various activities of a Teacher involved in the vocational education system.

#### 4. Conclusion

A distinctive feature of this definition is that it is the result of processing and sequential consolidation of information about the given phenomenon within a step-by-step definition design process. The fact that in the stepwise modeling the attributes of the phenomena and the relationships between them acquire some degree of completeness and an integrative meaning, testifies, in our opinion, to the enhanced wholeness and adequacy of the target definition. It is important to note the heuristic nature of this approach, as well as the possibility of its extrapolation, if not for the entire, yet for a fairly wide range of psycho-pedagogical concepts.

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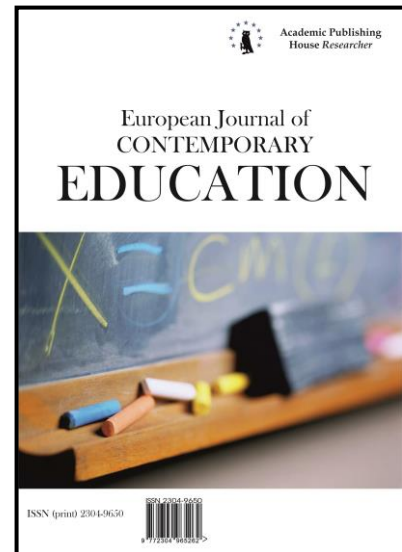
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## **Implementation of Subject-Oriented Methods in the Educational Process of University (Quantitative Results of the Investigation): Case Study**

Elvira M. Valeeva <sup>a</sup>, Ekaterina G. Milyaeva <sup>a</sup>, Regina V. Penner <sup>a,\*</sup>, Elena G. Sosnovskih <sup>a</sup>

<sup>a</sup>South Ural State University (national research university), Russian Federation

### **Abstract**

The authors place the problem of a subject-oriented model in educational process of higher education. The transition to subject-oriented methods is due to the transformations of modernity. Objective changes in reality, informatization and technological changes, require from students fundamentally new knowledge and skills, which the classical educational model cannot provide. This research presents the quantitative results of an educational investigation that was conducted with the aim of finding and testing the optimal forms in teaching humanities in university.

The investigation was attended with students who studied the course of philosophy in the Academic Year 2018–2019; we used different forms and methods of working with philosophical material: from classical to non-classical (philosophical practice).

In the investigation, we used philosophical practice as an alternative method of teaching philosophy. The non-classical nature of philosophical practice is manifested in the fact that attention is switched from the studied material to the subject of study. In those student groups where methods and techniques from philosophical practice were used, we fixed the students' attention not on the abstract philosophical concepts, but on the specifics of the perception of these concepts by the students themselves. In this way, we narrowed the distance between the theoretical level of philosophical knowledge and the real existential experience of modern students. In the process of the investigation, we paid attention to the independent work of students in the educational process.

The materials of the investigation can be used as recommendations for the organization of extracurricular work, focused on the formation of soft skills among students (including discussion and philosophical clubs for the development of critical thinking, logic and other open intellectual creative platforms).

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\* Corresponding author

E-mail addresses: [pennerrv@susu.ru](mailto:pennerrv@susu.ru) (R.V. Penner), [valeevaem@susu.ru](mailto:valeevaem@susu.ru) (E.M. Valeeva), [miliaevaeg@susu.ru](mailto:miliaevaeg@susu.ru) (E.G. Milyaeva), [sosnovskikheg@susu.ru](mailto:sosnovskikheg@susu.ru) (E.G. Sosnovskih)



**Keywords:** higher education, transformations in education, educational investigation, philosophy, philosophical practice, quantitative results of the investigation.

### **1. Introduction**

In the modern system of higher education, transformations that concern the learning process itself and affect the subjects of this process are taking place. Today's educational trends include e-education (distance, mixed formats) (Lu et al., 2015), personal learning paths (Schilling, 2005; Soboleva et al., 2020), competency-based approach (Lozano et al., 2012; Prosekov et al., 2020). The aforementioned tendencies are the basis of the transformations; they adjust the form and content of courses taught at university.

Technological progress sets new trends in social development, primarily associated with computer technology, the automation of most professions and the introduction of robotics (Barth et al., 2007). In such circumstances, a new approach to humanitarian knowledge is needed, in which the central role is assigned to a person and his activities (Asadullin, 2019; Mohamed Nazeer et al., 2019; Kulikova et al., 2019). This applies to the working not only with humanities specialists, but also with students of technical specialties (Howlett et al., 2016). In this regard, humanities undergo significant transformations, General Philosophy Course is also involved.

Metamorphoses of the educational process require considerable flexibility of its subjects. Constant changes are difficult for university professors; it is more difficult for students. On the one hand, a course has been taken towards the professionalization and commercialization of knowledge and competencies – a model of tactical behavior when the effort spent on obtaining knowledge and competencies should pay off in the near future (Lyotard, 1984: 123); on the other hand, educational programs are structured in such a way that humanities do not provide students with the required professional knowledge and competencies. Moreover, philosophy is aimed at the formation of extremely abstract thinking, working with strategies, not tactics.

In our opinion, in an era of constant transformation, a modern student must initially form an idea of the self and his place in this world, and only after it he will be able to engage in the development of practical skills. The problem here is that students do not see philosophy as something that they really can use in life; they do not understand the importance of comprehension for themselves. Therefore, in the Academic Year 2018–2019, we conducted an educational investigation with students attending General Philosophy Course. The investigation was carried out in three stages. At the first stage, we used quantitative measurements on the issue of the influence of the philosophy course on the value orientations of students, as well as on their interest in philosophy as a whole. At the second stage, subject-oriented methods were implemented in the educational process, including techniques from philosophical practice. Finally, in the third stage, we analyzed the effectiveness of the selected educational methods.

In the investigation, the process of teaching philosophy was constructed by the traditional academic forms and the methods of philosophical practice, the practice of direct philosophizing, rather than theorizing philosophical knowledge (Brenifier, 2018; Lahav, 2016). Methods of philosophical practice are not common in the educational environment and their usage is discussable (Fuller, 2017). Therefore, we decided not to change the format of the seminars. The seminars were designed under the methods of philosophical practice: slow reading, philosophical counseling and Socratic dialogue. Our goal of using these methods was to overcome the knowledge paradigm and to reach a subject-oriented educational model (philosophical diary format), within the framework of which "live" communication between students and philosophers is possible.

It should be noticed that the transforming reality requires from young specialists to have new knowledge and skills, new professions (Andrews, Higson, 2008). Specialties of the future form a request for new educational forms that work with the personality characteristics of students. Philosophical practice with a focus on the subject allows this request to be fully implemented.

### **2. Materials and methods**

The investigation involves three stages:

1. Questioning students in groups: with a partial introduction of philosophical practice, with a full introduction of philosophical practice, without the introduction of philosophical practice (control group);

2. Questioning the participants of the philosophical club before, during and after the completion of philosophical practice;

3. Content analysis of philosophical diaries for all interested students.

The investigation was of a pilot nature, since the study of philosophical practice is an innovation not only for pedagogy, but also for sociology. The starting point of the study was the assumption that philosophical practice, as a methodological method, is more conducive not only to the study of the subject, but also to a change in the worldview of students.

The study was carried out at the end of the semester, during which students took a philosophy course. In this case, the sample is of a special nature, the sampling is continuous. It is difficult to estimate the sampling error in non-random selection, since there are no formulas for their calculation.

The object of the research are students who took a philosophy course during a semester in different educational formats. The subject is within personal transformations. Purpose is to investigate the impact of the philosophy course on the worldview of students.

Tasks of the research: 1. to identify the attitude to the philosophy as a subject for study; 2. to assess the level of teaching the discipline; 3. to establish the effectiveness of various forms of teaching philosophy; 4. to find out if there has been a transformation of the norms and values of students as a result of mastering the discipline; 5. to study the influence of such a form of teaching as "philosophical practice" on the formation of philosophical thinking; 6. to establish whether an understanding of philosophical concepts has been formed: worldview, values, philosophizing; 7. to study whether the acquired knowledge influenced the life of students; 8. to check the toolkit for suitability for further research of philosophical practice.

In the process of analyzing the data of a sociological study, one-dimensional and two-dimensional tables of contingency of features were built (establishing the presence and strength of connection, patterns, influence) depending on the types of scales used in the designed questionnaire (calculating the Cramer, F, Eta coefficients).

Statistical processing of the questionnaires was carried out in the Vortex 7.0 data processing program.

The investigation lasted during the academic year and involved the students of South Ural State University. In order to test the main hypothesis, a sociological study was conducted by the method of survey (questionnaire). The study involved 105 respondents, most of them representatives of technical specialties (Institute of Engineering and Technology, Institute of Architecture and Construction, School of Economics and Management).

Subsequently, the questionnaire was supplemented by a qualitative study of philosophical diaries, which made it possible to understand the motives and specifics of the transformation.

The specifics of the research predetermined the distribution of the methodological aim into 3 parts: educational – the discourse of research, philosophical – the method of investigation (forms and methods of philosophical practice), sociological – the measurement method (questionnaire, content analysis).

The diary format was chosen in connection with the need to present philosophy to students in the most comfortable and subject-oriented format, as well as to fix the systematic work of the participants in the investigation with methods of philosophical self-reflection, introspection. We suggested that the diary will record not only quantitative indicators, but also qualitative ones, in particular, to reveal the existential experience of participants. The implementation of subject-oriented approaches in teaching philosophy and the disciplines of humanities in modern conditions is impossible without studying the existential experience of the student.

For the investigation, the material was prepared on the basis of the development and testing in practical exercises of the illustrated diary "Philosophical practice for every day" (idea and edition by E. Milyaeva). The Philosophical diary is a systematic collection of quotes from the works of thinkers of antiquity and modernity, united by the common theme "Philosophizing". The topic is highlighted as one of the most difficult for independent comprehension based on the analysis of the results of seminars with elements of philosophical practice.

The diary material is organized as follows:

- author's appeal to the diary reader, specifying the topic of reflection and giving reference points / landmarks;

- a quote of the month – a fragment of a philosophical text that sets the theme for the entire cycle of work;

- four fragments from texts defining the "philosophical mood of the week";
- philosophical quote for every day.

The duration of the investigation "Philosophical Diary" was 4 weeks (28 days).

We suggested that the investigation "Philosophical Diary" participants work with a philosophical diary according to a methodology based on Erich Fromm's introspection, which involves developing a habit of self-understanding and daily philosophical work to get to know the self (Fromm, 1993: 258-302). Participants of the investigation "Philosophical Diary" were recommended to devote a small amount of time (15-30 minutes) daily to reflection on a philosophical quote and their own experience. Firstly, they were needed to use method of concentration. Then read the fragment of the month or week and after that several read the quote of the day, listen to the self, focusing on what thoughts and feelings the philosopher's words evoke, how they relate to the previous fragments and the individual experience of the participant. If possible, students were needed to write down thoughts. Optionally, the recording could be accompanied by associative photographs, pictures, quotes or references to songs and films. Professor could not give recommendations on the interpretation of fragments, help with analysis, etc., and also could not remind about the need to fill out a diary every day. Thus, the participants were given complete freedom in reflecting and writing.

The participants in the investigation "Philosophical Diary" could choose a format of making notes in the diary convenient for themselves: a traditional handwritten diary or electronic (create posts on social networks (in public access or in a closed group)). Of the 13 participants, 9 people chose the handwritten version, 4 – the electronic one.

During preparation this research, we took into account the experience of our colleagues who conducted investigations in the higher education system. In this context, our attention was drawn to the work of scientists from Kazan Federal University (Russia, Kazan) (Golovanova, Sibgatullina, 2015; Shaidullina et al., 2015; Kamalova, 2015). These studies were aimed at finding forms of students' self-development within the educational process. Among the listed the investigation by I. Golovanova and T. Sibgatullina is closest to ours because of its orientation towards the formation of the self of student with pedagogical tools. Despite the proximity of the problems, colleagues from Kazan Federal University, as a rule, test the results of work with students in Pedagogy. In turn, the target audience of our investigation was not limited to a specific specialty.

If a research team from Kazan Federal University is working with the problem of an educational investigation from a pedagogical context, scientists from University of California (USA, Los Angeles) focus on a problem from a psychological context. 3 key tasks can be distinguished in their investigations:

- search for optimal teaching tools to improve the quality of education (Little, Bjork, 2014);
- search for tools to improve student memory (Storm et al., 2010);
- focus on self-testing procedures in the educational activities of students as an option for independent practical activity (Kornell, Son, 2009).

These tasks indicate that American colleagues are focused on the analysis of the cognitive processes of students and their improvement in the learning process. However, they do not touch on the problem of preparing a student for adulthood after university.

Finally, the subject-oriented educational model proposed in the study originated in the context of knowledge economy (Karpova et al., 2016). Knowledge economy as the "crown" of the post-industrial era is focused primarily on the information and innovation components. This is the stage in the development of mankind, when the vast majority are skilled workers (Smith, 2002). In this regard, training mechanisms for skilled workers are becoming a priority. These include the transformation of existing educational models. However, the knowledge economy today can be one of the key threats to personalized education because of its attitude to a person only as a source of innovation.

### 3. Results

The findings represent the initial part of an investigation on the implementation of philosophical practice as an educational technology (stages 1 and 3).

To measure the effectiveness of philosophical practice we designed a sociological questionnaire. It includes 36 questions, divided into several thematic blocks: about philosophy as an academic discipline, about the process of teaching philosophy, thematic questions about philosophical practice, about personal transformations following the course, and others.

Special stress had been placed on the following indicators: the level of teaching philosophy, applied knowledge, intrapersonal transformations, and skills of philosophical practice.

We conducted a survey on December 2018. Main tasks included the identification of the attitude towards philosophy as a scientific discipline; research of the effectiveness of various forms of teaching philosophy at the university; establishing a well-formed understanding of such philosophical concepts as "worldview", "values", "philosophizing"; scrutiny of the influence of "philosophical practice" on the formation of philosophical thinking; assessment of the level of teaching the discipline in various forms. Thus, we needed to find out whether students' norms and values were transformed based on the results of mastering the discipline and whether the gained knowledge had an effect on their understanding of their lives.

The survey involved 105 people, students of Institute of Engineering and Technology, Institute of Architecture and Construction, School of Economics and Management, Institute of Social Sciences and Humanities, mostly young men (70 %), aged 18 to 22 years.

Classes with students were held in four forms: traditional, distance, philosophical practice and partial implementation of philosophical practice. In our university, a distant form of conducting classes is actively developing, which allows students to show greater independence in the study of the subject, but at the same time it becomes more difficult to control the educational process. Philosophical practice, being an innovative form of conducting classes, makes it possible to delve deeply into the topic, and accordingly monitor the correctness and clarity of its understanding. Therefore, the question of how effective the application was of particular interest to the study. For this, a number of questions were developed that made it possible to compare various forms of teaching philosophy and their influence on the formation of knowledge in the subject and also on personal attitudes of students.

The fact that the majority of respondents (84.8 %) have not previously studied philosophy is important in these conditions.

Due to the survey respondents noticed that "philosophy" is studying the way people relate to the world (80 %); its related disciplines are psychology (86.7 %), sociology (79 %) and history (44.8 %). The data demonstrate that students see philosophy as a science of the personal plan, related, to a greater extent, to the personal perception of the world, i.e. subjective, associated with personal experiences. Person's ideas about society, or social philosophy, have become what we call sociology today. History considers the life of person and society in a temporal aspect, its transformation under the series of events. Thus, in accordance with their views, philosophy is a special view of social development, worldview.

According to the respondents, "worldview" is the basic life position, beliefs and ideals of a person (49.5 %), the system of a person's worldview (37.1 %). Values are the personal, socio-cultural significance of objects and phenomena (61.9 %), the importance and significance for a person of a certain sphere of life (21 %). Answering questions about basic philosophical concepts, students once again emphasized not only the social, but the personal significance of this science. Philosophy is understood by respondents in two main aspects: as a certain style of thinking (61 %) and reflection, reasoning (26.7 %), which indicates an understanding of the close relations between philosophy and logic.

Most students rated the contact with professor as informal (61.9 %). In our opinion, it contributes to a better immersion in the topic. A quarter of respondents noted a more stringent level, formal contact (22.9 %), which is a characterization of the traditional style of teaching. It is notably that 8.6 % were generally at a loss to evaluate the level of teaching. This category includes all students, regardless of the form of the classes. Perhaps, it is simply not important for them to master the discipline.

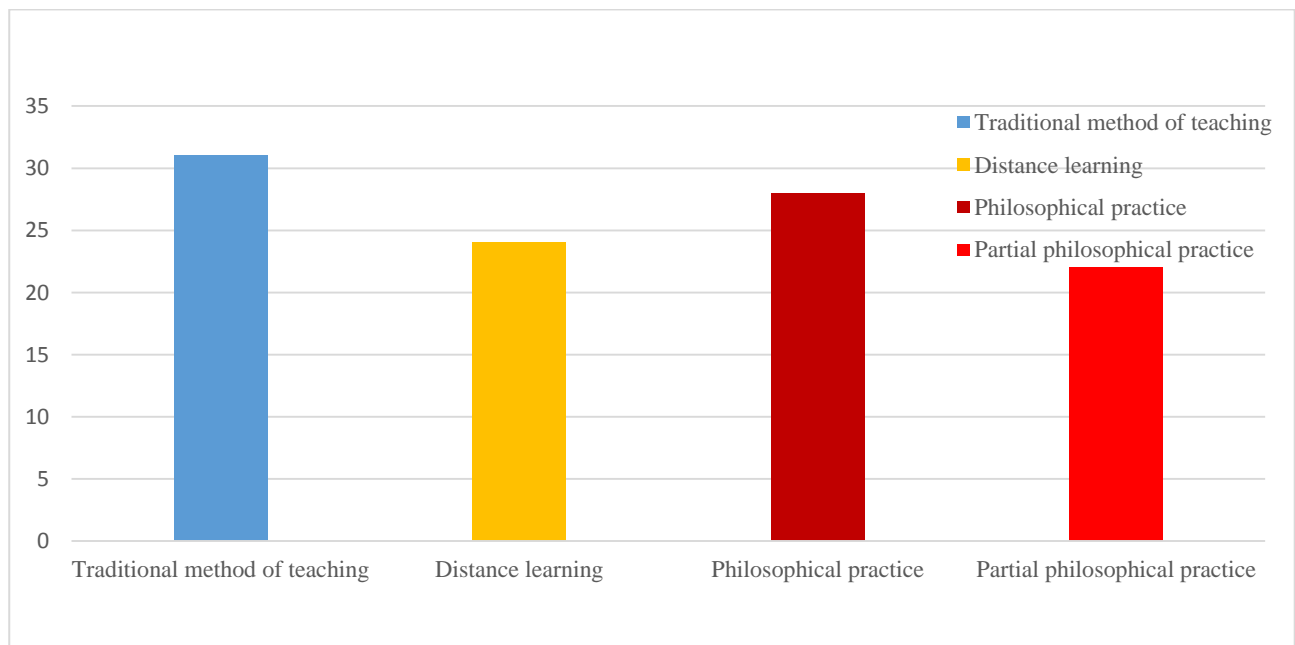
Basically, participants noted that it was interesting to attend classes. 53.3 % of respondents agreed with this statement, and a third more likely agreed with this. The same variation was obtained with the question of the use of multimedia equipment during classes. However, there is the fact that professors, unfortunately, do not choose the audience where the classes will be held.

Student reviews on the use of innovative methods in conducting classes were divided. About 44 % believe that innovative methods were used during the classes, and 40 % of the respondents have chosen variant of their absence. Innovative methods of conducting classes were noted by students who had classes in the traditional form. The distance learning form was not perceived by students as innovative, also applies to the partial implementation of philosophical practice. In the first case, computer technology for the modern generation is not something new and interesting, and in the second case, philosophical practices could "dissolve" in the general stream of traditional seminars or be perceived as a game. However, those students whose classes were conducted in the form of philosophical practices noted their innovativeness (Table 1). Cramer coefficient [0..1]: 0,263, error probability: 5,00 %, it is obvious there is no relationship between variables.

**Table 1.** The influence of form of organization of classes with philofical practice and choice of innovative methods in education (in percent of the total)

Organization of classes	Innovative methods in education					total:
	completely agree	rather agree	rather disagree	disagree	difficult to answer	
Traditional form	2,9	8,7	7,7	4,8	5,8	29,8
Distance education	2,9	5,8	5,8	2,9	4,8	22,1
Philosophical practice	4,8	13,5	2,9	4,8	1,0	26,9
Partial implementation of philosophical practice	1,9	3,8	11,5	0,0	3,8	21,2
Total:	12,5	31,7	27,9	12,5	15,4	100,0

Regardless of the form of conducting the classes the students understood the content of the course – 35.2 % fully agreed with this, partially agreed – 39 %.



**Fig. 1.** Types of teaching methods

However, the study showed that the traditional form of teaching is no less interesting than other forms: the traditional form – 29.5 %, distance education – 22.9 %, philosophical practice – 26.7 %, partial implementation of philosophical practice – 21 %.



The skills of professors to convey the content of the subject to students contribute to the interest in the subject, with which 54 % of respondents agreed. To a greater extent, professors in the traditional form – 29.8 % and philosophical practice – 26.9 %. 73.3 % of respondents noted the professor's willingness to help.

Most of all the students remembered the classes on the topics "Happiness" and "Cinema Hall", during which the screening and discussion of the A. Tarkovsky's film "Stalker" based on the story of the Strugatsky brothers "Roadside Picnic" took place. Among young people the topic of stalkers is well known by connection with the appearance of a series of computer games of the same name, as well as the development of tourism in ghost towns, which further "fuels" interest in the picture, which undoubtedly has a deeper meaning.

Students identified Socrates, Immanuel Kant, Sigmund Freud and Friedrich Nietzsche as their favorite philosophers. It seems most likely that the first two philosophers are well known to students from the time of school; therefore, these philosophers are more accessible. The last two have always been popular among young people because of their non-standard outlook on the world.

The vast majority of respondents noted that classes in philosophy, to varying degrees, influenced their worldview. Students identified "Thinking", "Being", "Human Being", "Philosophizing", "Freedom", "Happiness" and "Society" as the most important topics. Based on the results of self-reflection their understanding of such values as self-development (42 %) and self-realization (37.1 %) also changed. At the same time, 35.2 % of respondents noted that the philosophy course did not change their understanding of values. Based on the results of the survey, we formed the following hierarchy of values (in descending order): family, health, love, material well-being, self-realization, career, self-development, and social benefits.

To the question "How did the lessons of philosophy influence you?" 33.3 % answered that they became more interested in philosophical issues and 22.5 % chose the option "Did not affect in any way". Half of the respondents began to "better understand themselves". Controversial data were obtained in answers to questions about sensitivity to other people's problems and about concentration skills. When answering them, students were divided into two groups with diametrically opposite answers.

The possibility of practical application of the knowledge gained during the classes was noted by 66.7 % of respondents. In addition, 41 % of respondents would like to continue studying philosophy in the framework of a non-formal intellectual club, and 30.5 % would not want to study philosophy anymore.

Overall, the study provided only descriptive information, which is expressed in a one-dimensional distribution. The two-dimensional distributions turned out to be obvious. The lack of analyses means that design of the questionnaire must be changed for further investigation. Philosophical practice was perceived by students, for the most part, as a kind of forms of teaching philosophy and did not have a significant impact on them.

Further, these data was supplemented by a qualitative study of diaries, which helped us to understand the motives and specifics of the transformation of the worldview.

The investigation on the work of students with philosophical diaries was conducted in April – May, 2019. Students of non-humanities (mathematicians, engineers, chemists) studying the philosophy course were invited to take part in the investigation voluntarily, without interrupting the educational process and everyday activities. Of the among more than two hundred students, only 13 second-year and third-year students agreed to participate, of which 8 were males and 5 were females. This gender distribution reflects the general Russian tendencies of students in non-humanities. The age of participants was 20-21 years, which reflects the average age of full-time students in the 2nd and 3rd year of a Russian university.

**Table 2.** Diary: entry and filling form

Participant	A	B	C	D	E	F	G	I	J	K	L	M	N
Gender	male	Male	male	Female	Male	Male	female	Female	male	male	male	female	female
Age	19	19	20	20	20	20	20	20	20	21	21	22	20
Diary format*	H	H	h	e	E	E	E	H	h	h	h	h	h
Diary filled out (n/28 days)	27/28	11/28	21/28	28/28	28/28	28/28	28/28	7/28	22/28	22/28	17/28	23/28	28/28

\*h – handwritten diary, e – electronic version of the diary

5 participants made entries in the philosophical diary every day. It is worth noting that those who chose the option of posting on social networks ("Vkontakte" – 3; "Instagram" – 1) made notes daily (mainly in the evening) for all 28 days of the investigation.

Three participants made their diary entries about 60 % of the total duration of the investigation. One of the participants refused to participate in the investigation, justifying his refusal with workload in study and social work. The rest of the participants took notes about once in 2 days. From this we can conclude that systematic philosophical work requires serious self-discipline. Modern students, developing in conditions of informational noise, hyper-care from parents and teachers, do not have the necessary skills in time management and self-control. Also, using the example of handwritten diaries, one can note the difficulty in concentrating on a task that requires changing daily routine habits. Member N, who filled out the handwritten diary completely, said in an oral feedback that he had been keeping diaries in various forms since childhood and this was a habit. Undoubtedly, a rather complicated selection of philosophical texts played a role, requiring a deep theoretical base for independent perception.

Most participants made detailed handwritten notes (more than 500 characters per page), accompanying their own thoughts with epigraphs and quotes from Sci-Fi books, songs and films. This allows us to note the developed associative thinking of a modern student, familiarity with both mass culture and underground or art house works, and the undoubted accessibility of works of art for Russian students. Those who recorded in electronic form had the opportunity to accompany their entries with links to multimedia files (video, photos, audio, etc.).

In our opinion, for a modern student, communication with the self through a diary is equally lively in handwritten form as through a smart phone or laptop. The participants in the investigation recorded their thoughts from both, in the first person and the third person. They turned to existential experience, reflected on their own present and looked into their future, comparing their path with the existing cultural background.

We used content analysis to study philosophical diaries. The main emphasis was placed on questions that echoed the questionnaire – transformations within the personality, the skills of philosophical practice. The structure of the diary was developed taking into account the interest in these topics.

The content of the entries in most cases corresponds to the task and constitutes the participant's reflection on the submitted quote. It is worth noting that none of the participants managed to withstand reflection on the topic "Philosophy" throughout the investigation, in particular due to turning to their own existential experience, partly due to the specifics of age, when young people focus mainly on themselves, and not on abstract philosophical issues. In the content we can see not only the well-educated students, but also their own thoughts both on the "decoding" of the meaning inherent in the words of the philosopher and their own thoughts. Based on particular situations and events, the participants of the investigation pose philosophical questions: from "who am I?" and "why me?" to "what is being?" and "what is love/friendship/death/life?"

Most of the entries are imbued with existential experiences caused by the words of quotes, and related to the comprehension by participants of their place in the world or attitude to the future, in which young people, as a rule, ask their most exciting questions, trying to formulate an

answer for themselves. For example, the participant D reflects on the future *"I am scared to look into the future, but not because it seems like an absolute danger, but because it seems to be nothing. You look ahead and you see nothing, because it is not clear what and how it will turn out, which butterfly will flap with which wing, which people will come from and what they will bring with them. It's impossible even to make plans simply because you don't understand what will happen next (it's funny how it does not fit with my answer to the question about the future earlier). And the world outside me, too, is moving inexorably forward, and we can only assume that we will end tomorrow as part of the nuclear ashes, die on the bus or live to see holographic friends. It would seem that now there is a hedonistic paradise on the planet, everything is for us, but it is amazing how often it all seems to be precarious and useless."* Or participant E wrote *"It seems to me worthwhile to think about things that are happening to you now, have just happened or will happen soon. You can think far away, but do not slurp what happened yesterday, a week, a month, or a year ago."* Despite the melancholy mood of the entries, young people are focused on life in the future; they understand that they are built into the world around them and aware of their subjective assessment of this.

Participant F demonstrated the most creative approach to reflecting on the philosopher's words about a given topic, formulating several poetic lines about the formation of a person on the quote *"The superiority of philosophers over ordinary people is that even if the basic theories collapse, their lives will continue"*. (Aristippus, quote from *"Lives of the Eminent Philosophers"* by Diogenes Laertius). The opposite, short, but very personal opinion of participant E about the importance of theory in human life: *"It's not my intention to die ... But if it suddenly starts to come in, then this is unlikely to be tied to the destruction of any theories."*

An analysis of the diary entries of the participants in the investigation demonstrates that students are reflected in philosophical texts on their everyday life. These texts give a person certain guidelines and coordinates for building a picture of the world. Quoting one of the participants in the investigation, *"instead of answering one question, I got new ones,"* we can emphasize that young people are not satisfied with the available answers, but are ready to move on in the hope of expanding their horizons.

#### 4. Discussion

In 1979 J.-F. Lyotard published *"The Postmodern Condition"*. In this book, the French philosopher asked himself questions about what knowledge is and what are the models of its legitimation in the postmodern era. As a part of the study of knowledge, the author's attention is drawn to the question of the mechanism of transmission or teaching. According to J.-F. Lyotard, university education is effective; this is what society requires of it. *"The result that they want to get at the same time is the optimal contribution of higher education to the best efficiency of the social system"* (Lyotard, 1984: 117). This contribution is in the formation of competencies in two areas: to maintain the integrity of society itself and maintain its competitiveness on the world stage. The period of the XX century is an era of competencies, not ideals: *"The transfer of knowledge does not look more like what is intended to form an elite capable of leading the nation to liberation, but it provides a system of players capable of ensuring proper performance of the role in practical posts that are required by institutions"* (Lyotard, 1984: 118). This period, as required by the knowledge economy, is filled with knowledge. At the same time the era is impersonal.

The consequences of moving along the path of building competencies are as follows:

- student audience is divided into 3 types: professional intellectuals, technical intellectuals and recipients of the transmitted knowledge (humanities). In such a division, the depreciation of humanities occurs;
- university receives a new function, increasing the efficiency of the system, which it is trying to implement through retraining or continuing education;
- self-education turns into a constant and continuous process. This continuing education must respond to the direct demands of society;
- universities become dependent on political power because of their direct financial dependence on government;
- the system at university is built on the principles of functionalism. Therefore, the system is focused on the transfer of a mass of knowledge;

- the information component of university education is replacing the communication on, a machine replaces professor;
- performance replaces knowledge at university. In the framework of the commercialization of knowledge, the question "Is this true?" is replaced by the question "Can this be sold?" (Lyotard, 1984: 124).

In the description of the modern university J.-F. Lyotard captures criticism of the educational process. This fits into the general program of postmodernism to criticize capitalist society (J. Deleuze, F. Guattari, J. Baudrillard, J. Derrida). The hierarchical structure and its centering in Logos do not suit postmodern philosophers. Moreover, they doubt the survivability of such a social model. In exchange, they offer theoretical constructs and a methodology based on the principles of pluralism and relativism.

Options for overcoming the existing problems at university were formulated in the 1980s by philosophical practitioners. Only in the 1990s, for example, the German Association of Philosophical Practices or the American Association of Philosophical Practitioners (USA) hold the first international conference on philosophical practice and legitimize its name. In philosophical practice, treasures of world philosophy were put in specific techniques and mechanisms of philosophical work with non-philosophers, people from streets. Even today philosophical practitioners keep they distance with university as a place, where "dead" philosophy is (Achenbach, 2016). This gap between practitioners and university leaves the problems of education unresolved.

In our research, we attempted to respond to those university problems that were identified by postmodern philosophers in 1970–1980. In overcoming the problem of depersonification of education, we offered students the option of personified work with philosophical texts through the philosophical diary. We created the philosophical diary on the principles of philosophical practice: slow reading, reflection with the text, orientation toward the existential experience of the student.

## 5. Conclusion

The aim of the investigation – overcoming the knowledge paradigm in the framework of a course in philosophy and reaching a subject-oriented educational model using the forms and methods of philosophical practice – was realized. According to the results of the investigation, it can be noted that the introduction of subject-oriented methods of working with students into the educational process of the university is possible to several principles that we have outlined:

- focus on the student, not on the textbook or educational plan;
- development in the process of teaching course conditions for dialogue between professor and student;
- openness to the existential requests and interests of the student.

Orientation to interests and needs of students allowed us to develop the so-called soft skills in the process of teaching the philosophy course among participants in the investigation, a set of non-specialized skills important for the development of the student and his future career related to personal qualities, in particular, self-reflection, goal-setting, self-management, emotional intelligence (Batsunov et al., 2018). Developed skills can make students more stable and flexible in the face of the challenges of modern life. For students, a subject-oriented approach has become a necessary basis for the formation of "flexible skills" in the academic work of the course but mainly in self-understanding of themselves and their place in the world. In our opinion, the philosophical diary "Philosophical practice for every day" serves as a convenient guide in the search for a modern student himself and his place in this world.

Without a doubt, philosophical practice pays attention to the student, his personality and thoughts while the traditional forms of education pay attention to the acquisition of knowledge. However, in modern conditions, it is much more important to acquire applied skills that can be used in everyday life. Thus, philosophical practice is philosophy in action.

Based on the results of the investigation, we collected and published the philosophical diary. It is the selection of short quotes from philosophical works in a convenient format for updating students' independent work. In our opinion, extracurricular classes with philosophical diaries can be conducted with students who have already completed the course in philosophy. In this manner we organized the work of the philosophical club, carried out at the second and third stages of the investigation.

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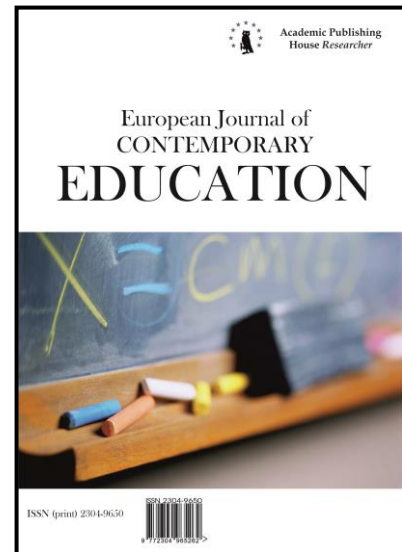
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## **Achievements and Challenges of Autism Support System in Russia: A Multidimensional Stakeholder Survey**

Anton A. Varlamov <sup>a,b,\*</sup>, Ivan V. Skorokhodov <sup>a,b</sup>, Elena Yu. Skorokhodova <sup>c</sup>, Igor L. Shpitsberg <sup>b</sup>

<sup>a</sup> Pushkin State Russian Language Institute, Russian Federation

<sup>b</sup> Rehabilitation Center for Children with Autistic Spectrum Disorders "OUR SUNNY WORLD" (Non-Government, Non-Profit Organization), Russian Federation

<sup>c</sup> Russian State Social University, Russian Federation

### **Abstract**

Autism spectrum disorder (ASD) is among the most common developmental disorders of great social significance. Adequate intervention can increase socialization of autistic individuals, both increasing their quality of life and decreasing financial burden. Initiatives to introduce modern standards of autism treatment and education in Russia were launched several years ago; unfortunately, there is little information on the perceived problems and barriers, which may hinder further development of autism support system. This paper presents the results of a stakeholder survey including both service receivers (parents of children with ASD) and service providers (professionals working with ASD children) from different regions of Russia. The study reveals that the quality of specialized services related to autism treatment is assessed much higher than the quality of inclusive education and accessibility of general education and other general services available to children and adults with ASD, highlighting the importance of implementing an inter-departmental system providing continuous support to people with ASD and facilitating their inclusion and social integration. The results also show that general attitude to distant diagnostics and education, on par to the estimates of quality of services related to distant education, are lower in non-capital regions, where the need for such services is higher due to lower accessibility of person-to-person services. The present study may be of use both for professionals in autism treatment and education, and for the specialists who may encounter persons with autism once in a while, as it brings a detailed estimation of several aspects of autism support both through the eyes of support receivers and providers.

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\* Corresponding author

E-mail addresses: [antonvarlamov@gmail.com](mailto:antonvarlamov@gmail.com) (A.A. Varlamov), [iskor@live.com](mailto:iskor@live.com) (I.V. Skorokhodov), [aentar@gmail.com](mailto:aentar@gmail.com) (E.Yu. Skorokhodova), [igor@solnechnymir.ru](mailto:igor@solnechnymir.ru) (I.L. Shpitsberg)

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### **1. Introduction**

Autism spectrum disorder (ASD) is a development disorder characterized by social and communicative impairments and restricted interests and behavior, as well as perception abnormalities ([American Psychiatric Association, 2013](#)). This term combines previously used diagnoses of infantile autism, atypical autism, Asperger's syndrome, and pervasive development disorder. It is one of the most common developmental disorders with average global prevalence about 1%, often having a strong negative impact on the quality of life of the affective individuals and their families, and thus has a crucial social significance ([Baxter et al., 2015](#); [Lugo-Marín et al., 2019](#)). The terms "high-functioning autism" (HFA) and "low-functioning autism" (LFA) are frequently used, referring to the absence or presence of intellectual disability accompanying ASD. LFA is considered more prevalent than HFA, with about 50 to 70 % of all the persons with autism having LFA ([Matson, Shoemaker, 2009](#)).

Low-functioning autism poses a great challenge, and treatment can have quite pessimistic outcomes, especially if the intervention was not delivered at early age ([Elder et al., 2017](#)). In the most unfavorable case, such a child is devoid of the opportunity to get any education and is constantly and totally dependent on either his or her relatives, or the social support services. In such a scenario not only the person with autism is excluded from the society, but his or her caregivers are obliged to spend most of their time and other resources to supervise and nurture him or her as well ([Montes, Cianca, 2014](#)). But the need for support is high not only for individuals with LFA. Persons with HFA often meet challenges in different aspects of their everyday life, mostly in social situations ([Tantam, 1991](#)), as they usually possess an impaired ability to comprehend nonverbal components of communication, such as gestures and facial expressions ([Amenta et al., 2014](#)), and figures of speech ([Rundbldad, Annaz, 2010](#)). Altered sensory perception, particularly hypersensitivity which is quite common to people with autism regardless their intellectual development, also impedes the quality of everyday life ([Uljarevic, 2017](#)).

Support of people with autism incurs heavy costs on their families ([Knapp et al., 2009](#)) and state support system ([Ganz, 2007](#)). Autism, while incurable, is treatable; a well-timed and well performed intervention allows more individuals on the autism spectrum to participate in social and economic life, decreasing this burden. A study of early intervention cost-efficiency in Australia has shown a cost-benefit ratio of 11.4; the overall savings exceed 1 billion AUD ([Synergies Economic Consulting, 2013](#)). Thus, providing high quality treatment to the individuals with autism is not only humane, but it is beneficial in the most pragmatic sense. Several authors have called for a comprehensive system introduction uniting facilities of treatment, education and social support in order to improve the quality of life and social integration of people with ASD ([Alekhina, 2015](#); [Nesterova, Aysina, Suslova, 2016](#); [Shpitsberg, 2018](#)). Establishing good quality of inclusive education and increasing accessibility of general education for people with autism is paramount for such a support system, as it greatly promotes social inclusion for people with ASD ([Shpitsberg, 2018](#)). This approach seems the most promising taken into consideration the current condition of the Russian support system for the individuals with ASD.

Currently, Russian society as well as the professional community are struggling to improve the quality of support to the ones with ASD using the approaches proven effective in other countries: introducing inclusive education and comprehensive support systems, and raising both public and professional awareness. Still, a lot of issues, while being addressed, remain prominent. Some of them are common for every autistic society, such as inequity of access to therapy and education ([Manelis et al., 2013](#)), family burden ([Mikhailova, Gutshabash, 2016](#)), social stigma ([Borodina, Fisunova, 2017](#); [Nesterova, Khitryuk, 2018](#)). Other challenges are more characteristic for Russia. For instance, the very term "детский аутизм" (childhood autism) officially recommended by the Ministry of Health implies that ASD is only a childhood condition, so adolescents and adults with autism face more challenges in their attempts to get support ([Borodina, 2015](#)). A routine practice of changing the autism diagnosis to other psychiatric diagnoses (intellectual disability, schizophrenia, schizoaffective disorder etc.) after the patient reaches 18 years affects not only the direct victims of this practice but the whole community, as it corrupts the data on autism prevalence in Russia, which are available currently only through

extrapolations of relatively small cohort studies (Ivanov et al., 2018). A lack of structured and statistically sound information on different aspects of everyday life of people with autism and their relatives affects the general understanding of the situation, hindering the improvement of the support system. In such situations stakeholder surveys are an accessible and a reasonably reliable source of information. Usually such surveys are focused only on one narrow group: adults with autism (Gotham et al., 2015) or parents and caregivers of autistic children (Heiman, 2002; Ryan, Quinlan, 2018), or teachers and therapists (Buell et al., 1999). Such polls are useful when a small set of issues is being researched. Broader issues require broader and more diverse sample, because different participants of autistic community have different experiences and neither of them should be rejected (Pellicano et al., 2014). Parents of children with disabilities, including ASD, are more prone to burnout and depression (Dumas et al., 1991; Ryan, Quinlan, 2018), so their answers, while sincere and insightful, may be negatively biased to some extent. On the other hand, opinions of specialists on the efficacy of facilities they work at may be biased towards higher ratings. Stakeholder surveys are useful as a source of information both on the general attitude to the issues in question and on group differences within the community. We were particularly interested in differences between the support receivers and support providers because lack of understanding between those two parties may decrease efficiency of their collaboration, which is a centerpiece of successful autism treatment (Ryan, Quinlan, 2018).

Differences between the Russian regions were an object of interest as well. Regional inequity in access to support and its quality is a known issue (Juárez et al., 2018; Murphy, Ruble, 2012). Its complex nature was noted in (Skinner, Slifkin, 2007): while the quality and variety of services for children with ASD are lower in rural areas, they are also less accessible due to lower social and economic status (SES) of its residents. This is true for Russia as well. The SES of Moscow and Moscow Oblast is by far better than rest of the country (Mayorova et al., 2018), which brings in higher quality of education (Grigoryev et al., 2016), life expectancy (Shkolnikov et al., 2019), human development index (Bobkov, Gulyugina, 2012) and overall quality of life (Sobol, 2018) in the capital region. We were curious if this pattern transfers to the estimation of different aspects of autism support and to what extent. This issue is especially relevant to Russia due to its population geography. Although only 25% of Russians live in rural areas, another 25 % live in small towns, which are not much different from a village in terms of social infrastructure. Moreover, about 66 % of Russian space (i.e. more than 11 million km<sup>2</sup>) are low density territories. This vast land is populated by roughly 7 million people with an average density of .6 people per km<sup>2</sup>. Distant education, diagnostics, and therapy seem particularly promising for those areas (Juárez et al., 2018; Sutherland et al., 2018), so we included a block of questions covering different aspects of telehealth and tele-education.

The paper presents the results of a multidimensional survey assessing stakeholders' opinions on support system for people with ASD in Russia, focusing on special education, inclusion, general education, and e-learning, and covering several other aspects of social support to people with ASD and their families. We specifically aimed

- 1) To obtain the estimates of different aspects of support of individuals with ASD and their families in Russia from service providers and service receivers;
- 2) To receive opinions on the current state and the prospects of remote diagnostics and distant education for children with ASD, as well as for using online solutions for raising awareness to ASD-related problems, disseminating good practices and parental education;
- 3) To assess the differences between different groups of stakeholders in their perception of different aspects of support system for people with ASD in Russia.

## **2. Methods and participants**

134 respondents participated in the survey. Respondents were asked to specify their relations to the ASD community, their total experience with the ASD, and their geographic region. 61 respondents were parents of individuals with ASD, 70 were specialists in ASD education or therapy, 8 were both, 11 were neither. The last group included mostly activists of related communities (parent organizations, charities etc.). While persons with ASD were also welcomed to participate in the survey, only 1 of them responded. This respondent was not included in a separate group. The experience was defined by four options: less than a year (18 respondents), one to three years (36 respondents), three to five years (29 respondents) and more than 5 years

(51 respondents). Pilot analysis of the responses suggested grouping the respondents further into two supergroups: less than 3 years (54 respondents) and more than 3 years (80 respondents). Parents had significantly greater experience than other respondents ( $\chi^2=7.23$ ,  $p = .007$ ). The respondents came from 33 of 85 Russian federal subjects. They were regrouped as follows: capital region, which included Moscow and the surrounding it Moscow Oblast (54 respondents), and non-capital regions (80 respondents), as the shares of separate non-capital regions were relatively small; this grouping reflects the above stated disparities in education quality and general life quality. All the respondents gave their informed consent before participation in the study.

The survey was conducted via Google Forms and consisted of 43 questions of different types divided into five sections (Table 1). Most questions (31) were a 5-point Likert scale where 1 was the most negative answer (“extremely low” for questions about estimation and “completely dislike” for questions about the attitude) and 5 was the most positive. Six were multiple choice questions allowing to choose several options. An open question concluded each of the six sections of the survey.

Statistical analysis was conducted using Statistica 8.0 software. As the score distribution for the most items was not normal, the between group analysis for ranked variables was performed using Mann-Whitney U test and within group analysis was performed with Wilcoxon signed-rank test. Nominal variables were analyzed with Pearson’s Chi-square analysis.

### **3. Results**

Mean ratings for all the Likert-type questions for the general sample and for different stakeholder groups are shown in Table 2 with the significance level of the resulting differences. Below in this section we present the most noteworthy results relevant to the study aims.

#### **3.1. Special and general education**

The ratings were obtained for different types of organizations providing special education and general support to people with ASD and their families. Parental organizations and non-governmental institutions got similar ratings of 3.37 and 3.27 respectively, while the state support facilities were rated significantly lower, at 2.14. The efficiency of interactions between organizations was also rated poorly with a score of 2.36. Parents tended to rate the state support facilities more critically than non-parents (1.77 vs 2.47,  $U = 1359$ ,  $p = .0001$ ), while the specialists rated it somewhat better than non-specialists (2.43 vs. 1.84,  $U = 1490$ ,  $p = .0008$ ). Even the state-employed professionals gave better scores to private and non-governmental facilities compared to state-own facilities: 3.21 vs 2.57 ( $T = 96$ ,  $Z = 3.14$ ,  $p = .002$ ); this difference in the efficiency assessment was even more pronounced in the ratings of their private-employed peers’: 3.48 vs 2.17 ( $T = 20$ ,  $Z = 4.56$ ,  $p < .00001$ ). All the items were rated significantly higher in the capital region in comparison to non-capital regions. The respondents with an experience of 3 and more years tended to give lower scores; this tendency reached statistical significance for both state and private institutions ( $U = 1680.5$ ,  $p = .023$  and  $U = 1727$ ,  $p = .041$  respectively). More detailed analysis of experience groups showed a negative correlation between experience rate and scoring ( $r = -.22$ ,  $p = .009$ ).

The basic accessibility of education for children with ASD was estimated rather low (2.17). Again, the parents’ ratings were significantly lower than for non-parent stakeholders ( $U = 1644.5$ ,  $p = .009$ ). We used two different questions to distinguish the attitude towards the concept of inclusive education per se and towards its current implementation. The concept of inclusive education itself was rated rather positively (3.58), particularly by the parents (3.98 vs. 3.29 for non-parents;  $U = 1489.5$ ,  $p = .001$ ). The attitude of the service providers was lower (3.35), and the specialist from the government facilities were significantly more critical to the concept of inclusive education than their peers from private sector (3.12 vs. 3.95;  $U = 460.5$ ,  $p = .005$ ). The current implementation of inclusive education got much lower average scores of 1.91 (no significant between group differences for this item), revealing that promotion of inclusive education still faces many barriers. The nature of this barriers as reflected in the answers on the most prominent challenges in establishing education accessibility for children with ASD. 90.9 % of the respondents named unpreparedness of teachers to work with autistic children, 89.4 % named lack of auxiliary specialists (such as tutors, psychologists, therapists etc.), 73.5 % named lack of supportive equipment and environment (such as alternative communication systems, rooms of sensory relaxations etc.), 65.2% named lack of adapted teaching materials, 56.8 % named negative attitude of other children or their parents. No respondents picked an option “None of the above” that would indicate that these challenges are irrelevant. Some items revealed regional differences:



the respondents from the capital region significantly less frequently indicated a lack of auxiliary specialists ( $\chi^2 = 7.18, p = .007$ ) and of adapted equipment and environment ( $\chi^2 = 4.46, p = .035$ ) as major problems. The respondents from the capital region were somewhat more prone to highlight negative attitude of classmates and their parents than the other respondents (66.7% vs. 52.5%), but this difference did not reach statistical significance ( $\chi^2 = 2.24, p = .13$ ). There also were infrequent mentions of negative attitude of teachers and school administration (2 of the total sample).

In response to the question asking to highlight the areas of education least adapted towards the needs of autistic children 88.6 % of the respondents noted social skills, 69.7 % noted basic school subjects, and 63.6 % noted self-care skills.

The respondents showed no differences on the issues of the most efficient form of education for children with HFA and LFA. For children with HFA, 28.1 % recommended full inclusion, 6.6 % voted partial inclusion with individual schedule and support, 7.6 % were for separate education in special schools. 1.5 % voted for home education, 2.2 % had other opinions. As for children with LFA, 45.5 % recommended assisted inclusion, 4.2 % voted for special schools, 6.8 % recommended home education, and only 2.3 % opted for full inclusion. 5.2 % had other opinions (mostly stating an opinion that an education form should be chosen according to a child's individuality).

### **3.2. Family support and parental education**

The overall level of family support was rated 2.19, psychological support for parents got 2.04, and financial support scored 2.17. Parents rated the first two items significantly lower than the other respondents: 1.77 vs 2.52 ( $U = 1309, p < .0001$ ) and 1.61 vs 2.40 ( $U = 1220, p < .0001$ ). Parental awareness of ASD-related problems got 2.6, and the overall efficiency of awareness-improving initiatives scored 2.41. Parent responders showed a high level of self-criticism, as their rating on this matter was significantly lower (2.31 vs 2.81,  $U = 1656.5, p = .011$ ). The efficiency of awareness-improving initiatives was rated significantly higher for the capital region (2.63 vs. 2.24,  $U=1657.5, p = .022$ ).

### **3.3. Social support, accessibility of general social services**

In general, the quality and accessibility of general services for people with ASD was rated lower than the quality and accessibility of autism-related services. Overall availability of medical services for children with ASD was rated at 2.44. The difference between parents and other participants had statistical significance (2.15 vs. 2.67,  $U=1684, p = .015$ ). Overall awareness of medical staff was rated 1.93 with no group differences. The items related to problems of adults with autism were rated particularly negatively. The current level of employment of adults with ASD was rated at 1.51. State programs of employment support scored 1.52, while non-governmental programs got 2.06. Residents of capital region were more optimistic in their rating of non-governmental initiatives (2.48 vs. 1.80,  $U=4515, p < .0001$ ). The awareness of law enforcement and judiciary professionals of ASD-related problems was rated at abysmal 1.45 with no differences between groups.

There was a statistically significant difference in ratings according to the experience group: respondents with more than 3 years of experience gave lower scores to most of the items ( $p$  levels ranging from .04 to .002).

### **3.4. Distance education and diagnostics**

The general concept of providing distance education and diagnostic services for children with ASD was rated 2.78 with no significant group differences. The current level of efficiency of distance services was rated at 2.14. The respondents from the capital region were more positive in their estimates (2.36 vs. 2.00,  $U = 1653, p = .032$ ). Positive rating of existing distance support differed between respondents depending on their experience: more experienced participants rated the current state lower, at 1.90, while less experienced participants rated it at 2.51 ( $U = 1441, p = .002$ ). The respondents assessed the current education system as poorly prepared to implement distant services for the children with ASD, the total average was 1.87. Specialists were slightly more optimistic in comparison with the other respondents, as well as the capital residents, but for both comparisons the results were barely significant (2.01 vs. 1.70,  $U = 3728.5, p = .047$ , and 2.06 vs. 1.74,  $U = 1719, p = .046$ , respectively). On the issue of general efficacy of remote diagnostics of ASD the opinions divided. 23.5 % of the respondents entirely disapproved the concept, 46.3 % approved remote diagnostics as a tool for screening and/or progress control, 27.3 % approved remote diagnostics for situations where a person-to person diagnostics is unavailable, and only 3 %

completely approved remote diagnostics. The overall preparedness of the public health system to integrate remote diagnostics was rated very low, at 1.47 with no group differences.

#### **4. Discussion**

This survey had several areas of interest. First, we intended to assess current opinions on basic challenges of people with ASD and their families. Next, we planned to analyze the difference between different groups of stakeholders and their views of the situation.

Several trends were easy to notice. First, as expected, parent responders were more pessimistic; the differences gained statistical significance in 21 out of 32 closed questions (see [Table 2](#)). One may presume that, adding to the above-mentioned problem of parental depression and burnout, there also is a clear effect of demand and supply. A receiver of a service usually rates it lower than the supplier ([Ramseook-Munhurrun et al., 2010](#)). Another between-group difference that may be related to burnout is an effect of experience (more experienced participants were significantly more critical in their judgements). In our sample parents had greater experience than nonparents and it can partly account for the difference in ratings but the effect of experience was quite prominent within both parent and non-parent groups; this corresponds to the data confirming that specialists and therapists are as susceptible to the issue of burnout as parents ([Hurt et al., 2013](#)). Our findings point out that the burnout problem should be taken into account, and specific initiatives should be promoted to counter this problem more efficiently. A more optimistic explanation of the findings that can partly account for the experience effect is related to the fact that the situation with the support of autistic individuals in Russia has substantially increased within the last decade, so lower scores of more experienced respondents may reflect their memories of issues that are less relevant nowadays.

The difference between the capital region and the rest of Russia is another serious issue. Higher estimates may be explained by better quality of available services, which is consistent with previous findings obtained for other countries ([Murphy, Ruble, 2012](#); [Skinner, Slifkin, 2007](#)). This, however, does not explain better attitude to the concepts of remote diagnostics and distance learning. Higher overall quality of life and better access to the state-of-the-art education, treatment, and diagnostic technologies may account for more positive estimates of the capital region respondents. The survey data were collected before the COVID-19 related lockdown and subsequent disruption of different everyday routines, including school education and treatment. The study of parents' evaluation of remote therapy sessions for their children with ASD held in May and June 2020 shows that after experiencing this format of treatment people become more enthusiastic towards it. 97.6% of parents reported progress in condition of their children and expressed their desire to continue remote sessions ([Shpitsberg et al., 2020](#)). We hope that the skepticism demonstrated by the respondents from non-capital regions will be eventually overcome by the demonstration of opportunities provided by distant education and distant treatment sessions. Nevertheless, the facilitators of distant services should note that the respondents from non-capital regions (that presumably are in greater need for distant services due to poorer access to person-to person services) showed greater aversion towards distant practices. At present this attitude may pose a barrier of its own and it should be taken into consideration while planning any measures to introduce distant education and remote treatment practices.

Some aspects of support system were rated similarly by all the stakeholders. The highest ratings were assigned to the issues directly related to autism treatment, the lowest — to the issues of other components of everyday life and support. Some issues scored particularly low (less than 2): current state of inclusive education (1.92), awareness of judiciary and security forces professionals (1.45) and of general medical professionals (1.93) about problems of children with ASD, employment level of adults with ASD (1.51) and state employment support (1.52), and readiness of current healthcare system to introduce remote diagnostics and treatment. Most of the questions related to the issues of adults with autism were also scored particularly low reflecting the vulnerability of this group. It reveals that, while some substantial progress has been made in autism treatment and promoting the system of special education services for children with ASD and their families, the providers and professionals in general social services are much less prepared to deal with specific problems of autistic individuals. These findings concur with the results of previous studies of teachers training in dealing with students with special needs ([Aysina et al., 2020](#)) and quality of medical services provided to the children with ASD ([Piskunov et al., 2018](#)).

These issues have to be properly addressed in order for the system of support to be more comprehensive, continuous, and fully efficient – otherwise the efforts of autism treatment professionals will be undermined by the low readiness of the society to incorporate people with ASD. It would require increasing the awareness of such professionals and promoting principles of universal design to ensure that people with ASD have proper access to general social services and do not have to face inclusion barriers.

It is also worth noting that similar unanimity of stakeholders was found for the recognition of relatively higher efficiency of non-governmental support institutions and parent organizations compared to slower adapting state-owned institutions. The experience of Russian non-governmental organizations may be used not only in setting an example of good practices, but as leverage for further progress achieved by more efficient collaboration of state-run and non-governmental institutions. The development of a framework of continuous comprehensive interdepartmental support for people with ASD and other mental disabilities is probably one of the first successful examples of such a collaboration. This framework was developed by the specialists of Our Sunny World, one of the leading Russian non-governmental ASD treatment facility. It applies across the whole lifespan and provides different kinds of support, from early diagnosis and intervention to sheltered employment and assisted living. This framework was first put into action in 2017 in Khanty-Mansi Autonomous Okrug – Yugra by the Governor’s decree ([The Government of Khanty-Mansi Autonomous Okrug-Yugra, 2017](#)). Later, it was introduced in Nizhny Novgorod Oblast (September 2019) ([The Government of the Nizhny Novgorod Oblast, 2019](#)) and Chuvash Republic (June 2020) ([The Government of the Chuvash Republic, 2020](#)), and several other regions showed their willingness to adopt this framework.

**5. Conclusion**

The survey data provided an overview of stakeholders’ opinions on the current state of autism support situation in Russia. The respondents were generally quite critical in their assessment, the parents of children with ASD being the most pessimistic. The highest ratings were given to the facilities that have individuals with autism as their prime audience, the lowest – to the services that have to deal with autistic individuals as with a part of general populace. It underscores the need for more efficient interdepartmental and private-public cooperation, raising awareness of providers and professionals in general social services, and pleads for promotion of universal design principles across all the systems providing social services. The experience of Russian private facilities may be a helpful asset for further development of support systems for people with ASD.

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**Appendix**

**Table 1.** The survey layout

#	Item	Type
General questions		
1	Please provide your estimation of overall efficiency of organizations of parents of children with ASD	Likert scale
2	Please provide your estimation of overall efficiency of state services of support of children with ASD	Likert scale
3	Please provide your estimation of overall efficiency of private services of support of children with ASD (NGOs, charities, private therapy centers)	Likert scale

4	Please provide your estimation of overall efficiency of interactions between different services supporting children with ASD	Likert scale
5	Please provide your comments on the issues of general support for children with ASD	Open question
Issues of education availability and quality		
1	Please provide your estimation of education accessibility for children with ASD	Likert scale
2	Please provide your opinion of the idea of inclusive education	Likert scale
3	Please provide your estimation of the current realization of inclusive education	Likert scale
4	Please choose the most prominent challenges in establishing education accessibility for children with ASD: 1) unpreparedness of teachers to work with autistic children; 2) lack of auxiliary specialists (such as tutors, psychologists, therapists etc.); 3) lack of supportive equipment and environment (such as alternative communication systems, rooms of sensory relaxation etc.); 4) lack of adapted teaching materials; 5) named negative attitude of other children or their parents; 6) None of the above; 7) Own answer.	Choose all that fit
5	Please choose the subject areas in the most need of adjustment for children with ASD: 1) Basic school subjects; 2) Social skills; 3) Self-support skills; 4) No adjustment is needed; 5) Own variant	Choose all that fit
6	Please select the most promising form of education for children with HFA: 1) Full inclusion; 2) partial inclusion with individual schedule and support; 3) separate education in special schools; 4) Home education; 5) Own answer	Choose one
7	Please select the most promising form of education for children with LFA: 1) Full inclusion; 2) partial inclusion with individual schedule and support; 3) separate education in special schools; 4) Home education; 5) Own answer	Choose one
8	Please provide your comments on the issues of education accessibility for children with ASD	Open question
Issues of autism treatment and diagnostics availability and quality		
1	Please provide your estimation of the overall quality of treatment of children with ASD	Likert scale
2	Please provide your estimation of treatment accessibility for children with ASD	Likert scale
3	Please provide your estimation of state autism treatment efficiency	Likert scale
4	Please provide your estimation of diagnostics accessibility for children with ASD	Likert scale
5	Please provide your estimation of the overall autism diagnostics quality	Likert scale
6	Please provide your estimation of ASD diagnostics quality in the specialized state institutions	Likert scale
7	Please provide your estimation of medical services accessibility for children with ASD	Likert scale
8	Please provide your estimation of awareness of medical professionals about practices of interaction with children with ASD	Likert scale
9	Please provide your comments on the issues of medical support for children with ASD	Open question
Issues of family support		

1	Please provide your estimation of the overall quality of support of families with children with ASD	Likert scale
2	Please provide your estimation of psychological support of parents of children with ASD	Likert scale
3	Please provide your estimation of financial support of families with children with ASD	Likert scale
4	Please provide your estimation of parent awareness on interaction with children with ASD	Likert scale
5	Please provide your estimation of awareness raising among parents on interaction with children with ASD	Likert scale
6	Please provide your estimation of the overall status of employment of people with ASD	Likert scale
7	Please provide your estimation of the state employment programs for people with ASD	Likert scale
8	Please provide your estimation of the non-governmental programs of facilitation of employment of people with ASD	Likert scale
9	Please provide your estimation of awareness of judiciary and security forces professionals about practices of interaction with persons with ASD	Likert scale
10	Please provide your comments on the issues of financial, occupational, and legal support for children with ASD and their families	Open question
Remote education, treatment and diagnostics		
1	Please provide your opinion on the concept of remote education and treatment of children with ASD	Likert scale
2	Please provide your estimation of the current level of remote education and treatment development	Likert scale
3	Please provide your estimation of the readiness of the present education system to remote work with children with ASD	Likert scale
4	Please provide your opinion on remote ASD diagnostics (e. g. by a video call): 1) Completely approve, it is effective and more convenient for the child; 2) Somewhat approve, remote diagnostics is acceptable if there is no physical possibility of direct contact; 3) Somewhat approve, remote diagnostics is insufficient for diagnosis establishment, but may be used for screening or progress control; 4) Completely disapprove, ASD cannot be diagnosed without a direct contact 5) Own answer	Choose one:
5	Please provide your estimation of the present public health system readiness to remote ASD diagnostics	Likert scale
6	Please provide your opinion of remote education of parents of children with ASD on the issues of interaction and treatment	Likert scale
7	Please provide your estimation of availability of remote education of parents of children with ASD on the issues of interaction and treatment	Likert scale
8	Please provide your estimation of efficacy of remote education of parents of children with ASD on the issues of interaction and treatment	Likert scale
9	What is the best approach to support children with ASD in remoted and isolated regions? 1. To use existing medical and educational facilities; 2. To establish branches of specialized state and private ASD support organizations; 3. To use remote support; 4. It is impossible, they should move to more accessible areas; 5. Own answer	Choose all that fit:
10	Please provide your comments on the issues of remote support of children with ASD	Open question
Please provide your comment on the issues that were left untouched by the questionnaire		Open question



**Table 2.** Mean rates and SDs (in parentheses) of the questions with Likert scales by groups. Prof. – professionals, Capital – Capital region. Asterisks denote statistical significance of the group differences: \* – p<.05, \*\* – p<.01, \*\*\* – p < .001

#	Parents (N=61)	Non-parents (N = 73)	Prof. (N=70)	Non-prof. (N=64)	Capital (N=54)	Non-capital (N=80)	More experienced (N=80)	Less experienced (N=54)	Total
General									
1	3.29 (1.1)	3.34 (1.1)	3.39 (1.01)	3.25(1.08)	3.61*(.76)	3.13*(1.16)	3.28(1.03)	3.39(1.07)	3.32(1.04)
2	1.77***(.99)	2.47***(.82)	2.43***(.97)	1.84***(.89)	2.39*(.9)	1.99*(.99)	1.98*(.85)	2.4*(1.09)	2.18(.98)
3	3.13(1.04)	3.46(1.24)	3.48(1.03)	3.13(1.24)	3.89***(.69)	2.92***(1.23)	3.15*(1.13)	3.56*(1.13)	3.31(1.15)
4	2.1***(1.01)	2.58***(.98)	2.5(1.02)	2.2(1.01)	2.78***(.79)	2.08***(1.06)	2.23(.94)	2.56(1.11)	2.35(1.02)
Issues of education availability and quality									
1	1.93**(.83)	2.42**(.95)	2.41*(.95)	1.97*(.85)	2.28(.79)	2.15(1.02)	2.14(1)	2.3(.88)	2.22(.93)
2	3.98***(1.11)	3.29***(1.23)	3.35*(1.23)	3.88*(1.18)	3.78(1.14)	3.49(1.27)	3.53(1.2)	3.72(1.24)	3.6(1.23)
3	1.77(.64)	2.01(.81)	2.01(.75)	1.78(.72)	2(.78)	1.84(.72)	1.85(.85)	1.98(.68)	1.92(.74)
Issues of family support									
1	1.77***(.84)	2.52***(1.03)	2.49***(1.03)	1.84***(.89)	2.3(.84)	2.1(1.12)	2.09(.97)	2.31(1.08)	2.19(1.02)
2	1.61***(.71)	2.4***(1)	2.3***(1)	1.75***(.84)	2.11(.77)	1.99(1.07)	1.91(.89)	2.22(1.04)	2.04(.96)
3	1.97(.89)	2.33(1.13)	2.37*(1.09)	1.94*(.94)	2.06(.92)	2.24(1.12)	2.15(.99)	2.19(1.12)	2.17(1.04)
4	2.31*(1.06)	2.81*(.84)	2.86***(.77)	2.28***(1.09)	2.74(.87)	2.48(1.03)	2.59(.9)	2.57(1.09)	2.6(.98)
5	1.97***(.98)	2.75***(.95)	2.83***(.93)	1.92***(.95)	2.63*(.85)	2.24*(1.13)	2.3(1)	2.54(1.09)	2.41(1.04)
6	1.36*(.61)	1.63*(.77)	1.59(.77)	1.42(.64)	1.57(.69)	1.46(.73)	1.44(.63)	1.61(.81)	1.51(.71)
7	1.39(.61)	1.6(.74)	1.57(.73)	1.44(.64)	1.57(.66)	1.46(.71)	1.48(.64)	1.56(.77)	1.52(.69)
8	1.97(1.02)	2.16(.85)	2.09(.83)	2.06(1.04)	2.48***(.88)	1.8***(.86)	1.93*(.88)	2.3*(.96)	2.06(.93)
9	1.41(.69)	1.47(.69)	1.44(.67)	1.44(.71)	1.48(.72)	1.41(.67)	1.41(.65)	1.48(.75)	1.45(.69)
Issues of autism treatment and diagnostics availability and quality									
1	2.46*(.98)	2.92*(.88)	2.89*(.83)	2.52*(1.04)	3.00***(.75)	2.51***(1.02)	2.56*(.94)	2.93*(.93)	2.71(.95)
2	2.25***(.98)	2.84***(.94)	2.77*(.95)	2.34*(1.01)	2.93***(.72)	2.33***(1.09)	2.35***(1.02)	2.89***(.88)	2.56(1)
3	1.87***(.92)	2.52***(1.06)	2.53***(1.07)	1.89***(.91)	2.5***(.86)	2.04***(1.12)	2.06*(.97)	2.46*(1.11)	2.24(1.04)
4	1.98***(.88)	2.79***(1.05)	2.71***(1.08)	2.11***(.94)	2.61(.81)	2.3(1.18)	2.2***(1.01)	2.76***(1.04)	2.4(1.06)
5	2***(.82)	2.73***(.96)	2.69***(.97)	2.08***(.86)	2.48(.79)	2.34(1.07)	2.21*(.9)	2.67*(1.01)	2.39(.97)
6	2.26***(1.2)	2.88***(1.03)	2.94***(1.08)	2.22***(1.11)	2.85*(1.04)	2.43*(1.19)	2.38***(1.1)	2.93***(1.15)	2.56(1.14)
7	2.15***(.93)	2.67***(1.12)	2.67***(1.11)	2.17***(.95)	2.33(.85)	2.5(1.19)	2.33(1)	2.59(1.14)	2.44(1.06)
8	1.8(.87)	2.01(1.05)	1.97(1.06)	1.86(.87)	1.89(.9)	1.94(1.02)	1.86(.85)	2(1.13)	1.93(.97)
Remote education, treatment, and diagnostics									
1	2.77(1.22)	2.78(1.2)	2.83(1.24)	2.72(1.17)	2.85(1.16)	2.73(1.24)	2.71(1.18)	2.87(1.24)	2.78(1.02)
2	1.92*(1)	2.33*(1.01)	2.36*(1.01)	1.91*(.99)	2.36*(.94)	2*(1.06)	1.9***(.92)	2.51***(1.07)	2.14(.91)
3	1.74*(.93)	1.97(.9)	2.01*(.92)	1.7*(.89)	2.06*(.92)	1.74*(.9)	1.76(.88)	2.02(.96)	1.87(.67)
5	1.36(.66)	1.53(.67)	1.53(.65)	1.38(.68)	1.5(.67)	1.43(.67)	1.38(.62)	1.57(.72)	1.47(1.23)
6	3.92(1.29)	3.77(1.17)	3.8(1.2)	3.88(1.27)	3.98(1.09)	3.74(1.31)	3.89(1.31)	3.76(1.1)	3.81(1.1)
7	2.33*(1.06)	2.77*(1.1)	2.69(1.1)	2.44(1.1)	2.87***(1.01)	2.36***(1.12)	2.4*(1.19)	2.81*(.91)	2.56(1.11)
8	2.74(1.24)	2.81(.99)	2.84(1.02)	2.7(1.19)	2.89(.97)	2.7(1.18)	2.71(1.21)	2.87(.92)	2.78(.95)

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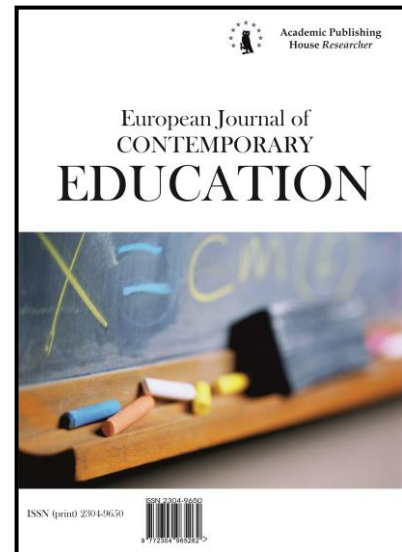
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## Challenges in Teacher Leadership: Workload, Time Allocation, and Self-Esteem

Vilma Zydziunaite <sup>a,\*</sup>, Simona Kontrimiene <sup>b</sup>, Tetiana Ponomarenko <sup>a</sup>, Lina Kaminskiene <sup>a</sup>

<sup>a</sup>Institute of Educational Research, Academy of Education, Vytautas Magnus University, Kaunas, Lithuania

<sup>b</sup>Vilnius University, Vilnius, Lithuania

### Abstract

In research on teacher leadership, teacher workload, teaching time allocation, and teacher self-esteem in teaching and at school are neither studied as challenges or influencing factors nor are they seen as related to leadership at all. In educational research the mentioned factors are mostly studied in relation to teaching effectiveness or quality. The present study is aimed at identifying the relationship between teacher workload, time allocation, self-esteem, and leadership at school. The study involved 418 subjects, primary school, pre-school, and vocational teachers. Results suggest no significant differences among teachers in terms of aggregate study variables by the type of school or teachers' position at school, yet differences emerged among teachers with different workloads in two composite variables, school activity and school stress as teachers with less than half a day workload are statistically significantly less active at school and experience less stress than full-time teachers; also, there is a significant link between teacher workload and time allocated to a number of activities as well as stress, and the same two determinants of teacher self-esteem both in teaching and at school are the level of activity in school and stress. The other variables important in the formation of teacher self-esteem differ, although both types of self-esteem are interrelated as the level of one is predictive of the level of the other. These findings accentuate that workload, time allocation, and self-esteem are important challenges in teacher leadership. The relationship between teacher workload, time allocation, self-esteem, and leadership needs to be defined and managed at the institutional and individual levels to avoid potentially undesirable effects and counterproductive teaching and learning behaviors.

**Keywords:** leadership challenges, self-esteem, school, teaching, teacher leadership, time allocation, workload.

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\* Corresponding author

E-mail addresses: [vilma.zydziunaite@vdu.lt](mailto:vilma.zydziunaite@vdu.lt) (V. Zydziunaite)



## **1. Introduction**

Teacher leadership started facing challenges as our society became more diverse and governments gradually began to view education as a path to meet the variety of social agendas. As a result of this view, students were encouraged to stay in school longer (Bellamy et al., 2003). Students who remained, instead of leaving school early, experienced some academic and social issues and these presented challenges for teachers who were not used to dealing with such types of problem. For teachers, this was the beginning of a change in the teaching profession as they had to spend more time dealing with social problems and learning to manage them within the classroom, no matter that sometimes it was at the expense of other students' academic achievement and a decline in the quality of teachers' own worklife (Winter et al., 2000). Creating student-centered classrooms with a collaborative learning environment where students focus on inquiry-based and authentic experiences demands much more than a teacher-centered classroom where the teacher transmits information to students (Dibbon, 2004). This context requires new skills from teachers, necessitating familiarity with different curricula, theories and methods of teaching and learning, IT application, lesson planning, leadership, etc.

The leadership of a schoolteacher is based on his / her pedagogical competence and subject-related knowledge, the success of students regarding their learning achievements, teacher professional development, active communication between him/her and students, dedication to the profession, and self-esteem (Berry et al., 2010). Teacher leadership is manifested through teaching and incorporates i) a purpose of the lesson as well as the expected outcome(s); ii) background by linking concepts to student background and past learning; iii) a structural idea for all students which allows for different approaches according to student needs; iv) questioning strategies used to encourage students' development of critical thinking, problem solving, and performance skills; v) adequate time for the students to respond; vi) teaching approaches that are adapted to meet the needs of diverse students; and vii) clear instructions to meet different levels of proficiency of all students in a classroom (McGregor, 2007).

Research on teacher leadership at school is focused on school principals-oriented school leadership, teaching position at school, and lack of leadership training (Alegado, 2018); providing opportunities for teachers to practice different approaches at school and in the classroom (Gumede, 2011); requirements for teachers to implement educational changes ignoring their lack of courage to implement innovations and their insufficient knowledge and skills (Sawalhi, Chaaban, 2019); leadership for learning to teach with ICTs and leadership in research for innovation (Laferrière, Breuleux, 2002); teachers' stress while working on school projects due to a lack of feedback on leadership from fellow teachers and school administration (Gordon, Solis, 2018); and the professional and cultural agenda of teacher leadership at school and teachers' disempowerment (Alsalahi, 2014). In research on teacher leadership the teacher workload, teaching time allocation, and teacher self-esteem in teaching and at school are not studied as challenges or influencing factors. The mentioned factors in research are mostly studied in relation to teaching effectiveness and/or quality (Treder et al., 2000; Gunter, 2001; Dolton et al., 2003; Ogundipe, Falade, 2014; Welch, 2018). Then there is a great deal of focus on the relationship between these mentioned variables with regard to teacher leadership at school.

Importantly, the relationship between teacher workload, time allocation, self-esteem, and leadership needs to be defined and managed at the institutional and individual levels to avoid potentially undesirable effects and counterproductive teaching and learning behaviors (Jenkins, 2004).

The study presented in this article is aimed at identifying the relationship between teacher workload, time allocation, self-esteem, and their leadership at school.

## **2. Background**

*Teacher workload.* Teacher workload means time spent in teaching, administrative or additional and extracurricular activities, and performing co-curricular responsibilities (Hosain, 2016). The teaching workload is confined to regular teaching activities like delivering classes, preparing lesson plans, assessing students' homework, etc. Hereby, teachers have to involve themselves in different non-teaching activities like counseling and organizing meetings with students' parents, etc. Teacher workloads are excessive and intensive, and the negative effects associated with an unrealistic workload are having a considerable impact on teaching quality, the quality of teachers' work life, and on students' learning achievements and experiences (Dibbon, 2004).

Teacher workload includes the following components (Leslie, 2002):

- Feedback (e.g., writing feedback about understanding of the progress of students' learning and planning of subsequent lesson(s)).
- Curriculum planning (e.g., considering running a curriculum plan and resources).
- Data management and teaching/learning interventions for students (e.g., self-reflection and review of data collection, which include reflecting on what the teaching and learning purpose is, what the most efficient and proportionate teaching and learning processes are, and how the teacher can ensure that the data collected are reliable and valid in regard to teaching and learning).
- Communication (e.g., thinking about all the communications in the working day and review if they are making a difference and what evidence there is for it; using a variety of communication channels with students and their parents, fellow teachers, and school administrative staff).
- Managing, implementing, and communicating changes (e.g., ensuring there is adequate time at the planning stage when preparing to make changes, collaborating with students, their parents, fellow teachers, etc. on proposals and involving all the components in assessing their performance; creating a shared understanding of the change process with the school community).

*Teacher time allocation.* It is known that teachers spend long hours at work (Harvey, Spinney, 2000). Activities other than teaching contribute significantly to teachers' workday time allocation: one-third of teacher time is spent on teaching and tutoring; twenty percent of teacher time is spent on preparation for lessons; more than ten percent of teacher time is spent on assessing students' homework; meetings and documentation each consume from four to seven percent of teacher time; the additional activities, e.g., supervision, administration, and extra-curricular activities also take around one-third of teacher time (Lieberman, Miller, 2005; Ogundipe, Falade, 2014).

For most teachers, most of their time is spent directly with students, yet the proportion of working time outside the classroom is considerable (Barbera, Reimann, 2014). This latter part of teachers' working time, also called "invisible work", e.g., assigned supervision time, preparation time, meeting and assessment time, testing/reporting time, time meeting with parents and voluntary activities (Wilson, 2016) has influenced the intensification of teaching.

Teaching time allocation, that is, which staff member teaches which subject, is an essential task carried out in schools every year and every semester. Teaching time must be reallocated for changes of staff (some teachers no longer available due to resignation, retirement, and new teacher availability) and/or program (some subjects cancelled and some newly developed). Teaching time allocation has been well recognized as a major contributing factor to teaching quality (Quet al., 2014).

The lack of teacher preparation time can affect teaching and learning quality in classes. When teachers are unable to properly assess student homework in a timely way and lack the time to provide tutorial classes or / and to do the additional or extracurricular work for students, they are not satisfied with the amount of time they spend preparing for lessons (Belliveau et al., 2002). Conversely, when teachers feel they have adequate planning time, they tend to be more satisfied with their teaching load and workload and are satisfied with the quality of their worklife. Teachers express concerns about the exorbitant amount of paperwork associated with the documentation process (Kocko, Wells, 2015).

*Teacher self-esteem.* Self-esteem has become a household word. Teachers and parents have focused efforts on boosting self-esteem, on the assumption that high self-esteem will cause positive outcomes (Baumeister et al., 2003). According to Sadler (2013), teacher self-esteem influences the use of teaching strategies that actively involve students in the classroom. Content knowledge and teaching skills are related to feelings of self-esteem as a key factor in the teacher's perceptions of their knowledge and skills. Mitchem et al. (2003) note that teacher self-esteem is related to specific aspects, for example, use of ICT. The teacher has to know what s/he is doing in the classroom, along with embracing a positive outlook toward using ICT as a means to teach students. Thus, teachers' attitudes towards innovation and self-esteem are key criteria when integrating ICT into the curriculum.

Teacher self-esteem consists of several components (Lawrence, 2006):

- *Self-concept* is an awareness of one's own self related to self-image, ideal self, and self-esteem and includes cognitive, affective, and behavioral aspects.

- *Self-image* is the authentic personal awareness of individual mental and physical characteristics.

- *Ideal self* develops with self-image, where an individual learns that there are ideal characteristics s/he must possess because they help one to behave and use skills according to standards that are valued in the society. In this context, the person builds the ideal self.

- *Self-esteem* is a feeling of self-worth and self-esteem with regard to a specific activity or behavior.

Enhancement of low self-esteem could be realized if teachers respect the self and others, are confident, care about the self, create loving and healthy relationships, are good friends to the self and others, accept the self just as they are, and like to be a part of life (Hartsell et al., 2010). If teachers have a positive self-esteem, it manifests in purposefulness, critical self-reflection, cooperativeness, openness to differences, optimism, taking responsibility in problem-solving, effectively managed emotions, relationships with others on the basis of trust, a good sense of personal and others' limitations, and providing opinions in a peaceful way (Mbuva, 2016).

### 3. Method

#### 3.1. Participants

Study participants were selected using a targeted convenience sampling technique. The study involved 418 teachers from five biggest regions in Lithuania. There were 48 (11.5 %) men and 370 (88.5 %) women, they all work at various educational institutions: gymnasiums (45 %), basic schools (26.1 %), vocational schools (16.3 %), primary schools (6.7 %), multifunctional educational centers (3.8 %), and secondary schools (2.2 %), their mean age was 50.6 (SD = 9, range: 23-70 years).

*Position held.* 81.6 % of participants were subject teachers, 15.8% primary school teachers, 1.9 % pre-school education teachers, and .7 % vocational teachers.

*Teaching subjects.* The largest number (65) of teachers teach national language (reading, writing, and literature), 59 teachers teach natural sciences and 58 mathematics, 45 teachers teach technologies, 35 teachers – social sciences, 35 teach arts and 25 – music, 32 teach foreign languages, 29 – physical education, 20 – religion and ethics, 5 teach the subject of civil society, and 10 are vocational teachers.

*Education.* The largest part of the sample (55.7 %) consists of teachers with a university level bachelor's degree; 1.9 % (or 8) of the respondents indicated that they have acquired a professional bachelor's degree at college (non-university level). The second most frequently indicated degree among respondents was a master's degree (42.2 %). One participant (or .2 %) holds a PhD.

*Work experience.* The total length of pedagogical work experience of teachers varied from 1 to 48 years (average 26.1 years, SD = 11). Data on time worked in the same school revealed that teachers had worked in current workplaces (schools) from several months to 47 years (average 18.4 years, SD = 12).

*Workload.* The majority of teachers (71.3 %) indicated that they work full-time at school, 17.7 % – half a working day, and 11 % work less than half a day.

#### 3.2. Measures

A questionnaire on challenges in teacher leadership was used. The instrument consists of two parts – *Background* and *Leadership*. The construction of the questionnaire was based on the Four Models of Teacher Leadership (Angelle, DeHart, 2016) and the concept of School Leaders (Mulford, 2003).

The *demographic* part, based on the research of Gunter (2001), Gumede (2011), and Sawalhi, Chaaban (2019), consists of 28 items in total covering gender, education, type of educational institution in which the pedagogical qualification was acquired, position at school, workload, work experience, level of education, and teaching subject(s). All questions were multiple choice, where respondents were asked to choose one response from the list provided.

The *leadership* part is based on the publications of Laferrière, Breuleux (2002), Margolis, Doring (2012), Alsalahi (2014), Alegado (2018), and Gordon, Solis (2018) and consists of eight topics incorporated into 11 broad questions with 106 items:

- *Time Distribution:* at school and in the classroom, e.g., planning or preparing for lessons in or out of school; assessing students' homework; communicating with fellow teachers, counseling,

and educational communication with students' parents; professional development; extracurricular activities; teaching students in the classroom; maintaining order in the classroom; drawing up educational plans, etc. – 2 questions with 12 items.

- *Professional Development*: i) activities: educational courses/seminars/conferences; formal in-service training programs; participation in teacher networks, etc.; ii) topics – curriculum knowledge; analysis of student inspection/assessment methods; classroom and student behavior management; application of ICT skills in teaching; development of interdisciplinary competencies; training in a multilingual and multicultural environment; communication and cooperation with students' parents, etc. – 2 questions with 18 items.

- *Feedback*: i) whether the feedback is received or provided by the school management, fellow teachers, parents, students, external evaluators, or no feedback was received; ii) aspects of feedback – knowledge of the main subject; pedagogical skills; student learning outcomes; classroom management and student discipline; training of students with special educational needs; extracurricular activities with students, etc. – 1 question with 11 items.

- *Positive Self-esteem*: i) *in teaching* (e.g., coming up with new teaching/learning ideas; being open to change; providing practical assistance to school teachers in applying new ideas; knowing how to overcome the challenges faced by students with disabilities; dealing effectively with students' behavioral problems; getting recognition from students' parents, etc.) – 1 question with 14 items; ii) *at school* (e.g., beliefs that colleagues are fair and cooperative; teachers are open and consider the needs of students; parents are actively involved in the day-to-day running of the school and contribute to solving problems; fellow teachers communicate effectively with students and their families; the school administration responds effectively to the needs and requests of teachers, etc.) – 1 question with 8 items.

- *Activities at School*: participation in school staff meetings; sharing educational material with colleagues; delivering lessons with colleagues; observing lessons of other teachers and providing feedback; participation in the development of the school curriculum, etc. – 1 question with 8 items.

- *Stress Factors at School*: e.g., time for preparing for lessons; workload; assessment of students' homework; administrative work (documentation); supplementary work (e.g., mentoring of young teachers); responsibility for student achievements; maintaining discipline in the classroom; verbal insults from students or their parents; adapting to changing school and country requirements; search for solutions to problems faced by parents; adaptation of lessons for students with special needs, etc.) – 1 question with 11 items.

- *Teaching in a Classroom*: setting lesson goals at the beginning of the lesson; explaining what students need to learn; explaining the connection between new and old topics; inspecting/assessing students' homework; assigning tasks that encourage students to think critically; organizing work in small groups so that students work together to solve a problem; working with students individually; encouraging students to follow class rules; assigning project work to students; allowing students to use ICT; encouraging students to evaluate themselves and reflect on their work; encouraging students to argue their opinions, etc. – 2 questions with 24 items.

The questionnaire parts are formed from closed-ended statements and each part is presented in a matrix-type question which is expanded by separate items. Items are assessed on different scales, such as “strongly disagree”, “disagree”, “neither agree nor disagree”, “agree”, “strongly agree”, or – “never”, “less than once a year”, “once a year”, “3-4 times a year”, “once a month”, “once a week or more”, etc. Study participants had to rate each item with a single value.

Based on the results of our study sample, internal consistency reliability (Cronbach's  $\alpha$ ) coefficients for items of the separate scales of the questionnaire were calculated and the following Cronbach's alpha estimates were obtained:  $\alpha = .898$  for *Time Distribution*,  $\alpha = .911$  for *Professional Development*,  $\alpha = .798$  for *Feedback*,  $\alpha = .876$  for *Positive Self-esteem in Teaching*,  $\alpha = .843$  for *Positive Self-esteem at School*,  $\alpha = .792$  for *Activities at School*,  $\alpha = .835$  for *Stress Factors at School*, and  $\alpha = .811$  for *Teaching in a Classroom*. All these values are higher than .7, therefore it can be stated that the data were reliable and it was not necessary to exclude any scale estimates from further analysis.

### 3.3. Statistical analysis

Data were collected between February 4, 2019 and December 20, 2019.

The software package SPSS 21.0 and Excel program were used to calculate internal consistency reliability coefficients (Cronbach's  $\alpha$ ), to test the distribution of data (Kolmogorov-Smirnov tests), to run intergroup comparisons (Kruskal-Wallis tests) and perform correlation (Pearson and Spearman) and multiple regression analyses. The level of significance was set at  $p < .05$ .

### 3.4. Ethics

Ethical aspects and validity of the current study were assessed and an ethical permission to conduct the survey was received from the Research Board of Vytautas Magnus University (17-12-2018, Protocol No. 12A). The questionnaire was anonymously completed online with no risk of revealing personal or institutional identity of respondents.

## 4. Results

In the first stage of the analysis, the Kruskal-Wallis H with *post hoc* tests\* were performed to examine whether teachers working in different types of schools, in different positions, and with different workloads differ by the factors that challenge teacher leadership at school. For this purpose, the differences were analyzed both according to the individual items of the various blocks of the questionnaire and according to the total estimates of positive attitudes about the self, positive attitudes about the school, and other variables such as time distribution, etc.

Our analysis of differences between teachers by the type of school revealed relatively few significant differences. In particular, the Kruskal-Wallis H tests with *post hoc* comparisons did not find significant differences in terms of aggregate variables (in all instances,  $p > .05$ ). The differences emerged only in terms of individual items in the questionnaire blocks, as indicated by the  $p$  values (see the description below).

*Time distribution by type of school.* Results of the Kruskal-Wallis H tests with *post hoc* comparisons suggest that teachers working in progymnasiums spend statistically significantly more time ( $p < .01$ ) on assessing students' homework ( $M = 5.00$ ,  $SD = .6$ ) than teachers in primary schools ( $M = 1.68$ ,  $SD = .8$ ), basic schools ( $M = 1.60$ ,  $SD = 1.1$ ), vocational schools ( $M = 1.67$ ,  $SD = 1.7$ ), gymnasiums ( $M = 1.98$ ,  $SD = 1.3$ ), and multifunctional centers ( $M = 1.75$ ,  $SD = 1$ ). In addition, gymnasium teachers spend significantly more time ( $p < .05$ ) on professional development ( $M = 1.44$ ,  $SD = .9$ ) than primary school ( $M = 1.18$ ,  $SD = .5$ ), basic school ( $M = 1.17$ ,  $SD = .5$ ), vocational school ( $M = 1.08$ ,  $SD = .4$ ), and progymnasium ( $M = 1.00$ ,  $SD = .3$ ) teachers. Lastly, gymnasium teachers spend significantly more time ( $p < .05$ ) on other /supplementary activities (documentation, communication, organization of events at school, etc.) ( $M = 1.24$ ,  $SD = 1.2$ ) than teachers working at vocational schools ( $M = .74$ ,  $SD = .6$ ) and progymnasium teachers ( $M = .50$ ,  $SD = .7$ ).

*Positive self-esteem in teaching and at school by type of school.* Our analysis of the answers to individual questions about attitudes towards the self and activities at school (the Kruskal-Wallis H tests with *post hoc* comparisons) revealed statistically significant differences in only three questionnaire items:

1) Using advantages of ICT in teaching, suggesting that teachers working in progymnasiums ( $M = 2.50$ ,  $SD = 2.1$ ) are statistically significantly less able ( $p < .05$ ) to take advantage of technology than teachers in all other types of schools (primary schools  $M = 4.04$ ,  $SD = .6$ ; basic schools  $M = 4.08$ ,  $SD = .7$ ; vocational schools  $M = 4.06$ ,  $SD = .7$ ; high schools  $M = 4.22$ ,  $SD = .4$ ; gymnasiums  $M = 4.12$ ,  $SD = .6$ ; multifunctional centers  $M = 4.06$ ,  $SD = .7$ ).

2) Belief that colleague teachers are fair and cooperative, whereby primary school teachers ( $M = 4.21$ ,  $SD = .8$ ) are significantly more likely ( $p < .01$ ) to say that colleagues are fair and cooperative than colleagues in basic ( $M = 3.87$ ,  $SD = .8$ ), vocational ( $M = 3.64$ ,  $SD = .7$ ), high schools ( $M = 3.33$ ,  $SD = .9$ ), gymnasiums ( $M = 3.73$ ,  $SD = .7$ ), and progymnasiums ( $M = 3.50$ ,  $SD = .7$ ).

\* A significant Kruskal-Wallis test used for non-normally distributed data indicates a stochastic dominance of at least one sample over one other sample, yet the test does not identify where the dominance occurs or for how many pairs of groups it obtains. To analyze the specific sample pairs for stochastic dominance, Kruskal-Wallis H tests with *post hoc* comparisons were performed.



3) Belief that fellow teachers interact effectively with students and their families, suggesting that primary school teachers ( $M = 4.07$ ,  $SD = .5$ ) are significantly more likely ( $p < .01$ ) to agree that fellow teachers interact effectively with students and their families than teachers working in high schools ( $M = 3.56$ ,  $SD = .9$ ), gymnasiums ( $M = 3.44$ ,  $SD = .8$ ), and progymnasiums ( $M = 3.50$ ,  $SD = .7$ ).

Teachers' responses about *activities at school* (the Kruskal-Wallis H tests with *post hoc* comparisons) indicate significant differences in two variables:

1) Participation in school staff meetings, suggesting that gymnasium teachers ( $M = 4.24$ ,  $SD = .8$ ) are statistically significantly more likely ( $p < .001$ ) to attend school staff meetings than vocational school ( $M = 3.74$ ,  $SD = .9$ ) and high school teachers ( $M = 3.89$ ,  $SD = .8$ ).

2) Sharing teaching/learning materials with colleague teachers, whereby primary school teachers ( $M = 3.96$ ,  $SD = 1.1$ ) are significantly more likely ( $p < .01$ ) to share teaching material than vocational school ( $M = 2.94$ ,  $SD = .9$ ) and multifunctional center teachers ( $M = 2.94$ ,  $SD = 1.3$ ).

*Activities in the classroom.* The answers to the block of questions about the most frequently used tasks and activities in the classroom (the Kruskal-Wallis H tests with *post hoc* comparisons) indicate significant differences in the following three questionnaire items:

1) Setting particular goals in the lesson, in which basic school teachers ( $M = 4.80$ ,  $SD = .6$ ) are statistically significantly more likely ( $p < .05$ ) to set lesson goals at the beginning of the lesson than primary school ( $M = 4.41$ ,  $SD = .9$ ), vocational school ( $M = 4.42$ ,  $SD = 1.1$ ), and progymnasium teachers ( $M = 4.00$ ,  $SD = 1.4$ ).

2) Explaining what students need to learn, indicating that gymnasium teachers ( $M = 4.76$ ,  $SD = 1.4$ ) significantly more often ( $p < .05$ ) explain to students what they need to learn than primary school ( $M = 4.22$ ,  $SD = 1.2$ ) and progymnasium teachers ( $M = 4.00$ ,  $SD = 1.4$ ).

3) Encouraging students to follow rules in the class, whereby basic school teachers ( $M = 4.61$ ,  $SD = .8$ ) significantly more often ( $p < .01$ ) encourage students to follow class rules than high school ( $M = 3.11$ ,  $SD = .9$ ), gymnasium ( $M = 4.11$ ,  $SD = 1.4$ ), and progymnasium teachers ( $M = 3.50$ ,  $SD = 2.1$ ).

Lastly, our comparison of teachers with different *workloads* by relevant study variables (the Kruskal-Wallis H tests with *post hoc* comparisons) yielded differences in two composite variables, school activity and school stress. First, teachers with less than half a day workload are statistically significantly less active at school than full-time teachers ( $M = 20.72$ ,  $SD = 6.1$  vs  $M = 23.2$ ,  $SD = 5.4$ ,  $p < .05$ ). Second, teachers working less than half a day also experience significantly less stress than full-time teachers ( $M = 21.54$ ,  $SD = 8.2$  vs  $M = 25.91$ ,  $SD = 7.1$ ,  $p < .01$ ). In addition, answers to individual items of the questionnaire suggest that teachers working less than half a day are statistically significantly less likely to share teaching/learning materials than their colleagues who work full time ( $M = 2.78$ ,  $SD = 1.4$  vs  $M = 3.41$ ,  $SD = 1$ ,  $p < .01$ ).

In the next stage of the analysis, the following statistically significant links (Pearson and Spearman bivariate correlations) were computed between variables that raise challenges to teacher leadership:

*Teacher workload.* A very significant moderate positive correlation was found between teacher workload and time spent on teaching ( $r = .34$ ,  $p < .01$ ). Teacher workload is also linked to time spent on students' homework assessment ( $r = .2$ ,  $p < .01$ ), time spent on parent counseling ( $r = .19$ ,  $p < .01$ ), time allocated to preparation for classes ( $r = .16$ ,  $p < .01$ ), activity in school ( $r = .14$ ,  $p < .01$ ), time devoted to collaboration with colleagues ( $r = .11$ ,  $p < .05$ ), and, importantly, there is a modest, although very significant relationship between teacher workload and stress experienced at school ( $r = .18$ ,  $p < .01$ ) (see [Table 1](#)).

• *Time allocation:*

A. Lesson planning. A medium-strength statistically significant positive correlation emerged between the time a teacher spends planning lessons and the time spent on assessing students' homework ( $r = .61$ ,  $p < .01$ ). There are also modest significant links between teacher time spent on lesson planning and time devoted to collaboration with colleagues ( $r = .29$ ,  $p < .01$ ), time for parent counseling ( $r = .23$ ,  $p < .01$ ), and, again, stress ( $r = .26$ ,  $p < .01$ ). Lastly and intuitively, time to plan lessons is moderately linked with time devoted to professional development ( $r = .26$ ,  $p < .01$ ).

Assessment of students' homework. The study does not support the assumption that the time spent on students' homework assessment is strongly related to specific school subjects. Such links,

although rather weak, are to be found only in relation to two things. The time spent on assessment of students' homework is positively but weakly related to teaching of a particular subject, namely, national language ( $r = .22, p < .01$ ) and mathematics ( $r = .12, p < .05$ ). It is perhaps intuitive that the time spent on assessment of students' homework is linked with the time devoted to parent counseling ( $r = .32, p < .01$ , time for collaboration with colleagues ( $r = .29, p < .01$ ), time for professional development ( $r = .23, p < .01$ ), and stress ( $r = .28, p < .01$ ). Interestingly, the time spent on assessment of students' homework is also positively and very significantly, albeit only modestly, associated with teachers' age ( $r = .16, p < .01$ ). It must be noted that this is the only variable in our study that correlated with age.

B. Reflecting on personal teaching. Several positive statistically significant relationships are characteristic of teachers' time given to reflect on personal teaching and other variables: there is a robust relationship with the time spent on lesson planning ( $r = .58, p < .01$ ); a substantial correlation with the time devoted to assessment of students' homework ( $r = .43, p < .01$ ); a modest association with the time devoted to collaboration with colleagues ( $r = .17, p < .01$ ); time for professional development ( $r = .22, p < .01$ ) and, importantly, stress ( $r = .2, p < .01$ ).

C. Collaboration with fellow teachers. The results also show a substantial positive statistically significant relationship between teachers' time devoted to collaboration with fellow teachers and time spent on counseling students' parents ( $r = .47, p < .01$ ) as well as a moderate association with time devoted to professional development ( $r = .34, p < .01$ ). As mentioned above, the time devoted to collaboration with colleagues is also linked with workload, time for lesson planning, time for homework assessment, and reflecting on teaching. And there is a modest relationship between the time a teacher spends collaborating with fellow teachers and implementing other/supplementary activities at school ( $r = .23, p < .01$ ).

**Table 1.** Relationships between teacher workload, time allocation, and self-esteem

	Age	Work-load	Education	Nat. lang.	Mat.	T. for reflecting on teaching	T. for lesson planning	T. for home-work assessm.	T. for collaboration with colleagues	T. for parental counseling	T. for professional development	T. for other/ supplementary activities	Teacher self-esteem in teaching	Teacher self-esteem at school	Activity in school	Stress
Gender	.0	.0	.1	.1	.0	.0	.0	.1	.0	.1	-.11*	-.1	.0	.0	.0	.1
Age		.0	.0	.0	.1	.1	.0	.16*	.0	.0	.1	.0	.1	.1	.0	.0
Workload			.0	.1	.0	.34*	.16*	.2**	.11*	.19**	.1	.1	.1	.0	.14**	.18*
Education				.1	.0	.1	.0	.0	.0	.0	.0	.1	.0	.11**	-.1	-.1
Subject: National language					.0	.1	.0	.22*	.1	.1	-.1	.1	.1	.1	.1	.11*
Subject: Mathematics						.0	.0	.12*	.1	.1	.0	-.1	.0	.0	.0	.1
Subject: Natural sciences						.0	.0	.0	-.1	-.1	.0	-.13*	-.1	.0	-.1	.0
Time for reflecting on teaching							.58*	.43*	.17**	.1	.22**	.12*	.0	-.1	-.1	.2**
Time for lesson planning								.61*	.29**	.23**	.32**	.1	.0	-.1	.0	.26*
Time for homework assessment									.29**	.32**	.23**	.11*	.0	-.1	.0	.28**



( $\beta = -.09$ ,  $t = 1.985$ ,  $p < .05$ ). This means that teachers feel better about their teaching if they have a positive view about the school they work at, are more active, allow more time for assessment of their students' homework and for other/supplementary activities, and stress out less; besides, teachers of foreign languages are likely to have a lower self-esteem in teaching.

**Table 2.** Predictors of teacher self-esteem in teaching

Predictors	B	SE	$\beta$	t	p
Gender	-.463	.953	-.023	-.486	.627
Age	.004	.079	.007	.057	.955
Education	1.005	.560	.082	1.796	.073
Workload	.799	.455	.083	1.757	.080
Subject: National language	.602	.925	.034	.651	.516
Subject: Mathematics	-1.704	.982	-.092	-1.735	.084
Subject: Natural sciences	-1.685	.925	-.090	-1.821	.069
Subject: Social sciences	.654	1.025	.028	.638	.524
<b>Subject: Foreign languages</b>	<b>-2.116</b>	<b>1.066</b>	<b>-.086</b>	<b>-1.985</b>	<b>.048</b>
Subject: IT	1.553	1.034	.075	1.503	.134
Subject: Arts	1.704	1.244	.073	1.370	.172
Subject: Physical education	.495	1.477	.019	.335	.738
Subject: Religion and ethics	-.237	1.336	-.008	-.177	.860
Time for reflecting on teaching	-.262	.170	-.090	-1.542	.124
Time for lesson planning	.194	.254	.050	.763	.446
<b>Time for homework assessment</b>	<b>.616</b>	<b>.311</b>	<b>.119</b>	<b>1.982</b>	<b>.048</b>
Time for collaboration with colleagues	-.545	.469	-.061	-1.162	.246
Time for parental counseling	.415	.564	.038	.736	.462
Time for professional development	.073	.467	.008	.157	.875
<b>Time for other/supplementary activities</b>	<b>.786</b>	<b>.367</b>	<b>.107</b>	<b>2.139</b>	<b>.033</b>
<b>Teacher self-esteem at school</b>	<b>.465</b>	<b>.070</b>	<b>.321</b>	<b>6.597</b>	<b>.000</b>
<b>Activity in school</b>	<b>.262</b>	<b>.058</b>	<b>.221</b>	<b>4.483</b>	<b>.000</b>
<b>Stress</b>	<b>-.132</b>	<b>.041</b>	<b>-.150</b>	<b>-3.231</b>	<b>.001</b>
$R^2 = .325$ . $F(28, 376) = 6.462$ , $p = .000$					

In the second model (see Table 3), which explored teacher self-esteem at school, activity in school remains a significant positive predictor ( $\beta = .25$ ,  $t = 5.199$ ,  $p < .01$ ), while the level of stress at school continues to serve as a significant negative predictor of this outcome variable ( $\beta = -.11$ ,

$t = 2.264, p < .05$ ); self-esteem at school is also predicted positively by teacher self-esteem in teaching ( $\beta = .32, t = 6.618, p < .00$ ) and negatively by the level of education ( $\beta = -.15, t = 3.249, p < .01$ ) and teaching the subject of arts ( $\beta = -.12, t = 2.248, p < .05$ ). This means that teacher self-esteem at school is likely to be higher if they feel good about their teaching, are more active, stress out less, and, interestingly, are less educated; in addition, teachers of arts tend to have more negative beliefs about the school they work at.

**Table 3.** Predictors of teacher self-esteem at school

Predictors	B	SE	$\beta$	t	p
Gender	.235	.657	.017	.357	.721
Age	.065	.054	.136	1.198	.232
<b>Education</b>	<b>-1.242</b>	<b>.382</b>	<b>-.147</b>	<b>-3.249</b>	<b>.001</b>
Workload	-.041	.315	-.006	-.132	.895
Subject: National language	.538	.639	.043	.842	.400
Subject: Mathematics	.586	.679	.046	.863	.389
Subject: Natural sciences	1.057	.632	.082	1.673	.095
Subject: Social sciences	1.112	.706	.068	1.574	.116
Subject: Foreign languages	.597	.740	.035	.807	.420
Subject: IT	-.855	.715	-.060	-1.195	.233
<b>Subject: Arts</b>	<b>-1.925</b>	<b>.856</b>	<b>-.118</b>	<b>-2.248</b>	<b>.025</b>
Subject: Physical education	.821	1.020	.046	.805	.421
Subject: Religion and ethics	.296	.923	.014	.321	.749
Time for reflecting on teaching	.033	.118	.016	.277	.782
Time for lesson planning	.025	.176	.009	.140	.888
Time for homework assessment	-.409	.214	-.115	-1.909	.057
Time for collaboration with colleagues	.224	.324	.036	.691	.490
Time for parental counseling	-.219	.390	-.029	-.562	.575
Time for professional development	.058	.321	.009	.182	.856
Time for other/supplementary activities	-.067	.249	-.013	-.270	.788
<b>Teacher self-esteem in teaching</b>	<b>.223</b>	<b>.034</b>	<b>.323</b>	<b>6.618</b>	<b>.000</b>
<b>Activity in school</b>	<b>.208</b>	<b>.040</b>	<b>.253</b>	<b>5.199</b>	<b>.000</b>
<b>Stress</b>	<b>-.065</b>	<b>.029</b>	<b>-.106</b>	<b>-2.264</b>	<b>.024</b>
$R^2 = .323, F(27, 378) = 6.558, p = .000$					

Hence, the same two determinants of teacher self-esteem both in teaching and at school are the level of activity in school and stress. The other variables important in the formation of teacher



self-esteem differ, although both types of self-esteem are interrelated as the level of one is predictive of the level of the other.

### **5. Discussion and limitations**

Teacher leadership is seen and implemented first and foremost through teaching and targeted educational activities in the classroom, at school, and out of it. In addition, it is directly related to workload, time allocation, and self-esteem of a teacher (Lieberman, Miller, 2005). Workload, time allocation, and self-esteem are seen by researchers typically as part of a teacher's managerial competence or are related to the quality or effectiveness of teaching. The mentioned factors in this study are viewed as challenges to teacher leadership, as the teacher must not only fulfill, but also fully withstand their obligations carrying out the teaching workload, and must devote time to students, their parents, and fellow teachers at school. Thus, teacher leadership is associated with skills that the teacher demonstrates by teaching students in the classroom and performing supplementary and extracurricular activities, operating in the space of the teaching profession, and representing it in and out of school. This requires the teacher's self-esteem, which is reflected in teaching and other activities at school. Then it is important to see the teacher's workload as a whole – it has formal “visible” and “invisible” parts (Lieberman, Miller, 2005). The latter usually involves additional work done as a responsibility and commitment, which boosts the teacher's self-esteem by demonstrating their competence. Thus, the teacher's workload and the time s/he allocates to various targeted or purposeful activities are components of their leadership, but they are not self-evident, and they are challenging. The teacher's ability to meaningfully and purposefully implement the workload and allocate time to important activities that are professionally mandatory and complementary manifests the teacher's leadership (Ballet, Kelchtermans, 2009).

The results of the current study show that teacher workload is very significantly related with stress. This relationship is of great importance as it might indicate that the most draining and buffering aspect is the workload coming from the teaching activity itself and the quality of the relationships experienced at school with students and their parents, fellow teachers, and school administration. Non-teaching-related workload includes excessive paperwork and high-stakes accountability demands that are among the important challenges to teacher leadership and could cause stress (Van Droogenbroeck et al., 2014).

Our findings also suggest that the teacher's positive self-esteem in teaching does not depend on demographic variables, but rather depends on whether the teacher shows positive self-esteem at school. This means that the age of the teacher, and thus the work experience, should not be considered as reasons for good teaching in terms of the teacher's self-confidence. Self-confidence of a teacher is an independent variable that determines the effectiveness and quality of teaching. Thus, it is not age or work experience as a quantitative aspect, but the self-confidence developed by the teacher and directly based on the quality or effectiveness of teaching that are variables of teacher leadership (Mohammed, 2017).

Our findings show that workload directly influences teacher's stress – a bigger workload predetermines greater teacher stress. It must be noted that any ignored amount of teacher workload has a negative impact on both teacher and student performance, which are signs of teacher leadership (Wakoli, 2015).

It is very likely that the more time the teacher spends assessing students' homework, the more effective the teaching they provide in specific subjects, as indicated by the robust correlations of this variable with time devoted to reflecting on teaching and time for lesson planning and a modest but very significant link with time allocated to professional development. It could be explained that systematic examination provides the opportunity for the teacher to learn about the strengths and limitations of students' learning, and then inspires the teacher to reflect on their own teaching, which directs the teacher to the path of leadership (Hosain, 2016). Thus, it is obvious that the results of the study confirm the importance of reflection, and our findings also indicate that the more time the teacher spends reflecting on teaching, the more attention they pay to lesson planning.

Furthermore, the results of our study allow the assumption that the more time the teacher devotes to collaboration with fellow teachers, the more time they spend on counseling students' parents; the more time the teacher devotes to their own professional development, the more time they spend on counseling students' parents; the more time allocated to supplementary/extracurricular work with students at school, the more time devoted to cooperation with fellow teachers and the more time

spent on parental counseling. Time spent on collaboration with colleagues and students is considered essential to success in teacher leadership (Qu et al., 2014).

The results also show that higher self-esteem in a teacher determines teacher time spent on performing extracurricular and other/supplementary work at school. But greater teacher self-esteem also determines a lower level of stress. Thus, the more competent the teacher is in teaching, the less stress they experience and the more effectively they act in the classroom and at school: this is when the teacher's leadership is recognized (Kilinc et al., 2015).

It must be stated that the study was limited to relationships between workload, time-allocation, and teacher self-esteem, although there might be other challenges in teacher leadership in the classroom and at school. In addition, the scope of the current research was limited to one particular area and culture. A cross-cultural study involving several different countries might provide other important findings.

## 6. Conclusion

Workload, time allocation, and self-esteem are important challenges in teacher leadership. The results of the present study indicate that the heavier the workload the teacher has, the more difficulties they experience in time allocation regarding the variety of activities in the classroom and at school, which leads to greater stress and lower self-esteem. Importantly, the same two determinants of teacher self-esteem both in teaching and at school are the level of activity in school and stress. In view of this, the school should develop its potential to support teacher leadership and needs to revise systematically the teachers' workload and time allocation so that teachers could experience less stress and raise their self-esteem. Teachers need to have the opportunity to discuss their attitudes towards strategies and approaches they see as meaningful in regard to workload and time allocation so that they might develop their leadership through teaching, implementing changes at school, and so on. Teachers need open, clear, and respectful communication from school administrations about reasons for additional or extracurricular work. Such active support for teacher leadership at school could be a significant factor in implementing effective strategies for teacher workload and time allocation management. If it is not effective, then teachers have no support, and their access to professional development, as the basis for teacher leadership, is limited because of the heavy workload and a complicated time allocation due to work overload.

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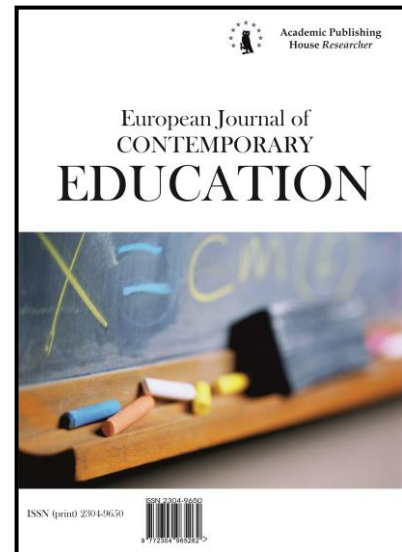
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## The History of Education

### The System of Public Education in Terek Oblast in the Period 1860–1917. Part 1

Aleksandr A. Cherkasov <sup>a, b, c, \*</sup>, Sergei N. Bratanovskii <sup>d, e</sup>, Ludmila G. Zimovets <sup>f</sup>

<sup>a</sup> International Network Center for Fundamental and Applied Research, Washington, USA

<sup>b</sup> Volgograd State University, Volgograd, Russian Federation

<sup>c</sup> East European History Society, Russian Federation

<sup>d</sup> Plekhanov Russian University of Economics, Moscow, Russian Federation

<sup>e</sup> Institute of State and Law of RAS, Moscow, Russian Federation

<sup>f</sup> Sochi State University, Sochi, Russian Federation

#### Abstract

This work examines the system of public education in Terek Oblast in the period 1860–1917. The present part covers the period 1860–1900.

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 run by the Ministry of Public Education. This source is characterized by incompleteness, which may be attributed to the fact that around that time the effort of collecting data on the system of public education in Terek Oblast in particular and across the Russian Empire as a whole was just starting out. Methodologically, wide use was made of the statistical method to identify a set of distinctive characteristics of the development of the system of public education in Terek Oblast in the period 1860–1900. To achieve the study's objectives, use was also made of general research methods such as analysis and synthesis, concretization, and summarization. Of special mention is the use in this study of the historical-situational method.

The authors' conclusion is that during the period 1860–1900, the development of the system of public education in Terek Oblast was based on the region's distinctive characteristics. At that time, the region witnessed the making of its systems of secondary, lower, and primary education. Due to the small size of the Russian population in the region at the time, it was not possible to create there quickly a large network of educational institutions, so the region's system of public

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\* Corresponding author

E-mail addresses: [a.cherkasov@incfar.net](mailto:a.cherkasov@incfar.net) (A.A. Cherkasov)



education was predominantly serving the needs of its Orthodox Christian residents. Another distinctive characteristic of the system of public education in Terek Oblast in the period under review was the large number of schools under the Ecclesiastical Department and the large number of children attending them.

**Keywords:** public education, Terek Oblast, period 1860–1917, Caucasus Educational District, Russian Empire.

### **1. Introduction**

Terek Oblast was established in 1860, the year following the capture of Imam Shamil and the end of the Caucasian War. At that time, the region incorporated the following eight okrugs: Nalchik, Kumyk, Ossetian, Ingush, Nagorny, Ichkerian, Chechen, and Argun. However, during the 1860s, a few more areas would become part of the region, more specifically the following three cities: Mozdok (1866), Kizlyar (1867), and Georgiyevsk (1868). Concurrently with the development of the system of civil administration in the region, its system of public education would also develop rapidly. The present part of the work reviews the development of the system of public education in Terek Oblast during the period from 1860, i.e. the year the oblast was established, to 1900.

### **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 run by the Ministry of Public Education ([Otchet, 1885](#); [Otchet, 1886](#); [Otchet, 1887](#); [Otchet, 1890](#); [Otchet, 1891](#); [Otchet, 1892](#); [Otchet, 1894](#); [Otchet, 1895](#); [Otchet, 1896](#); [Otchet, 1897](#); [Otchet, 1899](#); [Otchet, 1900](#); [Otchet, 1901](#)). This source is characterized by incompleteness, which may be attributed to the fact that around that time the effort of collecting data on the system of public education in Terek Oblast in particular and across the Russian Empire as a whole was just starting out.

Methodologically, wide use was made of the statistical method to identify a set of distinctive characteristics of the development of the system of public education in Terek Oblast in the period 1860–1900. To achieve the study's objectives, use was also made of general research methods such as analysis and synthesis, concretization, and summarization. Of special mention is the use in this study of the historical-situational method.

### **3. Discussion**

Regarding the extent to which the issue has been investigated, it is to be noted right away that during the period under review Terek Oblast was part of the Caucasus Educational District. At different times, the Caucasus Educational District has been the subject of research more than once. For instance, an attempt to investigate the history of public education in the Caucasus was made in 2016 by N.A. Shevchenko ([Shevchenko et al., 2016](#)). T.A. Magsumov has explored a similar subject, with a focus on the 1850s ([Magsumov et al., 2018](#)). O.V. Natolochnaya has investigated the operation of mountain schools in the Caucasus and the system of public education in Stavropol Governorate ([Natolochnaya et al., 2018](#); [Natolochnaya et al., 2018a](#)). The above-mentioned T.A. Magsumov has explored the system of public education in Kars Oblast ([Magsumov et al., 2020](#); [Magsumov et al., 2020a](#)), and V.S. Molchanova has researched the system of public education in Kuban Oblast ([Molchanova et al., 2019](#); [Molchanova et al., 2019a](#); [Molchanova et al., 2020](#)). A.A. Cherkasov has investigated similar processes in Black Sea Governorate ([Cherkasov et al., 2020](#)), and A.A. Mamadaliev – in Tiflis Governorate ([Magsumov et al., 2020](#); [Magsumov et al., 2020a](#)). Thus, in recent years researchers have expressed keen interest in investigating the development of the system of public education in the Caucasus, with the filling in of gaps in the study of this process helping obtain an integrated picture of public education in the pre-revolutionary Caucasus.

### **4. Results**

As in other regions of the Russian Empire, the system of public education in Terek Oblast was divided into the following three stages: secondary, lower, and primary.

#### **Secondary education**

Secondary education in Terek Oblast was represented by male and female gymnasia and progymnasia, as well as real schools for boys.

The first secondary educational institution, the Vladikavkaz Female Progymnasium, was opened in 1861, i.e. right after the establishment of Terek Oblast (Otchet, 1890: №106). On September 1, 1866, the city of Pyatigorsk became home to the Pyatigorsk Male Progymnasium (Otchet, 1891: №1). On January 1, 1874, Vladikavkaz became home to the first male secondary educational institution – the Vladikavkaz Real School (Otchet, 1885: applications). That same year, on August 24, the Vladikavkaz Female Progymnasium was transformed into a female gymnasium (Otchet, 1890: №106). On June 1, 1880, Terek Oblast became home to the Vladikavkaz Male Progymnasium (Otchet, 1885: applications). As early as July 1, 1885, the Vladikavkaz Male Progymnasium was transformed into a gymnasium (Otchet, 1886: applications).

On September 1, 1895, Pyatigorsk became home to a female progymnasium too (Otchet, 1896: 162). On January 25, 1898, Vladikavkaz became home to a female progymnasium (Otchet, 1899: 166). In 1899, the Pyatigorsk Female Progymnasium was transformed into a female gymnasium (Otchet, 1901: 166).

Table 1 provides the data on the region’s secondary educational institutions under the Ministry of Public Education and the number of students in them.

**Table 1.** Number of secondary educational institutions under the Ministry of Public Education and number of students in Terek Oblast in the period 1884–1900 (Otchet, 1885: applications; Otchet, 1886: applications; Otchet, 1887: 4, applications, 168; Otchet, 1890: № 1, 28, 51, 106, 127; Otchet, 1891: № 1, 28, 51, 77, 106, 127; Otchet, 1892: № 1, 25, 51, 77; 106, 127; Otchet, 1894: № 1, 25, 51, 77, 106, 127; Otchet, 1895: № 1, 25, 51, 77, 106, 127; Otchet, 1896: 2, 50, 105, 131, 162, 204; Otchet, 1897: 6, 54, 109, 135, 166, 208; Otchet, 1899: 6, 54, 109, 135, 208; Otchet, 1900: 6, 54, 109, 135, 166, 208; Otchet, 1901: 6, 54, 109, 135, 166, 208)

Year	Gymnasia		Progymnasia		Real schools	Total	Number of students		
	Male	Female	Male	Female			Boys	Girls	Total
1884	-	1	2	-	1	4	709	454	1,163
1885	1	1	1	-	1	4	760	432	1,192
1886	1	1	1	-	1	4	781	468	1,249
1889	1	1	1	-	1	4	737	425	1,162
1890	1	1	1	-	1	4	791	431	1,222
1891	1	1	1	-	1	4	814	472	1,286
1892	1	1	1	-	1	4	861	475	1,336
1894	1	1	1	-	1	4	789	489	1,278
1895	1	1	1	1	1	5	970	562	1,532
1896	1	1	1	1	1	5	1,058	608	1,666
1898	1	1	1	2	1	6	1,150	967	2,117
1899	1	1	1	2	1	6	1,174	1,065	2,239
1900	1	2	1	1	1	6	1,296	1,114	2,410

As evidenced in Table 1, in the period under review the region witnessed relatively weak dynamics in terms of the establishment of secondary educational institutions in it. Over the 16-year period, the number of educational institutions increased only by two, i.e. 50% of the total number. That being said, during the period under review the number of students increased more than two times, which would provide a sufficient foundation for the development of secondary education in Terek Oblast in the early 20<sup>th</sup> century. Another area worthy of consideration is the region’s student gender balance: if in 1884 girls accounted for about one-third of the total student body, by 1900 the figure had rapidly approached 50 %.

### Lower education

Lower education in Terek Oblast was represented by urban, tradesman’s specialized, mountain, and tradesman’s schools.

The region’s first mountain school, the Nalchik Mountain School, was established between 1851 and 1861. On November 28, 1863, the region became home to the Grozny Mountain School, and in 1870 – to the Nazran Mountain School (Otchet, 1885: applications). In 1868, it became home to the Vladikavkaz Tradesman’s Specialized School (Otchet, 1885: applications).

The first urban school, the Vladikavkaz Urban School, was created in 1874 concurrently with the real school and the female gymnasium. A year later, on July 1, 1875, the region became home to an urban school in the city of Mozdok, two years later – in the city of Kizlyar, and on August 1, 1880 – in the city of Georgiyevsk (Otchet, 1885: applications; Otchet, 1886: applications).

On July 1, 1889, the region became home to an urban school in Pyatigorsk as well (Otchet, 1890: № 185), with the total number of urban schools in Terek Oblast reaching five. In 1896, the region became home to the Grozny Urban School (Otchet, 1897: 294). On July 1, 1897, they established at the Pyatigorsk Urban School a lower tradesman’s school (Otchet, 1899: 406).

Table 2 provides the statistical data on lower educational institutions in Terek Oblast in the period 1884–1900.

**Table 2.** Number of lower educational institutions and number of students in them in Terek Oblast in the period 1884–1900 (Otchet, 1885: applications; Otchet, 1886: applications; Otchet, 1887: 198, 218, 232, 254; Otchet, 1890: № 185, 203, 241, 256; Otchet, 1891: № 184, 199, 240, 258; Otchet, 1892: № 184, 199, 240, 258; Otchet, 1893: № 184, 199, 240, 258; Otchet, 1894: № 184, 199, 240, 258; Otchet, 1895: № 184, 199, 240, 258; Otchet, 1896: 290, 316, 392; Otchet, 1897: 294, 320, 326, 426, 456; Otchet, 1899: 294, 322, 406, 436; Otchet, 1900: 294, 348, 456, 486; Otchet, 1901: 294, 348, 456, 486)

Year	Urban schools	Tradesman’s specialized schools	Mountain schools	Tradesman’s schools	Total	Number of students		
						Boys	Girls	Total
1884	4	1	3	-	8	888	-	888
1885	4	1	3	-	8	882	-	882
1886	4	1	3	-	8	817	-	817
1889	5	1	3	-	9	989	-	989
1890	5	1	3	-	9	1,005	-	1,005
1891	5	1	3	-	9	1,011	-	1,011
1892	5	1	3	-	9	1,010	-	1,010
1894	5	1	3	-	9	1,155	-	1,155
1895	5	1	3	-	9	1,216	-	1,216
1896	6	1	3	-	10	1,373	-	1,373
1898	6	1	3	1	11	1,780	-	1,780
1899	6	1	3	1	11	1,963	-	1,963
1900	6	1	3	1	11	2,006	-	2,006

As evidenced in Table 2, in the period under review the number of lower educational institutions in Terek Oblast increased by three. A considerable contribution was made to the development of the region’s urban schools, which accounted for 50%, with the region becoming home to its first lower tradesman’s school too. The demand for lower education in Terek Oblast at the time is best illustrated by the number of students in its lower educational institutions. Over the 16-year period, the number of students in those institutions increased more than two times – from 888 to 2,006 students. With that said, by 1900 some of the urban schools in the region were full to

capacity. For instance, the Vladikavkaz Urban School had an enrollment of 385 students, which was much above the average across the Caucasus\* (Otchet, 1901: 360).

### Primary education

The exact date of the establishment of the first primary school in Terek Oblast is unknown. However, there is information indicating that by 1841 the region had in operation two primary schools (Otchet, 1892: № 320). Over the next 25 years, the region became home to another 21 primary schools. In 1867, there began a sharp decline in the number of primary schools in the region. Specifically, from 1867 to 1871 the number of primary schools increased by 36, and from 1872 to 1876 – by another 27. Over the following years, the growth was quite slow (Otchet, 1892: № 320). By 1884, primary education in Terek Oblast was run by the following two entities: the Ministry of Public Education and the Ecclesiastical Department. Table 3 provides the statistical data on the number of primary educational institutions under the Ministry of Public Education and the number of students in them in the period 1884–1900.

**Table 3.** Number of primary schools under the Ministry of Public Education and number of students in them in Terek Oblast in the period 1872–1900 (Otchet, 1885: applications; Otchet, 1886: applications; Otchet, 1887: 272, 296; Otchet, 1890: № 296, 311; Otchet, 1891: № 315, 330; Otchet, 1892: № 317, 332; Otchet, 1894: № 318, 333; Otchet, 1895: № 318, 333; Otchet, 1896: 476, 506; Otchet, 1897: 506, 536; Otchet, 1899: 486, 516; Otchet, 1900: 536, 566; Otchet, 1901: 536)

Year	Number of schools	Number of students		
		Boys	Girls	Total
1884	98	4,388	1,324	5,712
1885	99	4,431	1,463	5,894
1886	102	3,861	1,114	4,975
1889	106	4,777	1,893	6,670
1890	107	4,978	1,963	6,946
1891	107	4,783	1,818	6,600
1892	107	4,950	1,841	6,791
1894	112	5,700	2,064	7,764
1895	119	6,071	2,448	8,519
1896	122	6,596	2,503	9,099
1898	134	7,439	2,401	9,840
1899	141	7,935	2,484	10,419
1900	159	8,429	2,520	10,949

As evidenced in Table 3, in the period under review the number of primary educational institutions in the region rose 60 %, from 98 to 159. That being said, the number of students in its primary schools rose less than two times. This must have been due to the Caucasian War and a lack of cooperation between the region's ethnic minorities and its authorities. It is to be noted that, according to the 1897 nationwide census, Russians accounted for 29 % of the region's population, followed by Chechens – 23.9 %, Ossetians – 10.3 %, Kabardians – 9 %, and the Ingush – 5.1 %, with the rest of the ethnicities in the region, including Ukrainians, Nogais, and Kumyks, accounting for less than 5 % of its population.

An important role in the development of primary education in the region was played by the Holy Synod. Just to compare, in 1896 the region's 122 schools under the Ministry of Public Education had a combined enrollment of 9,099 students, while its 113 parochial schools had a combined enrollment of 5,773 students (Otchet, 1897: № 341). With that said, it is to be noted that Terek Oblast's parochial schools tended to be established in lowly populated areas.

The region had another type of primary educational institutions in operation too. For instance, there were Armenian Gregorian schools, whose number kept changing. Specifically,

\* The average number of students per urban school across the Caucasus was 290 (calculated by the authors).

between 1889 and 1890 there were nine Armenian Gregorian schools in the region (Otchet, 1890: № 318; Otchet, 1891: № 338), in 1892 – 10 (Otchet, 1892: № 340), in 1894 – just four (Otchet, 1894: № 340), in 1895 – five (Otchet, 1896: 526), and in 1896 – four again (Otchet, 1897: 552). This variability must have been associated with changes in the demand for attending this particular kind of educational institutions. In addition, in the year 1895 alone Terek Oblast became home to as many as 154 Muslim schools (Otchet, 1896: 526), all of which continued operation in 1896 too (Otchet, 1897: 556). However, as early as 1897 schools of this kind ceased to be mentioned in the reports on the Caucasus Educational District, the reason being that they were ecclesiastical.

Table 4 provides the summarized statistical data regarding public education in Terek Oblast in the period 1884–1900.

**Table 4.** Number of educational institutions in Terek Oblast in the period 1884–1900 (Obzor, 1884: 48; Otchet, 1890: № 288; Otchet, 1891: № 307; Otchet, 1892: № 309, 340; Otchet, 1894: № 310, 341; Otchet, 1895: № 310, 341; Otchet, 1896: 458, 524; Otchet, 1897: 488, 554; Otchet, 1899: 468; Otchet, 1900: 518; Otchet, 1901: 518)

Year	Secondary	Schools					Total
		Lower	Primary			Run by other departments	
			Run by the Ministry of Public Education	Private	Parochial		
1884	4	8	98	7	N/A*	-	117 <sup>†</sup>
1889	4	8	106	6 <sup>‡</sup>	35	-	159
1890	4	8	107	8 <sup>§</sup>	38	-	165
1891	4	9	107	5	79	-	204
1892	4	9	107	5	86 <sup>**</sup>	-	211
1894	4	9	112	6	92 <sup>††</sup>	-	223
1895	5	9	119	5	94	-	232
1896	5	10	122	5	113 <sup>††</sup>	1	256
1898	6	11	134	5	N/A	N/A	156 <sup>§§</sup>
1899	6	11	141	4	N/A	N/A	162 <sup>***</sup>
1900	6	11	159	6	N/A	N/A	182 <sup>†††</sup>

The incompleteness of the data provided in Table 4 may be attributed to the fact that these statistics were gathered by different agencies, each of which used their discretion as to which metrics to use. Nevertheless, the statistics for the period 1889–1896 indicate that in the late 19<sup>th</sup> century there was a steady increase in the number of parochial schools in the region. Therefore, even if it is assumed that in 1900 the number of schools in the region remained at the

\* Data not available

† Data not available on the region's schools under the Ecclesiastical Department

‡ The region's private educational institutions had a combined enrollment of 133 (125 boys and eight girls).

§ The region's private educational institutions had a combined enrollment of 161 (123 boys and 38 girls).

\*\* The region's 86 parochial schools had a combined enrollment of 3,272 boys and 690 girls.

†† The region's 95 parochial schools had a combined enrollment of 3,230 boys and 1,025 girls.

†† The region's 113 parochial schools had a combined enrollment of 4,043 boys and 1,730 girls.

§§ Data not available on the region's schools under the Ecclesiastical Department and schools under the rest of the departments

\*\*\* Data not available on the region's schools under the Ecclesiastical Department and schools under the rest of the departments

††† Data not available on the regions' schools under the Ecclesiastical Department and schools under the rest of the departments



level registered in 1896 and in 1884 there were as many schools there as in 1889, it appears that in 1884 Terek Oblast had in operation a total of 152 schools, and in 1900 – 298 schools now, i.e. there was a 200% increase in the number of educational institutions in the region. With that said, the largest increase was posted by the region's parochial schools – a rise of over three times in the period 1889–1896.

## 5. Conclusion

During the period 1860–1900, the development of the system of public education in Terek Oblast was based on the region's distinctive characteristics. At that time, the region witnessed the making of its systems of secondary, lower, and primary education. Due to the small size of the Russian population in the region at the time, it was not possible to create there quickly a large network of educational institutions, so the region's system of public education was predominantly serving the needs of its Orthodox Christian residents. Another distinctive characteristic of the system of public education in Terek Oblast was the large number of schools under the Ecclesiastical Department and the large number of children attending them in the region.

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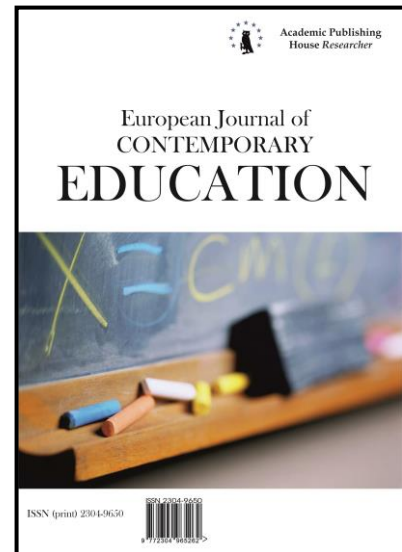
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## Transformations in the Field of public education of the Ukrainian State in 1918. Part 1

Sergey I. Degtyarev <sup>a, b, \*</sup>, Vladyslava M. Zavhorodnia <sup>a</sup>, Lyubov G. Polyakova <sup>b, c</sup>

<sup>a</sup> Sumy State University, Sumy, Ukraine

<sup>b</sup> International Network Center for Fundamental and Applied Research, Washington, USA

<sup>c</sup> Volgograd State University, Volgograd, Russian Federation

### Abstract

The government policy of the Ukrainian State, conducted in the field of public education within 1918 year, is reviewed in this article. The first part of the research covers the peculiarity of the work of the Ukrainian Ministry of Public Education, its structure and personnel. The authors paid separate attention to the formation process of the higher education institutions system and the internal organization of their activities.

The research is based on a corpus of published normative documents, memoirs of contemporaries of the events described here.

The authors concluded that in general the government policy of the Ukrainian State in the area of the public education system development was very successful. The work of the Ministry of Public Education itself was established in very short time. The productivity of the ministry was facilitated by the delegation of legislative initiative given to it. This helped to make many decisions quickly, reacting in time to the emerging needs of the public education sector. The existing universities received state support, and a chain of new educational institutions were created. However, there were several reasons that did not allow to perform the reform of the higher education system in full. First of all, these are military-political and economic reasons.

**Keywords:** Ukrainian Derzhava (State), Ministry of Public Education, Nikolai Vasilenko, Pavlo Skoropadsky, higher educational institutions, university, institute.

### 1. Introduction

The collapse of the Russian Empire, the starting point of which the October Revolution of 1917 had indeed become, was the beginning of the formation of national states in the regions that were previously a part of the empire. One of them was Ukraine - a state with a multiethnic population and with a number of border areas which were claimed by nearby states (Poland,

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\* Corresponding author

E-mail addresses: [starsergo@bigmir.net](mailto:starsergo@bigmir.net) (S.I. Degtyarev)

Romania, Bolshevik Russia). A significant part of the progressively thinking Ukrainian population, various political forces and public organizations were involved actively in the process of state-building. Different visions for further development of Ukraine presented by the participants of this process often caused internal conflicts. This endangered the state-building, made it vulnerable to external military-political forces, many of which did not consider Ukraine's right to self-determination.

The most systemic transformations in all spheres of life of the Ukrainian society and the state began only with the coming to power of the Hetman Pavlo Skoropadsky in Ukraine at the end of April 1918. The activity of the government of the Ukrainian State and the head of state himself were focused on the formation of a strong state with a powerful internal organization, capable to protect itself and to become a valuable partner on the international scene. Although there were, of course, many political blunders.

Both as his contemporaries as many modern researchers assess the policy of the Hetman P. Skoropadsky and his government in the field of public education in the most positive way. This was one of the highest priorities in the domestic policy of the Ukrainian State at that time. First, it was confirmed by the high legislative activity in this direction. In a range of normative documents and statements of politicians it was emphasized that the Ukrainian national school was a base for the renewal of the nation, and it had to be provided with all necessary things in proper and timely way ([Ukrains'ka derzhava, 2015b: 211](#)).

It is the government policy of the Ukrainian State in the field of public education that our article will be devoted to. The first part of this study will cover the structure and specifics of the work of the department of the Ministry of Public Education of the Ukrainian State particularly. Also, the activity of the Ukrainian government in the direction of reforming the higher education system will be analyzed here.

## **2. Materials and methods**

The research offered is based on the following sources: memoirs, regulations and periodicals. The normative documents made it possible to assess the scope of the reforms performed in the field of public education, to determine the priority directions of the government of the Ukrainian State in this area. This source enabled to research the implementation mechanism of educational policy in 1918 significantly. While writing this article, we used a two-volume collection of normative acts from the period of the Hetman P. Skoropadsky, published in 2015 ([Ukrains'ka derzhava, 2015a](#); [Ukrains'ka derzhava, 2015b](#)), along with the official paper of the government of the Ukrainian State, the Derzhavny Vistnyk newspaper ("State Gazette"), where all the official government findings were released.

Memoirs mostly contain contemporaries' assessments of individuals who participated in the establishment of the education system, their attitude to transformations in that area, etc. A similar source is the memoirs of the Head of the Ukrainian State, Pavel Skoropadsky ([Skoropads'kii, 2016](#)). D. Doroshenko emphasized the events associated with the opening of the Kiev State Ukrainian University in his memoirs ([Doroshenko, 2007: 355-361](#)). Another contemporary of the events of 1918, M. Shkilnyk, recognized the development of public education in the Ukrainian State in his memoirs, in spite he criticized P. Skoropadsky and his policy in general. But it was paid less attention to this subject in his study. The problems related to the establishment of some higher educational institutions in Ukraine and the process of Ukrainization in the education system were only taken into consideration. ([Shkilnyk, 2016: 376-379](#)).

Periodicals are one of the most factual sources. They highlighted the most relevant problems in the field of public education in Ukraine of the period studied. Thus, it was possible to determine the success and effectiveness of individual components of the educational reform performed. In addition, having used periodicals, we managed to illustrate a number of steps, performed by the Ukrainian government in establishing the certain sectors of public education, with specific examples.

The simultaneous usage of the sources mentioned above enabled us to expand and clarify a range of historical facts. This influenced, in its turn, on some value judgments of the authors.

In general, the work presented here is built on general scientific and special principles and on methods of cognition. In particular, the principles of historicism and objectivity allowed us to



approach objectively while assessing the subject and to take into consideration the opinions of various researchers and contemporaries of the described events.

The usage of historical-comparative, problem-chronological, formal-legal research methods made it possible to represent the complex process of implementing the policy of the Ukrainian State in the area of reforming the public education system, to identify the positive and negative phenomena typical for this process. The application of the method of source criticism helped to determine the level of reliability of the sources used and to interpret a number of historical facts in more objective way.

### **3. Discussion**

Various aspects of the history of the Ukrainian State in 1918 often become the subject of research by scientists. At the same time, a large quantity of problems, which require to be resolved, remains in this thematic field.

The Hetman is often depicted in memoirs and scientific literature as a politician, dependent on representatives of the Austro-German Command, which was located in Ukraine, and on other external political forces in his decisions, a man who favored entrepreneurs and large landowners exceptionally. This can be traced in the works of M. Grushevsky, S. Petliura, M. Shapoval, P. Khristiuk, M. Yavorsky, A. Likholat and many others.

Positive assessments of P. Skoropadsky's activities are often related to his policy in the field of public education, science, culture and partially in the field of diplomacy. Contemporaries of the events of 1917-1921, who was mainly among supporters of the policy of the Central Rada and of the Directory of the Ukrainian People's Republic, social democrats, evaluated P. Skoropadsky's activities in their political views negatively.

Recently many researchers agree with the modern scientist R. Pirog, who has come to the conclusion that "it is quite difficult to determine the absolutely exact formula of the national-state essence of the Hetmanate, as Ukrainian as Russian structural elements were reflected in this model" (Kalakura, 2008: 72). We also support this point of view.

The works devoted to the Ukrainian history of the period of the Ukrainian State in 1918 raise a wide range of issues. The subject of many studies became the problems associated with the formation of the bureaucratic apparatus, the creation of various state institutions and their staffing. First of all, these are the works of P. Gai-Nyzhnyk, I. Girich, O. Kudlai, O. Mironenko, R. Pirog, O. Rublev, A. Reent and other scientists (Hay-Nyzhnyk, 1997; Hai-Nyzhnyk, 2004; Hyrych, 2016; Myronenko, 1996; Pyrih, 2009; Degtyarev, 2018; Kudlai, 2008; Rublov, Reient, 1999). The foreign policy pursued by the Hetman P. Skoropadsky is researched in the whole range of works, special attention is paid to the issue of the formation of the Ukrainian Diplomatic Office of this period and Ukraine's relationships with various states. B. Levik, M. Gedin, S. Degtyarev, V. Zavhorodnia, L. Polyakova and others worked in that thematic field (Hedin, 2012; Levyk, 2017; Degtyarev, Zavhorodnia 2018; Degtyarev, Zavhorodnia, 2019; Degtyarev et al., 2019).

The policy of the government of the Hetman P. Skoropadsky in the field of public education was paid little attention in the works devoted to the history of the Ukrainian State in 1918 or in general to the period of Ukraine's fighting for statehood in 1917-1921. As a rule, the authors of such works made a positive appraisal of the reforms in the education system, gave examples of the founding of new educational institutions, attend to the Ukrainianization of state educational institutions (Rublov, Reient, 1999: 141-142; Hurzhii, Reient, 2011: 197-200). While studying the social, political and government activities of N. Vasilenko, the Ukrainian scientist V. Verstyuk touched some aspects of government policy in the field of public education in 1918 superficially (Verstiuk, 2008).

Some authors were focused on certain aspects of the development of the public education system of this period. So, T. Ostashko reviewed the activities of the government of the Ukrainian State in the field of education, science and culture (Ostashko, 2018). The researcher analyzed the regulatory framework of this period regarding transformations in this area. In particular, she highlighted the issues related to the founding of the secondary educational institutions network, the establishment of the higher education system, etc. A. Zavalnyuk investigated the system of university education within the period of the Ukrainian State (Zavalniuk, 2008). The scientist paid separate attention to the formation of the faculty corporation, which proceeded in different universities unevenly. Relying on the official publication of the government of the



Ukrainian State, the *Derzhavny Vistnyk* newspaper, A. Kudlai analyzed the legislative activity in the field of public education and culture in the period studied (Kudlai, 2008).

The former Minister of Foreign Affairs of that period and one of the ideologists of the hetman direction D. Doroshenko described the policy of the Government of the Ukrainian State in the field of public education in the details. In his "History of Ukraine 1917-1923" he devoted a separate chapter to this subject (Doroshenko, 2002: 233-256).

The work presented by us is based on two main components. We will pay separate attention to the arrangement of the public education department activities in general and make an attempt to research the founding process of the higher education system comprehensively in the Ukrainian State as well.

#### **4. Results**

The highest executive board of the Ukrainian State was the Council of Ministers. As any parliamentary-type body had not been founded at all, the Council of Ministers also received legislative functions. The government delegated the power of legislative initiative to individual ministries in some cases, and the legal force was granted to their decisions (Rublov, Reient, 1999: 113). The Ministry of Public Education of the Ukrainian State often used this right.

The heads of the ministries and their deputies were approved by the Head of the State personally. For the entire period from May to December 1918, the Ministers of Public Education of the Ukrainian State were N. P. Vasilenko (03.V.1918 – 25.X.1918), P. Ya. Stebnitsky (25.X.1918 – 14.XI.1918) and V.P. Naumenko (14.XI.1918 – 14.XII.1918).

N. Vasilenko occupied this position for the longest period. His authority was very high even among representatives of the opposition forces to the Government of P. Skoropadsky. He even executed the Chairman's duties while the absence of the Chairman in the Council of Ministers on several occasions (Ukrains'ka derzhava, 2015a: 230). Having taken the office of the Minister of Public Education, N. Vasilenko outlined his program targets immediately and pointed out: "I did come here not to destroy, but to continue, what has already been done and I wish to expand and to enhance the development of the Ukrainian national school" (Verstiuk, 2008: 150). He put in a lot of efforts to arrange the Ukrainian national education system. This was emphasized by many contemporaries (Doroshenko, 2007: 318-319).

As a rule, professionals with extensive pedagogical and managerial experience recognized in public education were appointed as deputy ministers. For example, a process engineer, Professor I. Krasusskiy, who had occupied the position of vice-rector of the Kharkov Technology Institute previously, was appointed as a Deputy Minister of Public Education on the 27<sup>th</sup> of May. His candidacy was proposed by N. Vasilenko to the Council of Ministers, and after its approval was submitted to the Hetman P. Skoropadsky for final acceptance (Ukrains'ka derzhava, 2015a: 39).

Besides the advisory body created specially functioned under the Minister of Public Education. Officials could be appointed as members of this Council on behalf of the minister and after the approval of their candidatures by the Government. So, the former trustee of the Kiev educational district V. Naumenko was appointed as a member of this Council on the 20<sup>th</sup> of July. A bit later, on the 23<sup>rd</sup> of August, the former trustee of the Vilna educational district M. Bazarevich became a supernumerary member of this Council. And on the 1<sup>st</sup> of October two appointments took place at the same time. The former director of the Moscow Stroganov Art School N.V. Globa was appointed as a full-time member of the Council under the Minister of Education and P. Korobka was appointed as a supernumerary member of this Council (Ukrains'ka derzhava, 2015a: 167, 240, 313).

Like all ministries, the Ministry of Public Education consisted of departments – higher, secondary, primary and vocational education. F. Sushitsky and A. Leshchenko were appointed as directors of the ministerial departments of higher and primary schools accordingly. A. Vilinsky was appointed as a director of the ministerial department of vocational education, who had already an experience in managing a department in the Ministry of Education under the Government of the Central Rada, on the 5<sup>th</sup> of October 1918 (Ukrains'ka derzhava, 2015a: 286-287, 318).

The Institute of Provincial Commissars of Public Education had been existing in the Ukraine since the time of the activity of the Central Rada. It became mostly the basis of human resources for the developing system of public education of the Ukrainian State. Many persons occupied the positions of provincial commissars of public education continued to execute their functions. There were such outstanding personalities among them as V. Andrievsky, G. Stadnyuk, I. Truba,

M. Cherkavsky, K. Dmitriyuk and others. They were professional and experienced administrators and teachers, therefore the Minister N. Vasilenko was interested in retaining those employees. Eventually the Institution of Commissars was reorganized into the Institute of School Administrators in the Province (Ostashko, 2018: 189).

Considering the economic and social-political situation of the State, the material support of the officials of the education department, especially the higher and secondary level, was quite on sufficient level. In addition, on the 10<sup>th</sup> of June 1918, the annual salaries of individual officials were increased by ministries. Now the minister was supposed to earn 20.7 thousand karbovanets, his deputies – 18 thousand karbovanets each, department directors – 15 thousand karbovanets each, etc. Since the 1<sup>st</sup> of January 1919, it was planned to increase the salary to all officers of the commissariats for the Kiev, Odessa and Kharkov school districts (Ukrains'ka derzhava, 2015a: 463, 707).

The Ministry of Public Education had possibility to apply a request for provision of the families of deceased employees, who had worked in the sphere of education and science, to the Council of Ministers. For example, the widow of the outstanding Ukrainian linguist, founder of the Ukrainian scientific dialectology, K. Mikhalchuk, was provided with such assistance in the form of a one-time allowance of thousand karbovanets (Ukrains'ka derzhava, 2015a: 109). Examples of such initiatives within the period studied here were not uncommon.

The sphere of culture was also under the jurisdiction of the Ministry of Public Education. In June the General Directorate of Art and National Culture was founded under its management, and the Ministry of Public Education became the Ministry of Public Education and Arts. We will use shorter forms of the titles, like "Ministry of Public Education" and "Ministry of Education" further in our work.

The Minister of Education was responsible for the arrangement of the museum business. It was his suggestion, that the government allocated 500 thousand karbovanets to acquire antiques and art for national museums to the state property in September 1918 (Ukrains'ka derzhava, 2015a: 300). On the initiative of the Ministry of Public Education, the State Symphony Orchestra was established (on the 22<sup>nd</sup> of November 1918).

The bill about the establishment of the National Library of the Ukrainian State Fund was approved by the Minister of Public Education on the 22<sup>nd</sup> of July. It was the Minister of Public Education, who introduced the bill on the creation of the Ukrainian Academy of Sciences (established on the 1<sup>st</sup> of November 1918). So, on the 26<sup>th</sup> of July, 200 thousand karbovanets were allocated for the initial expenses planned to be spent on the establishment of the Ukrainian Academy of Sciences and 500 thousand karbovanets each on the building of the St. Vladimir University Library and the Olginsky Gymnasium in Kiev at his disposal (Ukrains'ka derzhava, 2015a: 174, 185, 341-342).

The Ministry of Public Education supported the idea of developing Ukrainian cinema actively. It was considered that it became possible to distribute various knowledge among the broad masses, including information about Ukrainian culture, history and language via cinema in effective way. State financing for this area, indeed, was not expected due to lack of funds. The government had already tried to solve this problem. In particular, they considered the opportunity of involving private entrepreneurs and public educational institutions in the development of Ukrainian cinema. At the same time, partial state funding was also planned. The creation of directors and instructors' courses in Kiev was approved only on the 30<sup>th</sup> of October, for what the State allocated about 27 thousand karbovanets (Ukrains'ka derzhava, 2015a: 642-643, 678).

In general, the performance of the Ministry of Public Education of the Ukrainian State was highly active. Although there were a lot of difficulties associated with economic and political issues, lack of professional staff etc. In addition, the ministry did not have its own official printed periodical organ through which it could distribute its decisions and initiatives to the attention of the broad public. The publication of such body called "Journal of the Ministry of Public Education and Arts" was planned by the Minister V.P. Naumenko only in the last days of the existence of the Ukrainian State. He asked for the allocation of 25 thousand karbovanets for this publication on the 5<sup>th</sup> of December. The Council of Ministers decided to review this request at one of the next meetings. But the project has never been implemented (Ukrains'ka derzhava, 2015a: 413).

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As for the policy of the Ukrainian government in the field of development of the higher education system, the steps in this direction, probably, can be assessed as the most successful and

effective. Although the Ministry of Public Education did a lot to develop the system of educational institutions at all levels, the Hetman P. Skoropadsky considered personally that Minister N. Vasilenko paid more attention to higher educational institutions and less attention to secondary and primary schools. At the same time, the Hetman admitted that, nevertheless, a lot work had been performed in this area (Skoropads'kii 2016: 150).

It should be considered that some decisions in the field of higher education were taken by the government not on timely basis, usually with a delay. For example, only on the 28<sup>th</sup> of August it was decided to rename all state universities and higher technical educational institutions of the former Russian Empire into Ukrainian state ones on the territory of the Ukrainian State. And the Nezhinsky Historical and Philological Institute of the Prince Bezborodko received the state status even later on the 20<sup>th</sup> of September (Ukrains'ka derzhava, 2015a: 255, 297).

In July the rules for admission to universities for 1918-1919 were established. Individuals of both genders, regardless of nationality, had the right to apply these higher educational institutions. Applicants were required to provide certificates or diploma of graduation from gymnasiums, real or commercial schools, teachers' institutes or other educational institutions (Ukrains'ka derzhava, 2015b: 170-171). At about the same time, on the 9<sup>th</sup> of July 1918, the Council of Ministers submitted the candidatures of three rectors elected previously to the Hetman for approval: I. Krasussky for the Kharkov Technological Institute, P. Pyatnitsky for the Kharkov University and A. Bilimovich for the Odessa University. Moreover, it was proposed to approve these people in the rector's positions "retroactively." So, I. Krasussky was proposed to be approved from the 1<sup>st</sup> of June, P. Pyatnitsky - from the 21<sup>st</sup> of April, and A. Bilimovich - from the 11<sup>th</sup> of March (Ukrains'ka Derzhava, 2015a: 135). The practice of appointing to positions backdated in the Ukrainian State was not a rare case, as we mentioned in one of our works (Degtyarev, 2018). And a new wave of appointments to rector's positions took place on the 28<sup>th</sup> of September. E. Spektorsky was approved as a rector of the Kiev University of St. Vladimir, F. Sushitsky - as a rector of the Kiev State Ukrainian University and the Count N. Musin-Pushkin - as an honorary trustee of the Nizhyn Institute of the Prince Bezborodko. At the same time, F. Sushitsky was retired from the post of the director of the Department of Higher Education, which he occupied at that time (Ukrains'ka Derzhava, 2015a: 308, 329).

A number of higher educational institutions functioned on the territory of Ukraine during the period studied. Among them there were such reputable universities as the Kiev of St. Vladimir, the Kharkov University, the Novorossiysk University (called in other name the Odessa University), and the Historical and Philological Institute of the Prince Bezborodko. The Kiev Polytechnic University, the Kharkov Technological University, the Kharkov Veterinary University, the Yekaterinoslav Mining State Institutes, the Women's Medical Institute in Kiev and other universities functioned at that time as well.

In spite of the availability of a number of technical universities in the Ukraine within the period studied, there was a problem in preparing highly qualified specialist engineers. Great importance was attached to the opportunity to gain the experience of foreign professionals. The author of the essay in the "Zemske Dilo" newspaper ("Zemskoe Delo"), referencing to the examples of the successful industry development in the USA, underlined the utility to send Ukrainian engineers and technicians after graduation to work on probation at American enterprises. He considered that the Americans were able to train Ukrainian specialists even more effectively, than the Germans. In this regard the author presumed that it was necessary to strengthen the study of foreign languages in secondary schools (especially English and German) as soon as possible (Zemske Dilo №319a: 1). Unfortunately, such exchange of experience programs did not exist during the period studied and the Government of the Ukrainian State were not able to arrange them due to the current military-political and economic situation in the country.

At the same time, the government continued to initiate and stimulate the creation and further development of new higher educational institutions, involving public organizations and local government bodies in this process. Architectural and climatic institutes were opened in Kiev, polytechnic and agricultural institutes - in Odessa (Hurzhii, Reient, 2011: 198). Already on the 9<sup>th</sup> of June, the Jewish People's University, which became the first Jewish higher educational institution on the territory of the former Russian Empire, was opened in Kiev. An outstanding public figure M. Zilberfarb was appointed as a rector of it. There were three faculties functioned at the university: natural and mathematical, humanitarian and Jewish knowledge (Ostashko, 2018: 202).

Soon on the 1<sup>st</sup> of July 1918, the Faculty of Law was opened and began to function immediately in Poltava. All listeners received the rights of students of state universities. The education was conducted in accordance with the program of the Law Faculty of the Kharkov University. Professors from Kharkov University (E. Somek-Maksimovich, M. Sobolev, F. Taranovsky, A. Fadeev, N. Yastrzhembsky) taught there as well. A. Kisilev was appointed as a dean of the faculty. Students could be of both genders. And if they wished to continue their study at the Kharkov University, they were credited with the results of examinations at the Poltava Faculty of Law (Luch No. 23a: 3).

The Ukrainian Faculty of History and Philology (as a separate independent institution) was opened with the participation of the Public Educational Organization named "Prosvita" and the material support of local state institutions (zemstvo) in Poltava on the 6<sup>th</sup> of October. The Professor of the Kharkov University E. Chernousov became a dean of it. The lecturers were professors and associate professors of the same university, including such outstanding personalities as D. Bagaliy, M. Taranushenko, V. Shcherbakivsky, N. Sumtsov. 162 students and 44 free listeners started their education at this faculty immediately (Doroshenko, 2002: 249; Shkilnyk, 2016: 378).

In the autumn of 1918, the opening of the so-called Middle East Institute was planned in Kiev, where anyone with a secondary education could enter. The education there was supposed to last 2 years. The task of the institute was "to prepare diplomatic, consular and commercial agents, private and government organizers and managers of all kinds of trade, cultural and social enterprises in the Middle East." The curriculum was to include the study of law, economics, culture and ethnography of Bulgaria, Serbia, Romania, Greece, Turkey and the languages, such as Turkish, some Slavic and other. For more deeper study of the peculiarities of the states of the Balkan Peninsula and Asia Minor, it was planned to establish an additional one-year course. The education process also was supposed to include educational and practical excursions to the Middle East under the guidance of teachers (Luch №30: 2). But this project remained unrealized.

Back in 1917, the so-called Kiev People's Ukrainian University was founded in Kiev. It operated on a voluntary basis and was funded by private donations. In beginning of August 1918, the Council of Ministers decided to grant it with the status of a state one. Since that time, it became known as the Kiev State University (Ukrains'ka derzhava, 2015a: 200-201). The appropriate law was passed on the 17<sup>th</sup> of August. A bill on the transformation of the Kiev Ukrainian People's University into the Kiev State Ukrainian University had been developed by a commission of 13 professors and 2 assistant professors settled specially for those purposes (Zavalniuk, 2008: 205).

The university was established with four faculties: history and philology, physics and mathematics, law and medicine. The scientific and pedagogical staff of the faculties was not numerous. Thus, the initial staff of the medical faculty consisted of no more than eight people (including dean and professors). All of them were appointed by the Minister of Education. The language of education was Ukrainian (it was allowed in some cases to conduct lectures in Russian). In September 1918, a partial reorganization of the Kiev Ukrainian State University took place, as a result of which the Department of Bacteriology appeared here (Ukrains'ka derzhava, 2015a: 238, 295). Professorial positions were occupied by many famous scientists and teachers: I. Ogienko, F. Sushitsky, A. Grushevsky, D. Grave, V. Luchitsky, M. Tugan-Baranovsky, B. Kistyakovsky and others at this university (Doroshenko, 2002: 243-244).

While the university had functioned as a public one, it had been allowed to various categories of students to study there. Now, the students, who did not have a matriculation certificate, were not allowed to apply for a diploma. They were obliged to obtain such a certificate before receiving a diploma of graduation from the university. Also, persons without academic degrees were not admitted teaching in this institution (Ukrains'ka derzhava, 2015b: 237).

At that time the charters and the staffing tables of the Ukrainian State universities had not yet been drawn up and adopted. Therefore, all higher educational institutions were guided in their activities by the General Charter and the staffing tables of Russian universities with later amendments to this document dated the 23<sup>rd</sup> of August 1884 (Ukrains'ka derzhava, 2015b: 237-238).

The material and technical base of the Kiev State University was poor at the initial stage of its existence. Initially, in 1919 it was planned to allocate funds for the construction of buildings and the purchase of equipment for the university. Until that moment the institution was supposed to use the premises of higher and secondary schools in Kiev in accordance with the permission of the Minister of Education. But the question of providing the Kiev State University with premises was



very acute. P. Skoropadsky personally set the task to determine the location of the university at the end of August. The proposal declared by the Council of Ministers to use the construction of the Vladimir Cadet Corps for this purpose was rejected unanimously. But there was decision made to transfer all the buildings of the Kiev Artillery School to the disposal of the university. And the Minister of Internal Affairs was given the task “to attend to the improvement of the roads, leading to the Artillery School, and their lighting and to strengthen the protection of this area as well” (Ukrains'ka derzhava, 2015a: 238, 248). As a result, the buildings of the Artillery School located on the outskirts of Kiev were assigned to the Kiev State Ukrainian University. The estate of this school included a park and six large buildings. Many guests, including Hetman P. Skoropadsky himself, members of the Ukrainian government, diplomats from Germany, Austria-Hungary, Turkey, Bulgaria, Finland attended the ceremony while the opening of the Ukrainian University. (Doroshenko, 2007: 356, 359).

Simultaneously with the foundation of the Kiev State University, the Kamenets-Podolsk Ukrainian State University was also established (Ukrains'ka derzhava, 2015a: 201-202). This institution also had four faculties. In general, this university was managed in its activities with the same rules as other higher educational institutions. The first rector, deans and all first-year professors were appointed by the Minister of Education. Professorships were occupied by scientists from Kiev, Kharkov, Lvov, Yekaterinoslav, Odessa, St. Petersburg at the Kamenets-Podolsk University (Doroshenko, 2002: 248).

Departments of Polish and Jewish literature and history were created at the Faculty of History and Philology of the Kamyanets-Podolsk University. But teaching had to be done in Ukrainian in these departments (Ukrains'ka derzhava, 2015a: 201-202, 659; Ukrains'ka derzhava, 2015b: 241). And the theological faculty was established at the Kamyanets-Podolsk University on the 1<sup>st</sup> of July although the law on this was published only on the 22<sup>nd</sup> of November. The next departments linked to the disciplines taught were established here:

- 1) Scripture of the Old Law, Theology of the Old Law;
- 2) Scripture of the New Law, Theology of the New Law, Gospel history;
- 3) History of Ancient Church Writing, Christian Asceticism and Mysticism;
- 4) History of the Ancient Church, History of the Apostolic Century, Church-Historical Geography with Chronology, Source Study, Historiography of Ancient Church History;
- 5) Comparative Theology, History of Western Churches, History and Analysis of Western Confessions;
- 6) Philosophy and Psychology of Religions and Apologetics of Overt Religions;
- 7) Dogmatic Theology and History of Dogmas;
- 8) Christian Ethics;
- 9) Hebrew Language, Biblical Archeology, Biblical Geography with Chronology;
- 10) History of the Orthodox Worship;
- 11) History of the Russian Church and Source Studies and Historiography of Russian Church history;
- 12) History of the Ukrainian Church and Source Studies and Historiography of Ukrainian Church history;
- 13) History of Sermon (Homiletics);
- 14) Biblical History and History of Eastern religions;
- 15) Church Archeology and History of Christian Art;
- 16) History of the Greek-Eastern Church;
- 17) The History of Schism and Sectarianism and the History of the Orthodox mission;
- 18) History of Slavic churches;
- 19) Patrologie;
- 20) Canon Law.

14 ordinary, 6 extraordinary professors and 6 full-time associate professors were involved in teaching these disciplines. Their number could be increased, if necessary, and was dependent on the financial capabilities of the university.

It was planned to open a law faculty at the Kamenets-Podolsk University in the future. In this case, the discipline "Canon Law" should be transferred from the theological faculty to the legal one (Ukrains'ka derzhava, 2015b: 363-364).



At the initial stage, the manor house and the three-story building of the local secondary technical school were allocated to accommodate the Kamyanyets-Podolsk University (Zavalniuk, 2008: 206). The question of the construction and arrangement of university buildings was assigned to a Commission for the construction of the Kamyanyets-Podolsk Ukrainian State University created for these purposes specially. At the same time, the Minister of Education was entrusted with the task of reaching an agreement with the Kamenets-Podolsk City Duma and the Kamenets-Podolsk Provincial Zemstvo in order, that each of these self-government bodies would allocate 1 million karbovanets for the needs of the university (Ukrains'ka derzhava, 2015a: 202; Ukrains'ka derzhava, 2015b: 241-242).

While pursuing the policy of Ukrainization in all spheres of state life, the Ukrainian studies departments were established in the state universities as formed newly as existent already. There was decision made to open the Departments of the History of Ukraine, the History of the Ukrainian Language and the History of Ukrainian Literature at the Faculties of History and Philology of the Kharkov and Novorossiysk State Universities on the 1<sup>st</sup> of July 1918. The Departments of the History of Western Russian law were created at the Faculties of Law. At the same time, two Ukrainian studies departments were established at the Nizhyn Institute of History and Philology: the Department of the History of Ukraine and the Department of the History of Ukrainian Language and Ukrainian Literature. Such departments were opened as in the Kharkov and Novorossiysk State Universities as in the Nizhyn Institute of History and Philology at the end of September (Ukrains'ka derzhava, 2015a: 303-304; Ukrains'ka derzhava, 2015b: 299, 302). Everyone, who wished to receive a master's or doctor's degree and the title of adjunct was granted the right to defend a thesis in Ukrainian language in accordance with the law dated the 27<sup>th</sup> of September.

Although, in general, thesis defense and scientific disputes were allowed to be held both in Russian and Ukrainian languages at that time (Ukrains'ka derzhava, 2015b: 298).

Since September 20 scholarships had even been appointed for the training of professors and teachers of higher schools conducted the education in Ukrainian language. The size of such scholarships ranged from 5 to 7.2 thousand karbovanets, and they were settled for up to two years. The Minister of Education personally determined a candidate for a scholarship, its size and payment period in each individual case. The fellows were not allowed to be engaged in other activities (teaching or occupying any positions). And after a two-year period, they had to pass an exam for a scientific degree or complete a thesis. At the same time, the entire period, during which the scholarship was paid, equated to the civil service in the educational sphere (in the department) (Ukrains'ka derzhava, 2015a: 607; Ukrains'ka derzhava, 2015b: 290).

The activities of some higher educational institutions were settled by special regulations of the Ukrainian government. So, a draft law related to the procedure of electing the director of the Nizhyn Historical and Philological Institute was settled in October. The position of teacher of the law was eliminated, but a new position of professor of theology was set instead. And the position of the inspector of the institute was renamed to the assistant (deputy) director (Ukrains'ka derzhava, 2015a: 659). There was a women's medical institute functioning in Kiev. The Council of Ministers presented the next rights to the institute at the request of the Council of this institution on the 19<sup>th</sup> of October: to create its own state examination committee, to admit persons with a doctor's degree to defend the degree of doctor of medicine at the institute and to issue appropriate diplomas, to confer the title of assistant professor of the institute (Ukrains'ka derzhava, 2015a: 338).

The material support of higher educational institutions was an acute issue. Huge funds were required as for the maintenance of the scientific, pedagogical and service personnel of these institutions as for their arrangement. So, the annual salaries of the employees of the Kiev University, such as an archivist, a journalist and a clerical official, were set in amount of 3 thousand karbovanets since August (Ukrains'ka derzhava, 2015a: 210). On the 16<sup>th</sup> of October the amount of 1 million karbovanets were allocated for the maintenance of the personnel of four state institutes: the Kiev Polytechnic, the Kharkov Technological, the Yekaterinoslav Mining and the Kharkov Veterinary. Another 500 thousand karbovanets were allocated for the maintenance of personnel of the next state universities: the Kiev St. Vladimir, the Kharkov, the Novorossiysk in Odessa and the Nezhinsky Historical and Philological Institute of the Prince Bezborodko. The amount of scholarships for students of the Nizhyn Historical and Philological Institute was increased in

October. The amount of 643.8 thousand karbovanets were allocated for the maintenance of lower-level employees of higher educational institutions on the 12<sup>th</sup> of November.

In October money were granted for various economic needs of the Nizhyn Historical and Philological Institute, including the development of the power grid (141.2 thousand karbovanets), 300 thousand karbovanets were allocated for the completion of the construction of the library building of the University of St. Vladimir ([Ukrains'ka derzhava, 2015a: 335, 337, 365-366, 658](#)). The amount of 2.35 million karbovanets were allocated for the maintenance of the Kiev and the Kamenets-Podolsk State Ukrainian Universities at the end of August 1918 ([Derzhavnyi visnyk №46: 2](#)).

Despite the positive results in the field of improving the higher education system, many unresolved problems remained. The reasons of them were mostly associated with the difficult economic and political situation in Ukraine. For example, already in July 1918, the lecture fees at universities had to be increased, which the Minister of Education reported to the Council of Ministers ([Ukrains'ka derzhava, 2015a: 132](#)). In addition, the population raised significantly in Kiev in 1918. Many representatives of the bourgeoisie and the nobility flocked there from those regions of the former Russian Empire that were managed by the Bolsheviks. There appeared a problem with accommodation in Kiev. In connection with that fact, students were not able to rent rooms even at raised prices. Many of them had to drop out. On this occasion the Minister of Education appealed to the Kiev City Major and the City government (called Duma) with a request "to take measures and provide immediate active assistance to students by establishing a hostel for students" ([Zemske dilo №319b: 3](#)).

It is also known that the Ukrainian State was closely connected with the German military administration through a number of contractual obligations at that time. Representatives of the Austro-German troops did not always find a common language with the local population. Conflicts between them often led to the armed clashes, German military courts operated on the Ukrainian lands, and many public figures, including employees of the education system, were subjected to groundless arrests. The Ministry of Public Education provided support to many people who worked in its department in such situations. In the beginning of August 1918, the rector of the Kiev University of St. Vladimir E. Spektorsky was arrested by order of the German authorities. This caused a violent reaction as in the public as in the highest government circles of the Ukraine. On the initiative of the Minister of Public Education, the Council of Ministers protested to the German command against the arrest of the university rector whose appointment "was made by the power of the Hetman." The protest stated that such behavior of the German command disrupted the authority of the Ukrainian government and harmed the Ukrainian-German relations in general ([Ukrains'ka derzhava, 2015a: 209](#)).

It is also worth noting that political propaganda often influenced the minds of student youth. At the decline of the Ukrainian State already, the protest (anti-hetman) action took place in Kiev on the 15<sup>th</sup> of November 1918. This action was suppressed by force of arms. There occurred victims among the youth. The next day the Minister of Education V. Naumenko made a statement that it was necessary to discuss the subject related to "the rules and the use order of armed force in general, and especially with regard to student youth in all educational institutions of Ukraine." No concrete results were achieved during the discussion. But it was decided to apply to the Minister of War and the Minister of Internal Affairs with a request "that the military units and the Sovereign Warta [analogue of the state militia/police – Auth.] were not to be entered the educational institutions without prior agreement with the appropriate educational authorities at the head of these institutions" ([Ukrains'ka derzhava, 2015a: 376](#)).

## **5. Conclusion**

To summarize the first part of our research in general, it should be noted that the policy of the government of the Ukrainian State was very productive in the field of development of the public education system. Experienced professionals were involved in this process. The work of the Ministry of Public Education, created in the first days of the existence of the Ukrainian State, was established in the possible shortest time. In our opinion, it was important that this ministry was delegated with the legislative initiative in such difficult military-political conditions existed in 1918. Thanks to that measure, many decisions were made promptly and implemented in a short time. Also, the work of local education authorities was established. The head of the Ukrainian State

P. Skoropadsky pointed himself out that "... In spite of all the mistakes that I and the government made in Ukraine, under downright catastrophic conditions, under downright natural disasters ... – Ukraine was a state with all institutions, functioning properly, with defined actions plans, with a financial budget ... "(Skoropads'kii, 2016: 255).

The Ukrainian Government's policy on the development of higher education was dynamic and successful generally. The foundation of some new universities and the development of the existing ones is a good illustration of attempts to resolve the issue related to provision of qualified personnel to various professional fields at the state level. At the same time, the Country's Leadership and the society not only realized the need to train engineers, teachers, diplomats, etc., but also recognized the important role of higher education in the formation of the Ukrainian national statehood entirely.

However, there were several external and internal factors which influenced the development of the education system in the Ukraine negatively. First of all, it was the military-political situation in which the state was in 1918 and which influenced negatively all aspects of the country's life in general and the effectiveness of reforms in the field of education particularly. It should include the dependence on the Austrian-German administration on the territory of the Ukraine, the negative impact of anti-government agitation from the Bolsheviks' and socialists' side who mostly influenced on young people (high school students, students) significantly. Also, the economic difficulties hampered certainly the overall positive transformations in higher education. Although problems associated with the process of Ukrainianization of higher educational institutions existed, they were resolved at the highest government level effectively. The Government policy was also active in the direction of arranging the quality work as in the system of primary and secondary educational institutions as in extracurricular education. This subject will be highlighted in the second of our research.

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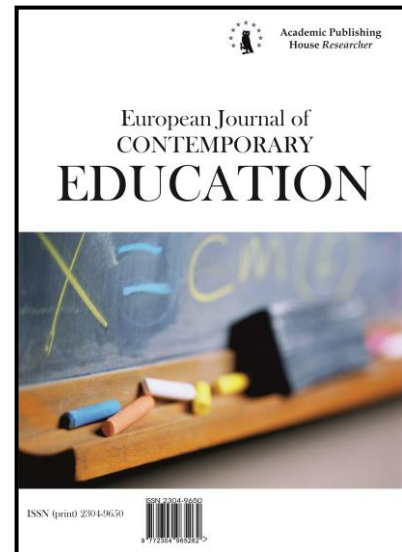
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### **The System of Public Education in Stavropol Governorate in the Period 1804–1917. Part 3**

Olga V. Natolochnaya <sup>a, b, c, \*</sup>, Ruslan M. Allalyev <sup>d</sup>, Vladimir A. Svechnikov <sup>e</sup>, Vladimir G. Ivantsov <sup>f</sup>

<sup>a</sup> International Network Center for Fundamental and Applied Research, Washington, USA

<sup>b</sup> Volgograd State University, Volgograd, Russian Federation

<sup>c</sup> East European History Society, Russian Federation

<sup>d</sup> Financial University under the Government of the Russian Federation, Moscow, Russian Federation

<sup>e</sup> Plekhanov Russian University of Economics, Russian Federation

<sup>f</sup> Sochi State University, Sochi, Russian Federation

#### **Abstract**

This work examines the system of public education in Stavropol Governorate in the period 1804–1917. The present part covers the period 1900–1917, with a focus on the regional characteristics of the development of the governorate’s network of educational institutions.

The key sources used in putting this work together are the annual Reports on Educational Institutions in the Caucasus Educational District, which provide data on the region’s schools run by the Ministry of Public Education, ‘The Most Faithful Report of the Chief Procurator of the Holy Synod on the Office of the Orthodox Faith’, and a set of documents from the Russian State Historical Archive (Saint Petersburg, Russia). Methodologically, wide use was made of the statistical method to identify a set of distinctive characteristics of the development of the system of public education in Stavropol Governorate in the period 1900–1917.

The authors’ conclusion is that the period between 1900 and 1914 was a time of prosperity for the system of public education in Stavropol Governorate. In this period, the region witnessed an immense increase in the number of secondary, lower, and, especially, primary educational institutions. In large part, this was linked with the activity of the Ministry of Public Education regarding preparation for the introduction of compulsory primary education. This activity resulted in a sharp increase in government spending on education, which would enable establishing multiple new educational institutions and recruiting the required teaching workforce. The timely completion of the project was hindered only by World War I.

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\* Corresponding author

E-mail addresses: [incfar.natolochnaya@gmail.com](mailto:incfar.natolochnaya@gmail.com) (O.V. Natolochnaya)

**Keywords:** Stavropol Governorate, system of public education, period 1804–1917.

### **1. Introduction**

Stavropol Governorate did not exist as an administrative unit at the beginning of the period under review. In the early 19<sup>th</sup> century, the region formed part of Astrakhan Governorate (the areas where Stavropol Governorate, Terek Oblast, and Kuban Oblast would subsequently be situated). Only in 1847, the region became a separate constituent unit within the Russian Empire – Stavropol Governorate. The present part of the work examines the making of the system of public education in Stavropol Governorate in the period 1900–1917. The previous part covered the period 1804–1900 (Natolochnaya et al., 2020; Natolochnaya et al., 2020a).

### **2. Materials and methods**

The key sources used in putting this work together are the annual Reports on Educational Institutions in the Caucasus Educational District, which provide data on the region's schools run by the Ministry of Public Education, 'The Most Faithful Report of the Chief Procurator of the Holy Synod on the Office of the Orthodox Faith', and a set of documents from the Russian State Historical Archive (Saint Petersburg, Russia).

Methodologically, wide use was made of the statistical method to identify some of the key distinctive characteristics of the development of the system of public education in Stavropol Governorate in the period 1900–1917. To achieve their research objectives, the authors also employed a set of general methods of research, including analysis and synthesis, concretization, and summarization. In addition, use was made of the historical-situational method to explore particular historical facts in the context of the era under study in conjunction with various "neighboring" events and facts.

### **3. Discussion**

During the period under review, Stavropol Governorate's system of public education was part of the Caucasus Educational District. The systems of public education within the Caucasus Educational District have been researched at different times by different researchers. For instance, O.V. Natolochnaya has explored the activity of mountain schools in the Caucasus (Natolochnaya et al., 2018), T.A. Magsumov has investigated the system of public education in Kars Oblast (Magsumov et al., 2018), and V.S. Molchanova has researched the system of public education in Kuban Oblast (Molchanova et al., 2019; Molchanova et al., 2019a; Molchanova et al., 2020).

In 2016, a group of researchers led by N.A. Shevchenko brought forward and tested a new system for periodizing the development of the system of public education in the Caucasus. The system involves dividing the process into the following three major periods:

1) Period 1 (1802–1834), which covers the first initiatives by the Russian government in the area of public education; in this period, the right to provide instruction to the population was granted even to Protestants;

2) Period 2 (1835–1871), which witnessed a toughening of requirements for provision of instruction in the region's educational institutions and the centralization of the educational process;

3) Period 3 (1872–1917), in which educational institutions in the Caucasus became an analogue for educational institutions in the European part of Russia; by 1917, the process of the system's making was over (Shevchenko et al., 2016: 364).

In recent years, researchers have expressed keen interest in the study of the systems of public education in various governorates within the Russian Empire. Of particular interest in this respect are the works of A.Y. Peretyatko and T.E. Zulfugarzade devoted to the system of public education in the Cossack region of the Don (Peretyatko, Zulfugarzade, 2017; Peretyatko, Zulfugarzade, 2017a; Peretyatko, Zulfugarzade, 2019; Peretyatko, Zulfugarzade, 2019a). 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). Elsewhere, O.V. Natolochnaya has investigated the system of public education in Vilna Governorate

(Natolochnaya et al., 2019; Natolochnaya et al., 2019a), and T.A. Magsumov has researched the system of public education in Kars Oblast (Magsumov et al., 2020; Magsumov et al., 2020a).

#### 4. Results

In the work's previous part, it was mentioned that by 1900 Stavropol Governorate became home to an entire network of educational institutions, which was comprised of six gymnasias, three lower uyezd schools, and nearly 1,000 primary educational institutions run by different establishments (Natolochnaya et al., 2020a: 685). The present part of the work provides an insight into the development of the region's public education system in the period 1900–1917. As in the previous part, the system of public education in Stavropol Governorate will be examined across the three of its key segments – secondary, lower, and primary.

##### Secondary education

In 1902, the Pyatigorsk Male Progymnasium was transformed into a male gymnasium (Otchet, 1905: 2). That same year, on February 11, Stavropol became home to the region's first teacher's seminary (Otchet, 1905: 253). The seminary would serve a very important purpose – providing a teaching workforce for the governorate's primary schools.

On August 30, 1905, Stavropol became home to the region's third female gymnasium (Otchet, 1908: 146), and on September 20, 1906, the region became home to a female progymnasium in the city of Georgiyevsk (Otchet, 1908: 147). A few more secondary educational institutions would be opened later on. Specifically, on October 20, 1907, the region became home to a female gymnasium in the city of Kislovodsk (Otchet, 1910: 148). In 1908, Stavropol Governorate became home to two secondary male educational institutions: on July 1, they established a real school in the city of Georgiyevsk (Otchet, 1910: 95), and on October 30, 1908, a male gymnasium was opened in the city of Kislovodsk (Otchet, 1910: 26). On September 1, 1909, the female progymnasium in the city of Georgiyevsk was transformed into a gymnasium (Otchet, 1910: 149). On August 1, 1911, a female progymnasium was opened in Mineralnye Vody (Otchet, 1910: 183). On September 1, 1912, Stavropol became home to the region's second male gymnasium (Otchet, 1914: 22). Between 1911 and 1912, the region became home to the Petrovsk Male Progymnasium, and a year later – to the Vorontsovo-Alexandrovskaya Male Progymnasium (Otchet, 1914: 22). On June 1, 1912, the region became home to the Petrovsk Female Progymnasium (Otchet, 1914: 204). On August 1, 1912, the Petrovsk Male Progymnasium was transformed into a gymnasium (Otchet, 1915: 42). On July 1, 1913, Stavropol became home to the region's first teacher's institute (Otchet, 1914: 154), and that same day the Vorontsovo-Alexandrovskaya Male Progymnasium was transformed into a gymnasium (Otchet, 1915: 42).

Table 1 summarizes the work carried out by the Ministry of Public Education\* in terms of the development of secondary education in Stavropol Governorate and displays the number of students in the region's secondary schools in the period 1900–1913.

**Table 1.** Number of secondary educational institutions under the Ministry of Public Education in Stavropol Governorate and number of students in them in the period 1900–1913 (Otchet, 1901: 6, 54, 109, 135, 166, 208; Otchet, 1905: 2, 56, 105, 134, 210-211, 274; Otchet, 1908: 8, 78, 126-127, 198; Otchet, 1910: 58-59, 78, 126-127; Otchet, 1912: 4, 80, 178-179; Otchet, 1912: 20, 68, 149, 198-199; Otchet, 1914: 42, 212, 149, 198-199)

Year	Gymnasias		Progymnasias		Real schools	Teachers seminaries and teacher's institutes	Total	Number of students
	Male	Female	Male	Female				

\* During the period under review, Stavropol had in operation one military school as well.

								Boys	Girls	Total
1900	1	3	1	-	1	-	6	1,045	939	1,984
1904	2	3	-	-	1	1	7	1,355	1,613	2,968
1907	2	4	-	1	1	1	9	1,383	1,973	3,356
1909	3	6	-	-	2	1	12	1,654	2,201	3,855
1911	3	6	-	1	2	1	13	1,766	2,538	4,304
1913	4	8	2	1	2	2	15	2,079	3,027	5,106

As evidenced in [Table 1](#), during the period under review the region witnessed a great deal of activity in terms of creation of not just gymnasia and progymnasia but specialized educational institutions for training pedagogical personnel for public schools as well. In addition, in 1904 there began a trend for the region's secondary educational institutions to be dominated by female students. This trend only strengthened by 1913.

### Lower education

Lower education in the region was represented by urban schools, tradesman's specialized schools, and tradesman's schools.

On October 7, 1901, Stavropol Governorate became home to the Sredni Yegorlyk Lower Tradesman's School ([Otchet, 1905: 453](#)). A year later, Stavropol Governorate became home to three new urban schools: on September 18 – Medvezhenskoye, on October 13 – Blagodarnenskoye, and on July 1 – Svyatokrestovskoye ([Otchet, 1905: 290-291](#)).

On July 1, 1912, a new urban school was established at the Stavropol Pedagogical Institute. Thus, at that point the governorate had in operation five urban schools ([Otchet, 1914: 342](#)).

In 1913, Stavropol Governorate witnessed the start of the process of transformation of urban schools into higher primary schools. The first school to change its status was the Svyatokrestovsk School ([Otchet, 1914: 338](#)). In 1914, there were now six such schools in the region (Blagodarnenskoye, Medvezhenskoye, Peschanokopskoye, Praskoveiskoye, Svyatokrestovskoye, and Stavropolskoye) ([Otchet, 1915: 472](#)).

[Table 2](#) provides the statistical data on the number of lower educational institutions in Stavropol Governorate in the period 1900–1914.

**Table 2.** Number of lower educational institutions in Stavropol Governorate and number of students in them in the period 1900–1914 ([Otchet, 1901: 294, 348, 456, 486; Otchet, 1905: 290-291, 356-357, 452, 453, 488-489; Otchet, 1908: 314-315; Otchet, 1910: 314-315; Otchet, 1912: 374, 392-393, Otchet, 1912: 406, 408, 410; Otchet, 1914: 406, 408; Otchet, 1915: 473, 475](#))

Year	Urban schools and higher primary schools	Tradesman's specialized schools	Tradesman's schools	Total	Number of students		
					Boys	Girls	Total
1900	1	1	1	3	413	-	413
1904	4	1	2	7	771	-	771
1907	4	N/A*	N/A	4	607	-	607
1909	4	N/A	N/A	4	589	-	589
1911	4	1	2	7	834	-	834

\* Data not available

1913	5	N/A	N/A	5	727	-	727
1914	7	N/A	N/A	7	653	184	837

As evidenced in [Table 2](#), in the period 1900–1914 Stavropol Governorate witnessed a sharp increase the number of both lower and secondary educational institutions. This growth was mainly based on the increase in the number of urban schools in the region, which rose from one to seven, or seven times. It is to be noted that the Reports on Educational Institutions in the Caucasus Educational District for 1907, 1909, 1913, and 1914 provide no information on the region's tradesman's specialized and tradesman's schools, although there *were* such educational institutions in operation in the region at the time, which is attested by the data for 1900, 1904, and 1911. This means that between 1900 and 1914 the number of lower educational institutions rose in the region from three to 10, i.e. more than three times. Based on these indirect figures, it may be possible to venture the assertion that the approximate number of students in lower educational institutions in the region at the time ranged between 1,000 and 1,100.

### Primary education

The system of primary education in Stavropol Governorate was strongly influenced by what was going on across Russia as a whole, specifically the preparatory work regarding the introduction of compulsory primary education, a process that commenced in 1908. It is to be remembered that the government's significant spending on primary education played a crucial role in terms of making education more accessible to the population. [Table 3](#) provides the data on the number of educational institutions under the Ministry of Public Education and the number of students in them in Stavropol Governorate in the period 1900–1914 ([Table 3](#)).

**Table 3.** Number of primary schools under the Ministry of Public Education in Stavropol Governorate and number of students in them in the period 1900–1914 ([Otchet, 1901: 536; Otchet, 1905: 532, 562; Otchet, 1908: 350; Otchet, 1910: 390, 392; Otchet, 1912: 448, 450, 457; Otchet, 1914: 428, 434; Otchet, 1915: 669](#))

Year	Number of schools	Number of students		
		Boys	Girls	Total
1900	242	10,825	3,116	13,941
1903	286	13,215	3,874	17,089
1904	314	14,549	4,091	18,640
1907	382	16,900	4,863	21,763
1909	389	17,442	5,238	22,680
1911	522	20,102	6,828	26,930
1913	714	22,495	9,073	31,568
1914	636	25,100	10,792	35,892

As evidenced in [Table 3](#), the number of primary educational institutions in the region increased at the time unevenly. Specifically, from 1900 to 1909, the figure increased only 1.5 times, i.e. from 242 to 389. In the period 1910–1913, the figure rose nearly two times, with only World War I reducing it somewhat based on the use of school buildings as hospitals and other facilities required in times of war. Nevertheless, this in no way reflected on the number of students in the region's primary schools, which continued to grow even in 1914. Overall, the number of students in the region's primary schools under the Ministry of Public Education rose in the period 1900–1914 nearly three times.

Of significance to the development of the system of primary education in Stavropol Governorate were also its primary schools under the Ecclesiastical Department ([Table 4](#)).



**Table 4.** Primary schools under the Ecclesiastical Department in Stavropol Governorate and number of students in them in the period 1900–1914 (*Vsepoddanneishii otchet, 1903: 66-67; Vsepoddanneishii otchet, 1909: 120-121, 128-129; Vsepoddanneishii otchet, 1910: 250-251; Vsepoddanneishii otchet, 1911: 244-245; Vsepoddanneishii otchet, 1913: 112-113; Vsepoddanneishii otchet, 1915: 122-123; Vsepoddanneishii otchet, 1916: 124-125*)

Year	Number of schools		Number of students		
	Parochial	Grammar schools	Boys	Girls	Total
1900	386	375	21,834	9,958	31,792
1904	439	336	24,217	12,489	36,706
1907	200	62	9,375	4,313	13,688
1909	252	-	9,053	4,464	13,517
1911	257	1	9,064	4,589	13,653
1913	252	1	8,931	4,820	13,751
1914	252	1	8,641	4,727	13,368

Regarding the data in [Table 4](#), it is to be noted that the data for the years 1900 and 1904 contained in the Chief Procurator's reports are for the entire Stavropol Diocese, which incorporated not only Stavropol Governorate. Only in 1907 did they begin to include in the reports separate information on Stavropol Governorate, which is what the sharp drop in the number of primary schools in the region and students in them is to be attributed to. The statistical data for the period 1907–1914 clearly indicate that, having reached its peak by 1907, the region's parochial education sector remained at the peak level until the start of World War I. The authors are of the view that there was a similar situation in the region in the period 1900–1904, although it is definite that the number of grammar schools in the region reached 100 or more.

[Table 5](#) provides the summarized statistical data regarding the development of the system of public education in Stavropol Governorate in the period 1900–1914.

**Table 5.** Number of educational institutions in Stavropol Governorate and number of students in them in the period 1900–1914 (*Otchet, 1905: 514; Vsepoddanneishii otchet, 1909: 120-121*)

Year	Secondary		Schools					Number of students
	Schools run by the Ministry of Public Education	Military schools	Lower schools	Primary				
				Schools run by the Ministry of Public Education	Private schools	Parochial schools	Grammar schools	
1900	6	1	3	242	4	Approx. 250		16,338*
1904	7	1	7	314	5	Approx. 250		22,379†
1907	9	1	4	382	N/A	200	62	39,414
1909	12	1	4	389	N/A	252	-	40,641
1911	13	1	7	522	N/A	257	1	45,721
1913	15	1	5	714	N/A	252	1	51,152
1914	15	1	7	636	N/A	252	1	50,097‡

The incompleteness of the data provided in [Table 5](#) may be attributed to the fact that these statistics were gathered by different agencies, each of which used their discretion as to which metrics to use. Specifically, from 1907 to 1914 no data whatsoever were published on the region's

\* Add to this approximately 13,000 students in the region's parochial schools.

† Add to this approximately 13,000 students in the region's parochial schools.

‡ Add to this approximately 5,000 students in the region's secondary educational institutions.

private schools. Nevertheless, it may be asserted that the central role in the development of education in the region was played by the Ministry of Public Education, while the role of the Ecclesiastical Department was confined to the niche that it had occupied since 1900.

As of January 1, 1915, Stavropol Governorate had 119,673 school-age children, with 49,245 of these going to school (RGIA. F. 733. Op. 207. D. 39. L. 2). This is a clear testimony that the region still had a long way to go before it would have a sufficient number of schools in place. Nevertheless, the scale of the work carried out in terms of the development of the region's education system in the prewar years was quite impressive. There was hope that all the work associated with the introduction of compulsory primary education would be completed on time, that is by 1918. The only thing that would thwart these plans was World War I.

## 5. Conclusion

The period between 1900 and 1914 was a time of prosperity for the system of public education in Stavropol Governorate. In this period, the region witnessed an immense increase in the number of secondary, lower, and, especially, primary educational institutions. In large part, this was linked with the activity of the Ministry of Public Education regarding preparation for the introduction of compulsory primary education. This activity resulted in a sharp increase in government spending on education, which would enable establishing multiple new educational institutions and recruiting the required teaching workforce. The timely completion of the project was hindered only by World War I.

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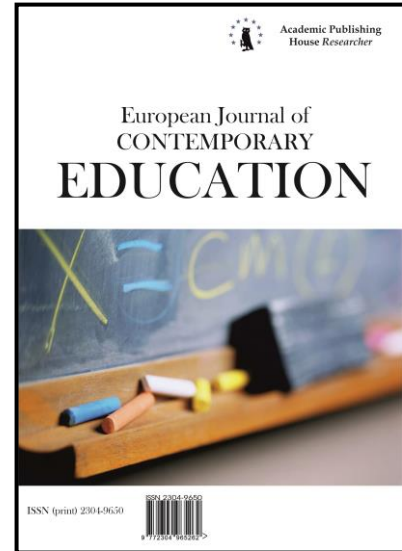
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### **On the History of the Pedagogical Thought in South Russia: Pedagogical Views of Major Pedagogues at the Novocherkassk Gymnasium in the 19th century. Part III**

Artyom Y. Peretyatko <sup>a, b, \*</sup>, Teymur E. Zulfugarzade <sup>c</sup>

<sup>a</sup> International Network Center for Fundamental and Applied Research, Washington, USA

<sup>b</sup> Volgograd State University, Volgograd, Russian Federation

<sup>c</sup> Russian Economic University named after G.V. Plekhanov, Moscow, Russian Federation

#### **Abstract**

Recent years have witnessed the publication of a variety of scholarly papers highlighting region-specific peculiarities of education in the Russian Empire. However, they tend to focus on statistical information regarding the number of schools, the number of students, etc. Therefore, theoretical and pedagogical views and unique features of the methodological work done by major provincial teachers remain poorly researched. The paper discusses the case study of the Novocherkassk Gymnasium that was the most prominent scientific and educational center in the Don region in the 19th century and that boasted a teaching personnel of renowned local figures. Remarkably, the material on the actual pedagogical process in the gymnasium was already collected before 1917, mainly in the initiative to celebrate the facility's centenary, and as many appropriate documents lacked, much attention was paid to gathering information from former gymnasium students. As a result, the knowledge of real teaching practices used in the gymnasium is based both on official documents and on oral, often critical, accounts by contemporaries of its teachers, and the group of teachers include persons who played an important role in the Don history.

The third part of the paper encompasses the period in the late 1850-1860s, when the Novocherkassk Gymnasium enjoyed a true "golden age". At the time, the institution had two teachers of national, not regional scale, the future authors of the famous textbooks, A.A. Radonezhskii and A.G. Filonov. S.S. Robush, director of the gymnasium, commanded great respect in Novocherkassk society, wrote pedagogical articles in the capital and local press and worked to publish the Don's first pedagogical journal. Each of the personalities shared a common pedagogical vision that epitomized a return to the ideas of A.G. Popov and A.G. Oridovsky about the overriding importance of the moral benefits of education, but brought forth the return through a new theoretical and practical lens. Teachers of the new generation ventured to use a conscious

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\* Corresponding author

E-mail addresses: [ArtPeretatko@yandex.ru](mailto:ArtPeretatko@yandex.ru) (A.Yu. Peretyatko)



approach to the very process of teaching, giving consideration to how and what they taught children, for the first time in Don pedagogical practice. As a result, after it had abandoned attempts to adapt to the needs of the Don Host in the training of officers and officials, the gymnasium successfully brought up specialists in a wide range of subject matter areas and claimed a leading position in the Kharkov educational district for the first time in its history.

**Keywords:** history of pedagogy, teaching methods, historical pedagogical views, Novocherkassk Gymnasium, S.S. Robush, A.G. Filonov, A.A. Radonezhskii

### 1. Introduction

In 1907, the Don Host's regional printing house published a substantial book by priest I.P. Artinskii, which described the history of the Novocherkassk Gymnasium. The author specifically emphasized in the preface that “the word ‘gymnasium’ in the title of the treatise is also defined using the adjective ‘military’, in addition to the attribute ‘Novocherkassk’” (Artinskii, 1907: V). Indeed, the Novocherkassk Gymnasium was a center of thought first for the Land and later for the Oblast of the Don Host over many years, and its graduates and teachers included the majority of Don academics, writers and public figures of the 19th century. It is hardly surprising that for the gymnasium's 100th anniversary in 1905, the local authorities made efforts to uncover and structure materials on the history of the institution. It early became clear that only few such materials survived: the gymnasium archive was damaged in fire in 1858, later its files and records were actively sold out by negligent employees, and most gymnasium directors failed to keep systematic records of their activities (Artinskii, 1907: IV). In this situation, the pedagogical council decided to ask I.P. Artinskii to help find information on the gymnasium's past, and to this end, the latter contacted Don historians and local lore experts, many of whom once were students at the institution (Artinskii, 1907: IV). The outcome of the request was Artinskii's book that was, therefore, based not only on official information, but also on the accounts provided by former students of the Novocherkassk Gymnasium.

We should say that I.P. Artinskii was not the first person whom the lack of sources on the history of the Don education prompted to use eyewitness accounts, the “oral history”, as defined by modern terminology. In 1859, a small book “Essays of the Don” by A.G. Filonov, which brought to light interesting facts from the past and present of the Don Cossacks in a somewhat haphazard manner. The last of the essays was entitled “Educational Institutions on the Don (from 1790 to 1807)” and was grounded, among other things, in the “unwritten accounts” given by several old men, of whom the author specifically singled out Esaul M.O. Nazarov, who in 1790 was accepted into the Don Principal Public School, later re-organized into the Novocherkassk Gymnasium (Filonov, 1859: 151-152).

So, we can now benefit from a fascinating first-hand source of information on the Don Host's most important educational facility of the 19th century, a center of the intellectual life of the Don Cossacks. We thought it might be valuable to systematize the available evidence of how influential figures in the Don history carried on their teaching practice in the Novocherkassk Gymnasium and what theoretical pedagogical views they conveyed. It is also noteworthy that, as we will see below, for all its major role in the region, the Novocherkassk Gymnasium was rather an ordinary provincial school for the Russian Empire, and, moreover, the one that was chronically underfunded. With our research, we will be able to take a glance at famous Don figures from an unexpected angle by reviewing their pedagogical talents, as well as to better understand what methodology served as a basis for the learning process in the Russian province of the last century.

A relevant note should be made here that historians have become markedly more interested in recent years in studying the region-specific features of pre-revolutionary education in Russia. Articles and article series on the education system development in the Vilna Governorate (Natolochnaya et al., 2019a; Natolochnaya et al., 2019b), Vologda Governorate (Cherkasov et al., 2019a; Cherkasov et al., 2019b; Cherkasov et al., 2019c; Cherkasov et al., 2019d), and in the Caucasus (Shevchenko et al., 2016) have been published in recent years. Researchers are also striving to identify features of the primary education system in the Cossack territories (Molchanova et al., 2019a; Molchanova et al., 2019b; Molchanova et al., 2020). On the other hand, the experience of individual provincial pedagogues, which was greatly appreciated by contemporaries, has received only cursory learned attention so far. However, the large number of outstanding

graduates of the Novocherkassk Gymnasium shows that the experience deserves careful examination, at the very least.

## **2. Materials and methods**

The third part of our paper focuses on the late 1850-1860s in the Novocherkassk Gymnasium, on the period that preserved the largest number of dedicated pedagogical works by its teachers. Director of the gymnasium S.S. Robush himself was the first researcher of the Don education history who devoted several articles to the topic (Robush, 1863; Robush, 1867). Teachers A.A. Radonezhskii and A.G. Filonov, later transferred to St. Petersburg, published their works in *Zhurnal Ministerstva Narodnogo Prosveshcheniya*, an edition owned by the Ministry of Public Education, which explored the peculiarities of teaching the Russian language and pedagogy (Radonezhskii, 1861; Radonezhskii, 1862; Filonov, 1856). In addition, considering the materials of this period's pedagogical councils, cited by I.P. Artinskii, which discussed not only organizational, but also issues on pedagogical theory (Artinskii, 1907: 185-194), we can confidently state that we have a vast array of materials at our disposal on theoretical pedagogical views of Novocherkassk teachers of the time, which were earlier hardly glossed over by researchers.

On the other hand, there are memoirs and even fiction works by students of the Novocherkassk Gymnasium from still available, which survived from the period starting in the 1860s to this day and describe the educational process in the institution. And here is where a novelette "Tower of Babel. History of one gymnasium" (*Vavilonskoye stolpotvoreniye. Istoriya odnoy gimnazii*), written by A.I. Kosorotov, a student at the school under review in the 1880s, particularly stands out (Kosorotov, 1900). Although this is a work of fiction, and the names of Don teachers were changed there, I.P. Artinskii took the novelette very seriously and used references to it in his official history of the Novocherkassk Gymnasium (Artinskii, 1907: 161). For this reason, the "Tower of Babel" can be regarded as a memoirs work that provides detailed portraits of Novocherkassk teachers and their teaching styles as viewed by their student.

So, we have sufficiently detailed information at last on the pedagogical theories the Novocherkassk teachers followed as well as on their teaching practices. It remains only to make the data a subject of research by using the historical descriptive method and compare them with each other by employing the historical comparative method.

## **3. Discussion**

The situation, which existed in the Novocherkassk Gymnasium in the 1850s, was reminiscent of the situation observed there in the 1810-1820s in many respects. The pedagogical stagnation meant a certain regression in the learning process itself, and, apparently, at the end of I.Ya. Zolotarev's directorship, the gymnasium faced some kind of internal crisis. First, the number of students suddenly began to go down again: after the highest figure of 295 students in the 1850-1851 academic year the gymnasium reached in its entire history, in 1851-1852, the number dropped to 261, and in 1852-1853 to 242 (Artinskii, 1907: 156). I.P. Artinskii, who, unfortunately, had few first-hand and unofficial accounts of the period in the gymnasium's history, wrote in generalities about "some ailment that afflicted the school life", which required, however, "the most urgent treatment" (Artinskii, 1907: 157). And again the gymnasium director was first in the firing line, but while in 1818, the Kharkov Educational District managed to defend A.G. Popov from the attacks by Don Ataman A.K. Denisov, in 1854 I. Ya. Zolotarev had to retire shortly after the audit of the Don educational institutions, carried out by the Inspector of Public Schools, F.L. Tyurin (Artinskii, 1907: 157).

Alas, the existing situation again showed that finding a good director for such an unconventional educational institution as the Novocherkassk Gymnasium was a very challenging matter. Another facet should be added to the background – the Don experienced growing xenophobic sentiments in the middle of the 19th century. In the 1860s, when the sentiments erupted into the surface, the deputies of the Don stanitsas (stanitsa is a village inside a Cossack Host) and local officials proposed to the Ministry of War the following laws, for example: "All positions in educational institutions are replaced by school ranks of both genders, predominantly from the Cossack estate" (Volvenko, 2014: 18). All indications were that the Don authorities wanted I.Ya. Zolotarev's successor to be a Cossack belonging to the military elite, otherwise it is difficult to justify their choice of A.A. Popov. He was already a middle-aged officer,

a son of A.G. Popov, who graduated from the Kharkov University back in the 1820s and worked as a history teacher at the Voronezh Gymnasium for several years after graduation (Artinskii, 1907: 311). From 1830, when he took dismissal from the gymnasium on reasons of ill health, A.A. Popov did not hold positions in the Ministry of Public Education, but served as an officer for special assignments under the Don Atamans for many years (Artinskii, 1907: 311). As a result, I. Ya. Zolotarev's post was inherited by a same-age peer and with rudimentary and long-outdated teaching experience on top of that. It was hardly possible to expect from him any solutions for conceptual pedagogical issues.

To make things even worse, A.A. Popov turned out to have rather a colorless personality. Almost all his characterizations found in the literature on the Don local history can be boiled down to the statement that he was the gymnasium's director (L.B., 1906: 59). The only exception was I.P. Artinskii, who described the successor of I.Ya. Zolotarev: "He was a man of a kind, gentle and sympathetic heart, but <he> did not display any decisive character or courageous initiative. Therefore, he tried above all to maintain the gymnasium in the condition and order which were established during the sixteen-year directorship of his predecessor Zolotarev" (Artinskii, 1907: 158). Finally, A.A. Popov was simply seriously ill, and when he died in 1859, holding the post of director in the gymnasium, the corresponding certificate read the following: "Colonel and Cavalier Popov suffered from <...> affluxes to the chest and abdominal organs, chronic liver blockage, shortness of breath, palpitations, dizziness, insomnia, loss of appetite, total depression of strength and exhaustion; all these seizures intensified in a progressive way and brought Colonel Popov to the utmost exhaustion (despite all sorts of medical care provided to him), in which he deceased of nervous crisis" (Artinskii, 1907: 173-174). In light of this, accusation against A.A. Popov that with his appointment, many aspects of the Novocherkassk Gymnasium's life deteriorated are hardly appropriate; the blame for this should be placed on the Don authorities that assigned for the position a Cossack who had serious health problems and lacked required competencies, but was close to the military elite.

During A.A. Popov's term, no competitions of teachers' research works were carried out, or at least we could not find any information on the activities. Although teachers filled out reports on the lessons delivered, and the pedagogical council held meetings on a regular basis, in fact, the new director, either by virtue of his illness or his placid disposition, did not even punish the teachers who conspicuously neglected their duties. Things got to the point that in the same 1859, A.A. Popov was called for by the administration of the Kharkov Educational District, which chanced upon the fact that several gymnasium teachers were "gross absentees" at their own lessons and required that "teachers' proper attendance at lectures should be carefully monitored, and in case of failure to be present, timely provision of appropriate medical certificates was strictly demanded" (Artinskii, 1907: 173). As it was the case before, the resign of the director, even if he had somewhat archaic views, was an active enthusiast and loved his work, led to dubious outcomes, and his immediate successor failed to facilitate the needed changes in the Novocherkassk Gymnasium.

But it was the period of inertia, linked to the weak director, which again saw a major renewal of the teaching staff and ideas of the new generation teachers proliferating in the gymnasium. One of these teachers was S.S. Robush, who was a significant but very unusual figure for the Don history. Having a Jewish origin "from the nobility of the Minsk governorate", he was graduated from the Kharkov University only in the middle of the 1840s, and then served in gymnasiums and schools all his life (Artinskii, 1907: 311-312). S.S. Robush joined the Novocherkassk Gymnasium as a teacher in 1850, and after the death of A.A. Popov, despite his peculiar roots, he became head of the gymnasium, emerging as its only director, of whom the local population kept memory for a long time. And we will take the liberty of citing several extensive excerpts that described the memory of S.S. Robush, the recollections of him that were preserved by Novocherkassk dwellers at the turn of the 19th and 20th century.

First of all, this point is opportune for turning to another unique source on the history of the Novocherkassk Gymnasium. One of its graduates in the 1880s, writer A.I. Kosorotov, wrote a novelette "Tower of Babel. History of one gymnasium". Although this is a work of fiction, and the names of Don teachers were changed there, I.P. Artinskii took the novelette very seriously and used references to it in his official history of the Novocherkassk Gymnasium. For this reason, the "Tower of Babel" can be regarded as a memoirs work that provides detailed portraits of Novocherkassk

teachers as viewed by their student. And the gymnasium's ex-director, M.A. Zilber, (i.e., S.S. Robush) is positioned not only as a good organizer and an outstanding teacher, but also as a near saint.

“Director Mikhail Abramovich Zilber, better known to his former students under the nickname Shmul. This nickname, indicative of Jewish origin (as well as of the tendency pertaining to all school students to give mocking nicknames), totally disagreed with either the appearance or the character of the deceased... Yes, he now reposes in the eternal slumber of a righteous man in the cemetery of the city of Razboinsk (Novocherkassk – A.P., T.Z.), and his grateful alumni, by having taken up a collection, recently built a beautiful monument over his tomb with a bronze bust and touching inscriptions. The monument was constructed recently, although the memorable patriarch passed away long ago. The situation repeated the story with the memory of many good people. After his death the good beginning he had made continued to work by itself, and so everyone felt good, and he was then forgotten. But years went by, new figures emerged with their own new beginnings – and now people looked back with a deep sigh, remembered that their life was better then, and immortalized the memory of a good person with tears of gratitude.

<...>.

For eighteen years he headed the gymnasium. I only met him in the last year of his life, but I distinctly remember his intelligent, slightly mocking face, shaved protruding lips, his voice hissing angrily when he pulled a student's ears, and his kind, smug laugh when he awarded the best student or heard a smart answer at an exam. He was the father, in the full sense of the word, of the gymnasium, who took to heart all joys and sorrows of his pupils. He had such a great love for the gifted that he often forgave them their most outrageous pranks; he felt pity for the untalented and helped them in every way; he dealt with the dissolute with his own hands right at the crime scene, but he never liked washing dirty linen in public, and he firmly believed that expelling a student from the gymnasium meant ruining him forever” (Kosorotov, 1900: 60-61).

However, S.S. Robush had opponents as well, who provided a strikingly different and an avowedly demonic characterization. In an ironic twist, the description also made it into the literature and was used by a contemporary writer D.E. Galkovskii when he depicted a typical “provincial Russian gymnasium” (Galkovskii, b. g.). The point was that a successor of S.S. Robush, D.F. Shcheglov, wrote a whole letter to K.P. Pobedonostsev, where he complained as follows: most of Russian educational institutions, instead of training “people of firm religious and patriotic views”, sought to meet local needs, to ensure “local inhabitants, zemstvo, administration and town communities were pleased with us” (Shcheglov, 2010: 4). The letter, after having been partially published by D.E. Galkovskii, earned certain notoriety, and its full version came out in 2010 in the Moskva magazine (Shcheglov, 2010). It is now even available on the Internet, where it is usually referred to as evidencing the degrading state of Russian education, which resulted from the liberal reforms of 1860–1870. And it was quite in line with the spirit of Russian nationalism of the late 19th and early 20th century that D.F. Shcheglov presented the Jew S.S. Robush as the primary mediator of detrimental ideas in Novocherkassk: “Over two and a half decades, in Novocherkassk, the director was the most prudent person (that is a person who tries as hard as he can to satisfy local needs and get along with the local authorities – A.P., T.Z.) almost in entire Russia, a Mr. Robush, a Jew by birth, as they say. This took place from the early fifties to the late seventies, amid the most dramatic progress. During his directorship, atheism was openly inculcated at classes, and he as if was unaware of this. Some strange agitators lived in the dormitory room, bringing there foreign revolutionary editions like Vperyod, Nabat, etc. And he did not notice this, and even persecuted the teacher, Mr. Polyakov, who revealed the case. As for Mr. Robush himself, monstrous things are told of him: being a teacher, he secretly, for money had students treated for syphilis (which is absolute truth confirmed by the investigation), married a protégé of the appointed ataman, a well-known lecher Khomutov, openly accepted bribes and more. And everything was fine in the gymnasium (that is its authority was unquestioned on the Don – A.P., T.Z.)” (Shcheglov, 2010: 5).

At last, the third description of S.S. Robush belongs to I.P. Artinskii. It struck, perhaps, the most sensible balance, and when compiling it, the historiographer of the Novocherkassk Gymnasium, apparently, gave consideration to the reviews of the still living supporters and opponents of the former director. However, the description creates an impression of some incompleteness, as if the historian himself hesitated over his opinion of his personage: “Based on the archival data, it can be said with certainty that he was a very shrewd director, and his



remarkable mental power, developed at the expense of his other spiritual strengths and clearly shown in his tact and in the ability to conform to conditions and circumstances, often manifested itself in his *cunning*. The latter trait in Robush's disposition was the cause for conflicting attitudes towards him and a conflicting judgment of his behavior and activities, formed by his contemporaries. The higher military and district authorities greatly appreciated the activities of Solomon Stepanovich, and he was the first director of the military gymnasium, who was awarded the rank of actual state councilor and the 1st class Order of Saint Stanislaus. Some professional colleagues of his felt distrust of him, and others were distinctly hostile towards the dictatorial director and his bossy patronage. The local society had admirers of Solomon Stepanovich in its midst, who expressed their gratitude to him by setting up a monument at his grave, in the Novocherkassk cemetery (Artinskii, 1907: 174-175).

So who was S.S. Robush, a teacher and later a director of the Novocherkassk Gymnasium? We believe that he, above all, was the first person on the Don after A.G. Oridovsky, who combined a prominent personality and a true vocation for pedagogy. We have mentioned many distinguished figures who taught between 1810 and 1840 in the Novocherkassk Gymnasium, but most of them left mark in history not through their teaching activity, far from that. Moreover, after they ended their teaching career, they showed no visible interest in further attempts to improve education. Unlike them, S.S. Robush embarked to publishing the first specialty pedagogical magazine – “Donskaya Shkola” – in the Don Host Oblast just after he resigned from his position in the gymnasium (Sazyanin, 1892: 3). Although he failed to start the undertaking, he continued to actively publish dedicated pedagogical articles in the local press (Sazyanin, 1892: 3). Interestingly, even in S.S. Robush's obituaries, his supporters could refer to any serious achievements of the deceased outside the pedagogical sphere. But, perhaps, none of the Don teachers was praised by contemporaries with such heartfelt words since the time of A.G. Oridovsky: “He was an inspired *educator* in the broad and deep sense of the word; he was a *self-denying* public figure, selfless to sacrificing his family interests; he was a *perfect* administrator and education organizer in the Don, and his name has become a powerful symbol in our area” (Kalmykov, 1892: 2). In fact, biographies of A.G. Oridovsky and S.S. Robush have many parallels, from the fact that both teachers came to the non-native Don in their young age, devoted their lives to spreading education in the Cossack community and, after their death, were rendered more honor by Don Cossacks than local teachers. We can also point out at the support of the authorities that protected the outstanding teachers from criticism from some members of the local public. It is the certain similarity of their pedagogical views that is most noteworthy considering the topic of our paper.

As we mentioned above, S.S. Robush was not only a practicing teacher, but also a pedagogy theorist who widely collaborated with journals and magazines. He was one of the first Don teachers, whose works were published by both social literary and pedagogical editions. For example, in 1863, the “Zhurnal Ministerstva Narodnogo Prosveshcheniya” (Journal of the Ministry of Public Education) featured his article “Do Don Cossacks want literacy?” (Robush, 1863). And, although the article was mainly historical and highlighted how literacy spread in the Don, some of the thoughts it contained clearly reflected S.S. Robush's general pedagogical views.

One idea which was uppermost in the views of the Novocherkassk Gymnasium's new director was that of education as the absolute good pre-requisite for the healthy progression of society. He even pronounced the specific goal of the Don education in the 1860s – “to freely deploy spiritual forces” for the “civil development of the region” (Robush, 1863: 126). This, of course, was a return to Oridovsky's ideas about the unconditional benefit of any education, but the return was a total reinvention and took place at a fundamentally different level. Considering education as the absolute good, S.S. Robush did not glorified abstract “science”, but could substantiate why Cossacks specifically need a general, mainstream and non-specialized education. Moreover, he set unequivocal priorities for its development, unexpectedly advocating that the Land of the Don Host needed women's schools first of all because while Cossacks were away at the service, “their family and household remain in the hands of mothers who, due to the lack of any elementary education, convey their children the collection of superstitions, prejudices and primitive instincts, which they themselves assimilated from their childhood” (Robush, 1863: 119). S.S. Robush summarized his discussion of the issue with a rhetorical question: “What upbringing can a child receive in this primitive superstition, in this environment of blind attachment to ceremonial formalities?” (Robush, 1863: 119). So, the central focus was again placed not on the acquisition of practical



knowledge, but on the general development of the personality, but now it was argued that the development was required to eradicate superstitions and prejudices, to break down formalistic upholding of traditions – to eliminate the factors that hindered the development of the Don region.

As for the pedagogical trends of the previous decades towards wider practice-oriented education and tighter control and regulation in gymnasiums, S.S. Robush adopted a definitely negative stance against them. For example, he condemned the initiative of 1850 to reorganize the Novocherkassk Gymnasium into a full-fledged cadet corps so that it met the needs of the Don Host. According to S.S. Robush, the reorganization would dramatically raise the cost of maintaining the new educational institution, while the benefits it could provide would be questionable (Robush, 1863: 125). And then, noting that Cossacks' hunger for education was far greater than the opportunities provided to them by the government to satisfy it, the director wondered whether education on the Don was limited because "a Cossack is a warrior, and when a warrior has been required to know anything beyond weapons?" (Robush, 1863: 125). Or, perhaps, the spread of literacy was slower than Cossacks themselves wanted because "we were preoccupied with collar insignias on the uniforms of gymnasium students?" (Robush, 1863: 125). It will also be appropriate here to quote S.S. Robush's commentary on the 1865 events, when jurisprudence and military science were erased from the Novocherkassk Gymnasium curriculum: "The Novocherkassk Gymnasium got rid of the *needless and useless burden* that was an obstacle to the successes of other, undoubtedly useful and much-needed knowledge. It can now continue its onward journey with greater ease, its true destination is now more visible – to lead the way towards general education" (Artinskii, 1907: 207).

But the most innovative and authentic feature of Robush's article was its close attention to the purely material and technical aspects of the educational process, which had no precedent in Don pedagogy. As a reminder, sporadic complaints about the "not too enviable" situation of teachers and proposals to "increase funding" allocated to the gymnasium were already voiced in the speeches of Don teachers in the early 1830s, but they were not properly elaborated on at the time. S.S. Robush, on the other hand, wrote honestly that the main and key problem of the gymnasium which persisted for a startlingly long time was the absence of its own building and the need to huddle in temporary facilities that did not meet even basic requirements. S.S. Robush emphasized that in the previous years it was the uncomfortable classrooms that made "the Don Host nobility send their children to other gymnasiums", and by the early 1860s, despite some improvement (the gymnasium was at least provided with one larger rented building instead of three small ones, scattered throughout Novocherkassk), "the cramped space and poor design of the premises exceeded any likelihood" (Robush, 1863: 117). By the way, despite his ties with the military authorities, S.S. Robush was so bold here as making very blistering attacks against them. As a reminder, money to construct a good building for the gymnasium was promised by M.I. Platov. S.S. Robush did not know of the fact but pointed out that the army made a commitment to build a gymnasium at their expense as early as in 1836 but failed to fulfil the pledge in a quarter of a century. "It is more cost-efficient for the army to rent premises for educational institutions on interest yielded by the capital that should be spent on the construction of military houses for them. But can one be guided by the calculation of interest in the matters of public education?" (Robush, 1863: 117). S.S. Robush also wrote about the "plight" of teachers in parish schools (Robush, 1863: 119), about extreme bureaucratic red tape in education management (Robush, 1863: 120) and the need for a special approach to the teaching staff in women's educational institutions (Robush, 1863: 128)...

Several years later, in 1867, S.S. Robush presented another very interesting article entitled "On public education in the Don army" (Robush, 1867). Although the article significantly repeated previous works by the Novocherkassk Gymnasium's director, he spoke in print for the first time on the way professional teachers should be trained. The relevant excerpt read as follows: "The overriding purpose of teaching is not so much about acquiring extensive information as in general mental development, in learning a practical skill of teaching, and in general in preparing teachers with more up-to-date views of the primary education" (Robush, 1867: 129). Put it differently, even when training subject-matter specialists, S.S. Robush suggested providing them with broad and universal knowledge, which they could utilize for the general development of their personality, and complementing it not so much with technical information as with practical activities within their profession. S.S. Robush further stressed that he always considered it

necessary when training parish school teachers not so much to teach them the theory of “pedagogy and didactics”, but to organize for them “classes in Novocherkassk parish schools where they could instruct pupils under the guidance and supervision of experienced teachers” (Robush, 1867: 129).

So, as a summary, S.S. Robush, like A.G. Oridovsky, was a devotee of education, committed to its as wide dissemination among Don Cossacks as possible. The gymnasium director believed that only knowledge could save the younger generation from superstition and spiritual backwardness, only a region where literate people lived could prosper and successfully develop in the modern world. On the other hand, excessively specialized education caused spiritual backwardness and was therefore dangerous. Moreover, S.S. Robush was well aware that organizing an efficient educational process required much effort and expertise. He no longer thought that recruiting teachers with qualification and even with love for their profession was enough; it was S.S. Robush, the first prominent Don teacher, who looked closer on the very process of delivering lessons in his publications and raised the issue of proper funding as vital to the existence of educational institutions.

As early as in the 1850s, S.S. Robush made efforts to build relations with people in his environment, who shared his pedagogical views. I.P. Artinskii specifically singled out two of them – A.A. Radonezhskii and A.G. Filonov, already known to us as the author of “Essays by Don” (Ocherki Dona) (Artinskii, 1907: 201). The teachers completed their studies not long ago, in the middle of the 1850s, and, what was more important, they graduated not from the Kharkov University, but from a vocational institution for teachers – the Main Pedagogical Institute in St. Petersburg (Artinskii, 1907: 324). Like their colleague and future director, not only did they work by profession, but also actively published works on pedagogy, where they demonstrated theoretical pedagogical views close to those of S.S. Robush.

Already the respect, with which A.G. Filonov spoke about A.G. Oridovsky’s personality and assiduity he demonstrated reciting the speeches of the protoiereus, are most suggestive of his pedagogical philosophy. Another indicative fact is that, as we remember, A.G. Filonov compared A.G. Oridovsky’s ideas with the “deep” and “brilliant” ideas of N.I. Pirogov, which declared that “it <was> first necessary to bring up a human, and after that train them as a soldier, professor, metalworker, diplomat, medical doctor...” (Filonov, 1859: 176). Obviously, the requirement to “bring up a human,” rather than training a dedicated specialist, also resonated with the teacher of the Novocherkassk gymnasium. But A.G. Filonov did not share the pedagogical idealism of the early 19th century, and moreover, he first came up with criticism over the professional incapacity of Don teachers at the time, which we illustrated in the first part of our paper. Finally, it was characteristic of A.G. Filonov to pay attention to the material support of the teaching process – for example, comparing teachers’ salaries in the Novocherkassk gymnasium in the 1800s and 1850, he concluded that teachers now lived in absolute poverty that affected the quality of their teaching performance. “Either a gymnasium, or money, either a position, or your life, either teaching activity, or society – choose any!” he exclaimed (Filonov, 1859: 163).

However, Filonov’s pedagogical views in the late 1850s were most clearly demonstrated in his first pedagogical article “Russian textbooks on the theory of prose writings” (Russkie uchebniki po teorii prozaicheskikh sochinenii), published by the “Zhurnal Ministerstva Narodnogo Prosveshcheniya” in 1856 (Filonov, 1856). As a reminder, at the Novocherkassk Gymnasium, a senior colleague of his, A.A. Leonov, carried out lessons on the Russian language using a very formalist approach – he taught children theory at an age when they were not yet able to comprehend it, was not interested in the content of the texts, only analyzed grammatical aspects and in general, apparently, did not give thought to whether the structure of his lessons and the textbooks used were efficient or not. A.G. Filonov, a teacher of a new breed, adopted a totally different perspective on the practical application of his profession. To achieve the best effect from his lessons, he tried to trace the “evolution of our (Russian) theory” of prose works, by reviewing both the advantages and weaknesses of all textbooks available at that time (Filonov, 1856: 1-4). In his first article, A.G. Filonov, however, only made first steps in this monumental study and limited the research object to the analysis of the textbooks from the earliest period up to the 18th century inclusive. Nevertheless, his findings completely discredited the practice employed by A.A. Leonov. According to A.G. Filonov, old textbooks suffered from a major defect – “scholasticism, the lack of legitimate, reasonable principles in the entirety of the narration” (Filonov, 1856: 60). The scholasticism meant here the excessive focus on the theoretic

representation, when “the authors, citing the words of ancient rhetors, spoke about generalities, dozens of them, about tropes and figures of speech, bringing their number to more than one hundred, instructed about periods, chrias and syllogisms only because the same theory is described by Halicarnassus, Phalernum, Cicero and Quintilian” (Filonov, 1856: 60). A.G. Filonov contrasted this speculative, dead knowledge against few “conscious characteristics” of old textbooks, i.e. the cases when their authors shifted from obsolete ancient instances to giving rules and providing examples for them, which could be efficiently put into practice in the “century when the authors of the textbooks lived” (Filonov, 1856: 60).

Therefore, the Don pedagogy in the 1850s existed in somewhat a paradoxical situation: pedagogues, who in theory advocated practice-oriented education, which, however, was very formalist in practice, were replaced by the supporters of general education that, on the contrary, had “conscious characteristics” and fitted the time. The Novocherkassk Gymnasium even initiated the development of the schoolbooks suitable for the education. It was A.G. Filonov who after having reviewed learning aids on the Russian language, was not fully satisfied with them and began to publish his own reader – “Russian chrestomathy, with notes” (*Russkaya khrestomatiya, s primechaniyami*) in 1863 (Filonov, 1863). Apparently, the reader turned out to be quite good as it had a number of reprints and receives quite positive evaluations by today’s authors (Pil’d, 2013: 82).

Another contribution was no less interesting than the creative activity of A.G. Filonov, but despite this was the undeservedly forgotten – the articles by A.A. Radonezhskii, which explored one of the milestone episodes in the history of Don education, that is the start of training professional teachers for parish schools by the Novocherkassk Gymnasium. The first article in the series, “The pedagogical department at the gymnasium in Novocherkassk” (*Pedagogicheskoe otdelenie pri gimnazii v Novocherkasske*), was published in 1861 (Radonezhskii, 1861). It was a new experience for Don pedagogy – A.A. Radonezhskii described in detail the essential role of training real educators, not just specialists in a particular area of the school curriculum, but people who were able to “play on the soul” of a child: “Proficient music teachers say, and famous artists confirm that the manner of holding the bow on the violin neck – fingers on the piano keys – ensures a singular power to their play on the instruments – why people don’t think (and whether we think?) that guiding children’s souls through first lessons in their school education is a delicate art?... Playing on the soul was not as easy as on a simple pipe, said Hamlet. Sadly, even in olden days gentlefolks assigned bad lackeys to supervise children, and we are also not picky about the choice of tutors, tutoresses and teachers, especially for primary education” (Radonezhskii, 1861: 100).

Unfortunately, A.A. Radonezhskii did not suggest a positive image of a good teacher in this article, but wrote a lot about the negative image of a bad teacher, alas, typical of the Russian Empire at the time. The negative image again contained many traits and qualities characteristic of those teachers in the Novocherkassk Gymnasium, who, like A.A. Leonov, required that children formally memorized theories disconnected with reality. Here is a description A.A. Radonezhskii gave for typical content of subjects in gymnasiums: “The very first page showed abstruse hieroglyphs: arithmetic is a study area, grammar is a study area, genitive, dative, accusative, vocative, *stol* (Nominative for table), *stola* (Genitive of table), *stolu* (Dative of table) – the tropic of Cancer, the tropic of Capricorn, the ecliptic, etc. <...>. Should we wonder after that that we burst into tears and were as scared with the school as they scared with devils, witches and other monsters? Indeed, what kind of study area is this, where there are crayfish, and goats, and cases - what kind of game is it?” (Translator’s note. Untranslatable wordplay: 1) words “Cancer” and “crayfish” are homonyms in Russian “rak”; 2) word “game” is used to translate Russian “dich” that has two meanings simultaneously expressed here – “wild animals, fish and birds hunted for food” and “stuff, nonsense, absurdity”) (Radonezhskii, 1861: 101-102). And so, instead of making it easier for children to comprehend these scholastic arts and sciences, remote from reality, teachers demanded that pupils thoughtlessly memorize them. In this regard, A.A. Radonezhskii cited an occurrence that took place with S.S. Robush, which, by the way, testifies to the cozy relationship between the director and the teacher of the Novocherkassk Gymnasium. S.S. Robush was once visited by an applicant for a teacher position, who in fact had no idea how to teach lessons. The hapless applicant refuted all arguments provided by an experienced pedagogue that it was necessary to know special teaching methods, that a child would “not understand” dark and vague explanations, with the following reply: “And if he doesn’t understand, I will whip him, and he will understand then” (Radonezhskii, 1861: 96).

However, we should not idealize Radonezhskii's pedagogical views as well. Perhaps the most controversial point in his articles was his attitude towards children. We remember certain complaints were also made against S.S. Robush in this regard: while A.I. Kosorotov approved of the director's unwillingness to bring it to public violations committed by gymnasium students, D.F. Shcheglov, by contrast, accused him of criminal negligence, that he "pretended to know" what a mess went on both in classrooms and in students' dorm apartments. And A.A. Radonezhskii's article clarifies why the director of the Novocherkassk gymnasium turned a blind eye to children's misconduct: "Submissive sitting, peace and quiet do not guarantee successes; childish playfulness is just as characteristic and excusable for the young age as grass is for the ground; things interesting to others have no meaning and are to no purpose for a child; it is not a teacher's Jupiterian importance and not the commanding attitude that unlock a door to a child's soul, but the treatment filled with motherly love, kindred and genuine affection, a family atmosphere fostered at the school" (Radonezhskii, 1861: 102). Of course, these statements looked good on paper; but they had their darker side in practice, which we will describe later.

A.A. Radonezhskii suggested a positive image of a good teacher in his article "Two years of studies in the pedagogical department at the Novocherkassk gymnasium" (Dva goda zanyatii v pedagogicheskom otdelenii pri novocherkasskoi gimnazii) (Radonezhskii, 1862). From his viewpoint, the main quality of such a teacher was willingness to learn and develop themselves, and continuously embrace new pedagogical ideas (Radonezhskii, 1862: 290). Accordingly, a good teacher was not governed by dead written rules, but was committed to a strong desire to teach a child, and relied more on practice than on theory. In this regard, A.A. Radonezhskii's experience of teaching "pedagogy and didactics" to would-be parish teachers is particularly indicative. Initially, he tried to teach pedagogy in the right way "according to the program", in the form of typical lessons, focused on such topics as "harmonious education", "Bell and Lancaster", "heuristic, academic, catechetical method" (Radonezhskii, 1862: 297). However, he quickly found out that students either did not remember such lectures at all, or understand them "with difficulty" (Radonezhskii, 1862: 297). And then A.A. Radonezhskii deliberately rejected the program verified and approved by the authorities, replacing "theoretical expatiation" in it with "practical exercises" that completely covered the remaining part of the course (Radonezhskii, 1862: 297-298). During these practical lessons, both the teacher and his students drew up plans for potential lessons, and A.A. Radonezhskii even published the most successful works. Despite being simplified to a certain degree, the plans have not been outdated to this day in their structure, and could come out in a modern magazine on pedagogy. Here is an example of how a teacher should explain the concepts of "liquid" and "solid" to the youngest children:

Me: 'Does water feel like a stone or like a tree?'

Pupils: 'No.'

Me: 'So, why isn't water a stone?'

Pupils: 'It pours.'

Me: 'What other objects can pour like water?'

Pupils: 'Wine, oil.'

Me: 'Can you pour milk?'

Pupils: 'Yes, we can.'

Me: 'What about porridge or bread, for example, can you pour them?'

Pupils: 'No.'

Me: 'Why?'

Pupils: 'Porridge is thick.'

Me: 'And milk?'

Pupils: 'Milk is fluent.'

Me: All objects: water, beer, milk and wine that can be poured because you said they are *fluent*, are called *liquids* or *liquid* objects; while a tree, stone, earth are *solid*" (Radonezhskii, 1862: 300).

Unfortunately, A.G. Filonov and A.A. Radonezhskii did not stay long in the Don region. Their pedagogical works, apparently, were appreciated by the authorities, and the teachers were transferred to St. Petersburg the former in 1864, and the latter in 1862 (Artinskii, 1907: 324). Without dwelling on their further biographies, we should only note that in them the Novocherkassk Gymnasium lost teachers, standing out not only on the regional level but visible in the all-Russian



scale, the authors of a number of successful textbooks for educational institutions (we already wrote about A.G. Filonov's reader above, and A. A. Radonezhskii compiled, for example, "Essay on the history of Russian literature" (Ocherk istorii russkoi literatury) (Radonezhskii, 1899). Nevertheless, other teachers joined the Novocherkassk Gymnasium, who might not mark their careers with such achievements, but fully shared the new pedagogical views. By tradition we will mention only some of them, in the first place, those who played a major role in the Don history.

The issues of teaching the Russian language, which were interesting to A.G. Filonov, were later addressed by a young teacher, A.M. Savel'ev. In the early 1860s, he even sent a manuscript of the "Notes on teaching Russian language and literature in gymnasiums" to the Kharkov University (Artinskii, 1907: 190). However, A.M. Savel'ev made it into the Don history as a major local historian and the author of the book "Tercentenary of the Don Army" (Savel'ev, 1870). An even more renowned local historian was S.F. Nomikosov, author of "The statistical description of the Don Army Region" (Nomikosov, 1884). He worked as a teacher at the gymnasium for a very short time, and, apparently, did not show much interest in pedagogy, but the style of his lessons was totally in line with the new demands. S.F. Nomikosov succeeded in arousing a love for geology in one of the most outstanding graduates of the Novocherkassk Gymnasium in its entire history, a geographer and explorer, I.V. Mushketov. "In the gymnasium, influenced by teacher Nomikosov, who taught natural science and enthralled his students with diverting stories, I.V. Mushketov began to create a collection of minerals and rocks," V.A. Obruchev, already a student of I.V. Mushketov and another great Russian scientist, wrote (Obruchev, 1962: 54-62). Finally, A.I. Kosorotov singled out "a teacher of religion, Father Hypatius" in his "Tower of Babel," and according to I.P. Artinskii, the character depicted priest I.G. Fesenkov, who taught the law of God in the gymnasium since 1855 (Artinskii, 1907: 161). The reader saw "Father Hypatius" as "exceptionally strict" in appearance, but an intelligent and kind priest who, when children were tired of "a multitude of Church Slavonic texts and abstract theological discussions," could dilute the biblical morality with a simple but suitable example from real life (Kosorotov, 1900: 63-64). A.I. Kosorotov's portrait of the teacher contains particularly interesting features – although some of the old priest's utterances seemed rather inappropriate (for example, his insults of children or complaints about the abolished physical chastisements), his masterly grip on the class's mood and his kind attitude towards pupils were clearly visible. For example, when a child in the back of the classroom tried to anonymously play a joke on "Father Hypatius", he beguiled the offender into coming to the blackboard, but instead of a real punishment he called the offender a "fool" "with a smile" and shamed not him, but the class that were equally willing to laugh at both, the teacher and their mate (Kosorotov, 1900: 65-67). We think this is an excellent illustration of the "family atmosphere" that, according to A.A. Radonezhskii, should prevail in a school: "Father Hypatius" in the "Tower of Babel" looks more like the children's elderly relative than a real teacher, a grumpy but loving grandfather, preaching at young people for their own good, but, alas, without any respect for personal boundaries. This impression is also confirmed by A.I. Kosorotov's general conclusion: the old teacher of the law, who not only calls children "fools", but also a "flock of donkeys," is positioned as a person who surprisingly "loves very much and understands pupils" (Kosorotov, 1900: 61).

However, "old school" educators, supporters of formalist scholastic teaching methods, still had strong positions in the Don region even as late as in the 1860s. A.A. Radonezhskii with sadness in his tone provided a story of one of his students who became a teacher at a stanitsa parish school. Having "more or less novel ideas about primary education," the young pedagogue tried to make the learning process more interesting for children, and designed his reading and writing lessons using literary texts from new readers (Radonezhskii, 1862: 390). However, this provoked the indignation of senior teachers, who were exasperated by the fact that in the classroom children analyzed some "fables" instead of the traditional "psalter and book of hours," and argued that such interesting studies would only produce "nothing but trifles" (Radonezhskii, 1862: 390).

Proponents of the old views could be met not only in parish schools, but in the Novocherkassk Gymnasium as well. We mentioned more than once the example of A.A. Leonov, a teacher of the older generation. However, young graduates of the Kharkov University also included some devotees of the formalist scholastic method of teaching. The group also features at least one outstanding Don Cossack, I.P. Pryanishnikov. He compiled the first collection of documents on the Don history (Pryanishnikov, 1864) and also was a very conservative public figure who urged to preserve Don traditions (Dontsy, 2003: 418-421). It was I.P. Pryanishnikov, who, despite his young



age, stood up against most Novocherkassk teachers to defend A.A. Leonov's views that the theory of language should be taught already in primary school, and the content of the texts studied at Russian lessons was of no importance at all (Artinskii, 1907: 193-194). I.P. Pryanishnikov demonstrated even more formalism in teaching geography. A detailed critical commentary of I.P. Pryanishnikov's lessons made by his colleagues has survived to our time. It is a revealing insight into the progressing pedagogical views of Don teachers, and we should have a closer look at it.

First of all, I.P. Pryanishnikov was attacked because he totally discarded pupils' mental development when he began the study of geography in the first grade with the so-called mathematical geography, and young children were absolutely "incapable of elevating themselves" "to the abstract provisions" of the science (Artinskii, 1907: 192). Alternatively, I.P. Pryanishnikov was advised to teach physical geography, i.e. to study with children the same phenomena of climate change and varying day and night lengths in different parts of the Earth, but consider them "as facts," with a focus on entertaining, not on mathematical explanations (Artinskii, 1907: 192). It was pointed out to I.P. Pryanishnikov that mathematical geography would anyway be studied in the last, seventh grade, and only by that time students would grasp the conceptual apparatus required to understand the discipline; for first grade children, giving strictly systematized theoretical knowledge was not essential – it was more important to excite their curiosity with "picture-like" descriptions, "bringing a whole world of new ideas into the mindset of children" (Artinskii, 1907: 192). However, I.P. Pryanishnikov argued with other teachers even about the textbook – while the majority considered Obodovsky's textbook "unsuitable" for teaching in principle, the young geography teacher called it the best one for its "comprehensiveness and strict system" (Artinskii, 1907: 192). Thus, at the turn of 1850-1860, the Don witnessed a full-blown clash of pedagogical schools for the first time, in which the old, scholastic, formalist approach collided with the new one that prioritized the needs and capabilities of a child. The old school was not prepared, as it was the case in the 1830s, to simply withdraw, allowing young pedagogues to put their ideas into practice; there was no unity in the Novocherkassk Gymnasium on how and what to teach.

At this point, S.S. Robush, who laid the foundation for the gymnasium's future prosperity under his leadership, made one of his main achievements – he organized "pedagogical conversations" at pedagogical councils: at these councils, teachers now discussed not so much formal issues of missed classes, punishment of hooligans, etc., but argued about the best formats to conduct lessons (Artinskii, 1907: 183). Although the initiative was put forward by the Kharkov educational district, S.S. Robush managed to make the pedagogical councils informative and engaging even from the point of view of a modern teacher. Participants discussed, for example, issues of introducing special tutorship by teachers for individual classes; holding the attention of students at lessons; creating a unified teaching system for Russian and foreign languages (Artinskii, 1907: 184). Apparently, these "pedagogical conversations" served as a forum where teachers of the new generation gave a decisive battle to their more conservative colleagues.

"Unconsciously memorizing countless rules and exceptions using Vostokov and Grech grammars, in my opinion, is not helpful at all in learning the native language. It is a common situation when a pupil confidently recites a grammatical rule and all the exceptions to it, but becomes confused when you ask him to provide some examples to illustrate the rule he told. In the mind of a child, the Russian language, he can speak quite fluently, and some grammar of Vostokov are two totally different worlds that have no relation to each other," A.M. Savel'ev attacked A.A. Leonov and I.P. Pryanishnikov (importantly, all three participants in this debate are prominent Don regional historians of the 19th century, and it never even occurred to anyone before to study their disputes in the aspect of finding the best methods to teach Russian (Artinskii, 1907: 185). For example, a history teacher, A.S. Zmiev also came under criticism from his colleagues – he defended the traditional program that offered to begin the study of the past with a general theoretical overview concentrated on antiquity: "It will be much more valuable for the Russian youth if we, above of all, introduce them into such events in the Russian history that affected the life of the Russian people, instead of telling them all these tales and stories about Semiramises, Egerias and others, to which teaching history in the third grade of the gymnasium is mostly limited. The spirit of the century and the physiognomy of the Russian people will be represented in the imagination of a Russian pupil based on the stories about major events and figures from the Russian history, and the power and liveliness of the narration can enchant a child's attention and instill sympathy for the native country in a child's heart" (Artinskii, 1907: 193).

Summing up the episode with “pedagogical conversations”, we should note that one of them discussed a project to significantly increase the number of hours for teachers, and probably, the reason was to improve their salaries (we should remind that A.G. Filonov complained about teachers’ unbearable poverty). However, most educators decided that poverty was a lesser evil compared to the prospect to turn into “a machine that perpetually repeats the same wheel circle until it is completely worn out” (Artinskii, 1907: 194). The actual citation of their verdict on the issue was as follows: “For a teacher to be able to deliver his subject for the benefit of the institution and fulfill all duties required of him by modern pedagogical literature, he should have no more than 12 lessons or 15 hours per week. Only with this number of lessons, a teacher has enough time to take up self-improvement; only then he is able to keep pace with research and look for ways to better and more easily communicate the results of his pedagogical efforts, to produce beneficial impact on the mental and moral development of his students; only then there will be fewer attacks on the imperfections of our teachers and the lack of initiative of secondary educational institutions” (Artinskii, 1907: 194-195). In reality it was not possible to keep the teaching load at 12 lessons per week, but in cases where the load was higher than 20 hours, S.S. Robush requested his superiors to provide one more teacher (Artinskii, 1907: 199).

There are indications that the ideas of new teachers about the need for a “family atmosphere” in education, about a special, individual approach, adapted to each child’s needs, gradually prevailed. This is how S.S. Robush characterized the teaching staff of the Novocherkassk Gymnasium in the middle of the 1860s: “A happy union of capable and energetic people, committed to the same strong principles” (Artinskii, 1907: 209). However, the practical outcome of the implemented “strong principles”, i.e. the new general pedagogical views of Novocherkassk teachers, was rather unconventional, although many students appreciated it. A.I. Kosorotov gave the following description to it: “Why, in fact, was the described period (the period when the gymnasium was run by M.A. Zilber/S.S. Robush – A.P., T.Z.) was patriarchal in its nature? Because of these family-like relations. Educators took the kids as they were born, and looked on them as little savages who were more disposed to do silly things than anything worthwhile. As a result, it was such a joyous event when a little savage, beyond all expectation, showed aptitude for culture at a particularly happy moment; on the contrary, if he worked a nasty prank at some inappropriate time and place, then, without much chagrin, they rubbed his nose in it, like a puppy, so that he felt no desire to do it next time. This system, of course, fell far short of the ideal. However, I don't know about others, but I can find a lot of good in it” (Kosorotov, 1900: 67). So, the Novocherkassk pedagogues indeed fully imbibed A.A. Radonezhskii's idea that “submissive sitting, peace and quiet do not guarantee successes,” and tolerated childish pranks, hoping that education would be useful even for the most incorrigible students. Unfortunately, this resulted not only into good-humored insults of pupils by some teachers, but also, what was much worse, into extremely low requirements for gymnasium students. As a consequence, they also grew to consider themselves as “savages”, and the policy of permissiveness set in in the classes over time, which roused the indignation of D.F. Shcheglov.

But this happened after S.S. Robush completed his directorship term. On the contrary, the situation with behavior and discipline somewhat improved and became more stable when he managed the gymnasium, judging by what I.P. Artinskii wrote. Mechanisms to maintain order in the gymnasium, which lost some of their efficiency under A.A. Popov, were restored. For example, right at the first pedagogical council chaired by S.S. Robush, the new director highlighted the issue of the need to “preserve proper order and silence among students” by reducing the number of breaks and prohibiting teachers to leave classrooms during lessons to fetch textbooks from the library (Artinskii, 1907: 175). During A.A. Popov's directorship, as we remember, teachers so frequently skipped classes that the breach was even noticed by the administration of the Kharkov Educational District, while under S.S. Robush's leadership, skipping dropped dramatically, and each teacher, if he had to be absent at his class, provided a good reason (Artinskii, 1907: 209). S.S. Robush tightened control over the students both in quantity (the number of inspectors who supervised teachers’ presence at lessons was increased from one to two (Artinskii, 1907: 216), and in 1867 two more class teachers were recruited for the gymnasium staff (Artinskii, 1907: 227), and in quality – in 1868, special rules “on disciplinary measures for students of the gymnasium” were introduced for the first time (Artinskii, 1907: 229). The only point was that in the view of those who supported harsh discipline, S.S. Robush's general concept of enhancing control over students was

wrong: the director and his teachers strove to achieve not the strong discipline, but rather to raise children's awareness of their mistakes and ensure their rectification (it is appropriate here to remind of "Father Hypatius," who called the prankster "a fool" and explained his silliness to him, but refrained from any disciplinary action). The gymnasium's official documents enshrined the idea in the following way: "When determining a disciplinary measure for a student, one should not so much try to punish him for his offense as to rectify his morality through remonstrances" (Artinskii, 1907: 229).

As a result, the Novocherkassk Gymnasium took the lead in the Kharkov Educational District for the first time in the institution's history. In 1865, District officials qualified the gymnasium's performance as "most satisfactory" and attached to the opinion excellent attestation documents of some of the teachers, of which we will cite only those concerning the figures mentioned above (Artinskii, 1907: 209). "Teaching the Law of God was entrusted to an experienced mentor, a priest, Master Ioakim Fesekov, whose pedagogical talent was already appreciated by the Novocherkassk society thanks to his essay published in 1864, "Explanation of the first commandment of the Law of God" (Artinskii, 1907: 209). "Based on pupils' comprehensive answers on the subject of Russian Language and Literature, I had time to learn more about the very essence of Savel'ev's teaching practice (Senior Teacher of Russian Language and Literature). The practice can be called exemplary in all respects. Each subject area is explained using the historical method; students were introduced to all classic works of ancient and new Russian literature – as it was found out at the test – under the direct guidance of their teacher" (Artinskii, 1907: 210). In 1866, the gymnasium was audited personally by the Educational District Trustee, K.K. Voigt, who concluded that the absolute majority of subjects were taught in an "appropriate", "strong" and "scientifically grounded" manner (Artinskii, 1907: 224). The only exceptions in the opinion were history, which was delivered only at a "satisfactory" level (children knew facts, but could not analyze them), and political geography in which performance did not stand up to any criticism ("one of the students with good grades was unable to answer a single question" (Artinskii, 1907: 224). The last but not the least, in 1867, D.A. Tolstoy, Minister of Public Education, stated in plain terms that "the Novocherkassk Gymnasium was one of the best gymnasiums in the Kharkov Educational District, both in its curriculum and student performance" (Artinskii, 1907: 228).

Since the paper is not intended to describe the history of the Novocherkassk Gymnasium, we will not list all the successes it achieved in the 1860s. We simply note that it was the institution's booming time. The number of students increased to 582 by 1871, which means it actually doubled in twenty years (Artinskii, 1907: 234). Its graduates include many eminent personalities. We have already written about I.V. Mushketov, I.V. Timoshchenkov and F.K. Trailin, famous researchers of the Don, studied at the gymnasium's pedagogical department. The importance of these personalities is already confirmed by the fact that they were featured in monograph of a renown historian N. A. Mininkov several years ago (Mininkov, 2016: 10, 14). The last graduates at the department of oriental languages, predictably closed up under S.S. Robush, included P.M. Vlasov, the Russian Empire's future ambassador to Persia (Artinskii, 1907: 212). Interestingly, P.M. Vlasov had a significant impact on the history of Russian diplomacy in general, as he headed the first diplomatic mission of the Russian Empire to Ethiopia (Artamonov, 1979: 27).

Nevertheless, it is apparent that S.S. Robush, besides being a prominent educator, was also a resourceful official who knew how to exaggerate the already impressive achievements of the Novocherkassk Gymnasium. Probably, during his directorship, inappropriate behavior and disciplinary violations among students were covered up and their grades were inflated by the staff. According to I.P. Artinskii, the critical event, which brought the dubious situation in the gymnasium to light, happened just in 1870. First, a senior pupil inadvertently killed a child with an "accidental" gun shot (Artinskii, 1907: 237). The story might have been attributed to an unhappy combination of circumstances, but then Novocherkassk Gymnasium graduates disgraced themselves by failing admission exams to the Moscow University: 6 out of 14 applicants, including one who finished the school with honors, showed outrageously weak knowledge (Artinskii, 1907: 237). The university administration reported the incident to D.A. Tolstoy, who personally required to take action on the incident, but 1871 continued to witness scandals related to the Novocherkassk Gymnasium: the same Moscow University complained to the minister that out of 11 worst works on the Russian language, written by applicants, 5 belonged to graduates of the Novocherkassk Gymnasium (Artinskii, 1907: 237-238). But it is the Russian language teaching practice

implemented by A.M. Savel'ev, in line with the new pedagogical ideas, that the entire Kharkov Educational District was especially proud of!

So, once again, the pedagogical theory of the Novocherkassk Gymnasium teachers had initially produced a major positive impact and then started to lose their relevance, proving to be a barrier to further progression of the Don education. However, this time there was no internal contradiction in the outdated pedagogical views: S.S. Robush and his supporters believed "patriarchy," "domesticity," a kindly treatment of students, lenient marking and covering up their misconduct were quite acceptable. Moreover, justifying their actions, teachers could refer to the truly remarkable successes of the gymnasium it achieved in the 1860s. But the Ministry of Public Education was not prepared to tolerate the unconventional environment that was cultivated in the Novocherkassk Gymnasium. What was worse, after S.S. Robush's resignation, it became clear that the educational process efficiency largely relied on the director's charisma and the willingness of spoiled students to listen to his opinion. Unfortunately, S.S. Robush should leave the gymnasium sooner or later, and following this another conflict was to be expected between the older generation teachers, committed to "patriarchy", and their younger colleagues.

This time, the controversy, caused by the teachers' opposing pedagogical views, was so deep as to inflict irreversible damage on the gymnasium, which it never fully repaired. We will review this period in the last, ending part of our research paper.

#### **4. Conclusion**

The "golden age" of the Novocherkassk Gymnasium in the 1860s was brought about by the shift in the pedagogical views of its teaching staff. The change was indeed revolutionary at its heart when the ideas of the previous generation of teachers – I.Ya. Zolotarev's concepts of practice-oriented education – were completely rejected to pave the way for a return to the ideas of A.G. Oridovsky and A.G. Popov, brought into being at a fundamentally new theoretical and practical angle. The Novocherkassk Gymnasium was perceived by its employees as the Don Region "leader in general education," as a full value educational center for the entire Don, as a place for training teachers and nurturing educated Cossacks, capable of eradicating the superstitions and archaic traditions that were still alive in stanitsas.

The advances of the new generation teachers, champions of new pedagogical ideas, were also linked to the fact that a whole constellation of outstanding pedagogues were brought together in the Novocherkassk Gymnasium at the time. S.S. Robush, director of the gymnasium since 1859, was the first true "educator activist" on the Don after A.G. Oridovsky, who was more than a good teacher and school administrator – he was a person genuinely passionate about spreading knowledge among Cossacks. He first tried to publish a pedagogical magazine in the region, he launched a school for parish teachers in the gymnasium, he advocated women's education among Cossacks. The very fact that grateful alumni built a monument to a director with Jewish origins in rather xenophobic Don Host Oblast testified to the tremendous respect he commanded at least in some part of the local public. A.A. Radonezhskii and A.G. Filonov were educators of the national level. They worked in the Novocherkassk Gymnasium only for a short time, but seemed to play a major role in translating new ideas to its teachers. While teaching in the Novocherkassk Gymnasium, A.G. Filonov began to compile one of the most well-known anthologies of Russian literature of the second half of the 19th century. These prominent figures were followed by people who made less significant contributions to pedagogy: "exemplary" teacher A.M. Savel'ev, I.G. Fesenkov, who greatly influenced students, and others. The fate of the old school ideas was sealed not only because they outlived their usefulness and reached the limit of their potential in educational terms; A.A. Leonov and I.P. Pryanishnikov, who struggled to defend them, were clearly less good teachers than supporters of the new trends. To the credit of S.S. Robush, he managed to set up a really valuable debates among teachers in the Novocherkassk Gymnasium in the format of "pedagogical conversations" during pedagogical councils, which helped the entire teaching staff gradually embrace new ideas. I.Ya. Zolotarev once succeeded in enlisting bright personalities and prominent local researchers to teach in the gymnasium; S.S. Robush achieved even more – the gymnasium received qualified educators during his directorship.

In the late 1850-1860s, a lot of teachers with diverse pedagogical views worked in Novocherkassk, and as they had no single recognized leader, systematizing their ideas is not an easy task. We would, however, venture to suggest the following paradigm:



1) Education is an immanent value and is pre-requisite for the comprehensive development of society. So, the fast “civil evolution of the region” is impossible without promoting literacy (S.S. Robush).

2) Education should be general without excessive technical focuses. It is crucial “not so much to acquire extensive information as to ensure general mental development” (S.S. Robush).

3) Education needs teachers with relevant training who can understand children and are able to awaken their interest in subjects. “Guiding children's souls through first lessons in their school education is a delicate art” (A.A. Radonezhskii).

4) In the middle of the 19th century, the key issues of Russian education were its excessive scholasticism and theoretical nature. “Unconsciously memorizing countless rules and exceptions using Vostokov and Grech grammars, in my opinion, is not helpful at all in learning the native language” (A.M. Savel'ev).

5) On the contrary, a starting point for a good teacher should not be theory, but practice, and the instructional power should be based not so much on speculative knowledge as on the interests and desires of students. “Things interesting to others have no meaning and are to no purpose for a child; it is not a teacher's Jupiterian importance and not the commanding attitude that unlock a door to a child's soul, but the treatment filled with motherly love, kindred and genuine affection, a family atmosphere fostered at the school” (A.A. Radonezhskii).

6) Finally, the material support of the educational process and a teacher's needs were recognized among top priorities. The biggest risk for a teacher was believed to be the possibility to become a “a machine that perpetually repeats the same wheel circle until it is completely worn out,” to satisfy the desire to receive a decent salary (the entire pedagogical council of the Novocherkassk Gymnasium).

Of course, we can look on these statements as “general phrases repeated from time immemorial” (as a reminder, we wrote in the first part of our paper that this was the characterization given by N.A. Dobrolyubov to A.G. Oridovsky's pedagogical speeches). However, in our opinion, the importance of these basic statements is often forgotten in education even today. At any rate, they ensured the success of the Novocherkassk Gymnasium – the school quickly increased enrollment, its pupils included outstanding figures, the gymnasium earned indisputable authority in the local society.

It was the informal atmosphere and kind attitude towards children that played a cruel joke with the Novocherkassk Gymnasium. In 1870, the facts of lenient marking were revealed, which drew severe criticism from the Ministry of Public Education. In addition, it became clear later that the discipline was built in the gymnasium on the students' respect for the director and some of the teachers, and this created a precondition for a serious crisis if the people left the school. Finally, the beneficial potential of the ideas of S.S. Robush and his followers was drained by the 1870s, but young teachers, mediators of new pedagogical views, were flung into the worst conditions for the entire 19th century to implement their concepts – the Novocherkassk Gymnasium's development ground to a halt, but the local society held it in such great respect that wanted to see no changes.

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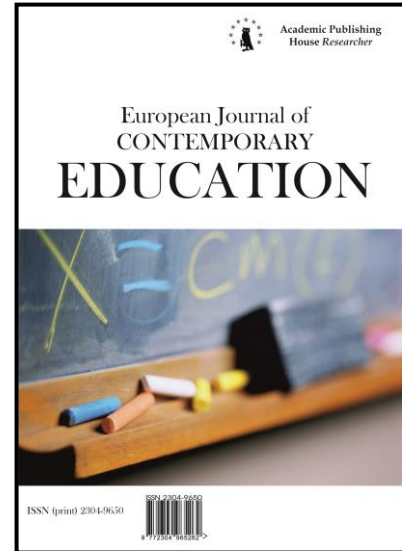
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## The Charter of Saint-Petersburg Mining University as a Historical and Cultural Document

Daria A. Shchukina <sup>a,\*</sup>, Natalya A. Egorenkova <sup>a</sup>, Olga N. Bondareva <sup>a</sup>,  
Sheila Vieira de Camargo Grillo <sup>b</sup>

<sup>a</sup> Saint-Petersburg Mining University, Saint-Petersburg, Russian Federation

<sup>b</sup> Universidade de San Paulo, San Paulo, Brazil

### Abstract

This article presents the results of the analysis of the first two Charters of Saint Petersburg Mining University. A short period of educational activity of the first higher technical educational institution in Russia is represented: from the date of the decree founding the Mining School in 1773 and the first Charter approved by Catherine II to the beginning of the XIX century, namely, 1804, the year of the second Charter. These documents are considered in their cultural and historical context, and the continuity in the implementation of education and training of mining engineers is revealed. Authors compare the Charter of the Mining School (1774) with the Charter of the Land Gentry Cadet Corps (1766), as well as the Charter of the Mining Cadet Corps (1804) with the Charter of Moscow University (1804). The Charters of the last third of the XVIII – early XIX centuries contain objective information about the formation of the higher education system in Russia. The origins of two branches of higher education in Russia, classical University and higher technical educational institution, are indicated. Within the framework of the examined texts, a range of topics and issues discussed in the Charter as in organizational and legal document is highlighted. Universal character of the Charter as a document of its time, including a description of various aspects of activities of the educational institution, is noted. Analysis of the texts showed that Charters of the Mining School and the Mining Cadet Corps determined the life order of a closed educational institution. At the heart of its work was the task of educating a new person for a state service. All this allows us to consider the Charter as a historical and cultural document of a certain period.

**Keywords:** statute of the St. Petersburg Mining University, St. Petersburg Mining school, St. Petersburg Mining Cadet Corps, Land Gentry Cadet Corps, Moscow University, higher

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\* Corresponding author

E-mail addresses: [dshukina@yandex.ru](mailto:dshukina@yandex.ru) (D.A. Shchukina), [donkip@yandex.ru](mailto:donkip@yandex.ru) (N.A. Egorenkova), [olga\\_bondarewa@mail.ru](mailto:olga_bondarewa@mail.ru) (O.N. Bondareva), [sheilagrillo@uol.com.br](mailto:sheilagrillo@uol.com.br) (Sh. Vieira de Camargo Grillo)

education in Russia in the last third of the XVIII – early XIX centuries, educational ideal of the late XVIII – early XIX centuries.

### 1. Introduction

Saint Petersburg Mining University, the first higher technical educational institution in Russia, will celebrate its 250<sup>th</sup> anniversary in 2023. This educational institution has played an important role in the history of Russian culture and education. Due to the fact that the activities of the University are regulated by the Charter, it is worth to consider the two Charters of the Mining University (1774, 1804) and to compare them to the documents of other educational institutions of the same period.

According to the interpretation of the Comprehensive normative dictionary of modern Russian language, a charter is a set of rules that establish the procedural arrangements or application of something; a set of provisions that determine organization and operation of an institution, the rights and obligations of its members ([Kommentarii k Federalnomu zakonu.., 2007](#)).

Following the common classification of official business documentation, a Charter belongs to the category of organizational and legal documents of the administrative sub-style ([Shchukina et al., 2011](#)). The Charter of an educational institution characterizes the features of the corporate culture of a particular organization.

### 2. Materials and methods

The published texts of the charters of higher educational institutions in Russia in the last third of the XVIII – early XIX centuries: published in a separate imprint – the Charter of the Imperial Land Gentry Cadet Corps (1766), the Charter of the Mining school (1774) and published in the Complete collection of laws of the Russian Empire (PSZRI) the Charter of the Mining Cadet Corps (January 1804) and the Charter of The Imperial Moscow University (November 1804) served as the material of this research.

When preparing the article, the authors used the following methodological principles: historicism, consistency and objectivity. Due to the synthesis of these principles, the model of functioning of the Charter of a higher educational institution as a cultural and historical document was presented.

The method of comparative analysis was chosen as the main method for studying the selected texts. The texts of charters as official-business style documents were compared according to the following parameters: document structure, content, and language. Within the framework of the studied texts the range of topics discussed was highlighted and coincidences and differences in the transmission of basic information were revealed.

The [Table 1](#) shows the main formal and substantive characteristics of the analyzed documents.

**Table 1.** The main formal and substantive characteristics of the analyzed documents

The Charter	The publication date	The structure of the Charter	Organization of educational activities	Mission
the Charter of the Imperial Land Gentry Cadet Corps	1766	Ten chapters	Five ages (three years each)	Teaching military and civil science to a cadet and educating him in a manner befitting his rank.
the Charter of the Mining school	1774	Introduction, four parts, conclusion	Seven classes (mathematical, surveying, chemical, mechanical,	“Zeal for the service to the Fatherland and love for the benefit

			mineralogical, physical, drawing)	of it.”
the Charter of the Mining Cadet Corps	January 1804	45 articles	Three age classes (lower, middle, and upper)	Providing engineering personnel for mining enterprises.
the Charter of the Imperial Moscow University	November 1804	16 chapters, 187 paragraphs	Four faculties (moral and political sciences, physical and mathematical sciences, doctors' and medical sciences, and verbal sciences)	Preparation for entering the civil state service.

The history of the formation of the Russian state system of higher technical education and the education of a new person for public service became an important object of study. Comparison of two charters of the last third of the XVIII century (the Charter of the Imperial Land Gentry Cadet Corps and the Charter of the Mining school) revealed the role of charter in determining the main mission of higher education institution. The analysis of the charters of the beginning of the XIX century (the Charter of the Mountain Cadet Corps and the Charter of the Imperial Moscow University) identified the origins of two branches of higher Russian education: the higher technical educational institution and the classical University.

### 3. Discussion

The topic of interest of this article is discussed in modern researches within the framework of historiographical and pedagogical discourse.

The historiographical discourse is represented by a significant number of researches, which can be combined into the following fields of study: historical, historical and legal, and historical and pedagogical. In particular, researchers analyze the history of legislative regulation of University education since the XVIII century, determine its secular nature, and establish the connection between University education and state service (Zipunnikova, 2009). One of many works devoted to the history of Moscow University analyses the role of the Charters in the development of the management system (Maksimova, 2014). Examining the models of institutionalized education of the XVIII century in Russia, N.R. Sidorov comes to the conclusion that the mission of institutionalized education consisted of professional training of people who performed services to the sovereign in this period; the state, embodied in the person of the Emperor and his associates, was the customer and the investor of such education (Sidorov, 2011). N.R. Sidorov points out the dominance of the «defensive» factor in the life of the state and the society, which predetermined the subordination of the civil sphere to the military. The dynamic development of military educational institutions made it possible to train personnel for the state service as well (Greibenkin, 2018).

Historical approach to the study of functioning of educational institutions has a long tradition. Russian Cadet Corps history is elaborately described in the work of A.N. Antonov. In particular, it mentions the names of some outstanding people who worked on the creation of this educational institution (the first Director Field-Marshal H.A. Minich; the future hero of The French invasion of Russia of 1812 M.I. Golenishchev-Kutuzov) or were brought up in it (the first Russian actors F.G. Volkov and I.A. Dmitrievsky; the first Russian playwright A.P. Sumarokov) (Antonov, 1906).

Collective monographs «Essays on the history of the Mining Institute (1773-1917)» and «The History of mining in Russia: XVIII-XX centuries» written by researchers at the Department of history of Saint Petersburg Mining University are based on an extensive documentary base. These books comprehend the experience of founding a Mining school as a matter of national importance, study the specifics of the educational process and present literary portraits of writers, artists, theatrical personalities, actors, educators and mining engineers. Based on the analysis of facts from the life of famous students, it was concluded that «the climate that was created in the



Mining Corps in the first quarter of the XIX century not only influenced the growth of professional skills, but also had an impact on the realization of a broad creative opportunities for graduates» (*Istoriia gornogo dela.*, 2011; Afanasev et al., 2010). We will also point up a research that examines the historical aspect of structural and linguistic features of such an important document of the administrative sub-style as the Charter that defined the educational activities of the University (*Shchukina, Egorenkova, 2019*).

The first attempt of a critical analysis of Russian pedagogical system was made by M.I. Sukhomlinov (1828–1901) (*Sukhomlinov, 1866*). The experience of educational activities of St. Petersburg Mining School and the Mining Cadet Corps is reflected in historical researches and reviews, in official documents, etc. The first pedagogical study of the features of educational process in St. Petersburg Mining School and the Mining Cadet corps was conducted by O.N. Bondareva (*Bondareva, 2017*). It is also worth mentioning that the Charter is not considered as a historical or cultural document of a higher technical educational institution in existing researches.

#### **4. Results**

Analysis of the documents founding the higher education institutions of the XVIIIth century showed that there was a certain tradition of document development. First, an Imperial decree founding an educational institution was issued, and then a plan/project of its functioning was presented. For example, on July 29, 1731 Empress Anna Ioannovna signed a Decree on the Foundation of The Land Gentry Cadet Corps – the first cadet corps in Russia. On January 12, 1755, Empress Elizabeth Petrovna issued a Decree «On the establishment of Moscow University and two high schools. With the application of a highly approved project on this subject». On October 21, 1773 Empress Catherine II (1729–1796) approved the report of the Senate «On the establishment of the Mining school at the Berg-Collegium» and a plan for its organization presented by the privy councillor, Senator M.F. Soymonov (1730–1804).

Forms of European education and upbringing were gaining popularity in the XVIII century Russia. The appearance of ideas of the «new man» influenced the development of the enlightenment thought in Russia. The ideal of man was created in European culture and included the following qualities: activity, independence, rationalism and desire to transform society. In almost all educational institutions in Russia a new ideal of man – noble, honest, and moral – was established.

Ideas of European pedagogy were reflected in the creation of closed educational institutions with classical education. The study of classical languages (Latin and Greek) and mathematics, which was the basis of fundamental education, was introduced. The breadth of the scientific worldview was brought to the fore, providing an opportunity to choose the sphere of application of forces. The new educational concept was implemented in the first technical University in Russia – Saint Petersburg Mining School.

In the age of Catherine II, the age of Russian Enlightenment, educational institutions received their Charters: on September 11, 1766 Empress Catherine II signed «The Charter of the Imperial Land Gentry Cadet Corps» and on June 28, 1774 – «The Charter of the Mining school». Activities of the Imperial Moscow University, that was established for educational purposes on the model of European universities for nobles and raznochintsy, was regulated by the Draft (1755) which served as a Charter but formally was not such a document. The Imperial Gentry Corps was a closed educational institution for nobles who were sent to the state service. It seems that the Charter of the Mining school leans heavily towards the Charter of the Gentry Corps in form and content.

It is noteworthy that the tradition of high style is used in introductions of both Charters of these two educational institutions, where the goals and objectives of founding are articulated.

In the introduction to the Empress Catherine II's «Charter of the Imperial Land Gentry Cadet Corps» (1766) the goal is defined in the following manner: «To establish this Corps in such a way that the study of military and civil science was always accompanied, as an integral part of the youth, by virtuous and proper to his title education until the very graduation of the cadet» (*Ustav Shliakhetnogo Korpusa.*, 1766). The high style of introduction is formed by a set of specific vocabulary that emphasizes the importance of state affairs carried out by the Empress:

«the benefits and welfare of the state»; «noble youth»; «the fruits of our other institutions»; «state firmness» and more.

The introduction of «The Charter of the Mining school» (1774), compiled by the Berg-Collegium, is addressed to the Empress Catherine II and is also written in a high style, containing book vocabulary with a touch of solemnity and significance; among the established collocations are: «all-generous mother of the Fatherland»; «sacrificing her comfort»; «with amazing prudence and wisdom»; «among the victories, Majesty and glory»; «her visionary eye», etc. The text is composed according to a plan: a solemn appeal to the recipient, citation of addressee's merits to the Fatherland, articulation of usefulness of science for state affairs, a general plan of the establishment of the Mining school by the Berg-Collegium, the importance of establishment the Mining school among the other deeds of the Empress. The introduction ends with a detailed metaphor: «our zeal will elevate this monument, which is not prone to decay, and which, in turn, will bring everlasting benefits, will glorify this day – a source of Russia's happiness» ([Ustav Gornogo uchilishcha., 1774](#)).

It is worth to emphasize that the text of the Charter of the Gentry Corps of 1766, written on behalf of the Empress, contains imperative constructions characteristic to the document called «decree»: «We command the Council to be»; «we entrust the Board over the corps»; «we allow to make ranks, determine salaries, compose instructions, etc». Text of the Charter of the Mining school of 1774, compiled on behalf of the Berg-Collegium, contains instructions on how to organize school activities: «the teacher must manifest the rules», «interpret the rules», «the mechanic must explain», «must explain», «the students will be examined every six months», «the class teachers are ought to teach students diligently, carefully noting the inclinations», etc.

The text of the Charter of the Gentry Corps (1766) structurally is more clearly composed. It consists of an introduction, a short conclusion and ten chapters: Chapter one. On the position of the Council of the Land Gentry Cadet Corps; Chapter two. On the Director General; Chapter three. On the order of education and training of young nobles and the first age of them; Chapter four. On the second and third ages; Chapter five. On the fourth and fifth ages; Chapter six. On examinations and awards; Chapter seven. On the police Chief and the Chief Treasurer of the Land Gentry Cadet Corps; Chapter eight. On the police Chief; Chapter nine. On the Chief Treasurer; Chapter ten and last. The chapters are divided into paragraphs and sub-paragraphs.

The emphasized educational function in the description of official duties of the Corps employees stands out in every chapter. It is said there that «the main purpose of this institution is to provide the best possible education to the noble youth» ([Ustav Shliakhetnogo Korpusa., 1766](#)). For example, Director General is described as a position for a man skilled both in military affairs as well as civil rules; his behavior and morals should set an example or the entire community of the Corps; he must show lenity and decency both in deeds and in words ([Ustav Shliakhetnogo Korpusa., 1766](#)).

The third, fourth and fifth chapters contain a list of subjects studied by the cadets at different ages. In the fourth (15-18 years) and fifth (18-21 years) ages the cadets are divided into military and civil ranks. The text of the Charter gives an idea of some aspects of the daily life of a closed military educational institution. The third, fourth and fifth chapters contain a list of subjects studied by the cadets at different ages. In the fourth (15-18 years) and fifth (18-21 years) ages the cadets are divided into military and civil ranks. The text of the Charter gives an idea of some aspects of the daily life of a closed military educational institution. For example, corporal punishment was strictly prohibited. In the eighth Chapter it is said: «Under no circumstances corporal punishments are allowed to be committed in this Corps» ([Ustav Shliakhetnogo Korpusa., 1766](#)). Cadets were not allowed to have the serf servants. The school had a library, a gallery with paintings, two churches, a hospital, and a pharmacy.

The structure of the first Charter of the Mining school (1774) is quite simple, it includes a brief introduction, conclusion and four parts: On the position of class teachers (in the modern sense, the term «position» means «duty»); on the exams and graduation of students from the Mining School; on the position of students; on the position of chamberlain (a court rank of the III class, whose duties included managing the household and the teaching stuff of the school).

The first part lists the subjects studied by students (called classes in the document) and briefly reveals their content: mathematical, surveying, chemical, mechanical, mineralogical,

physical, drawing – total number seven classes. For example, the mechanical class studied statics, hydrostatics, aerostatics, mechanics, hydraulics, and pneumatics.

The second part defines the terms and rules for taking exams. It is also stated in the Charter that up to six people were selected to serve in the Mining school as a *shichtmeister* (mentor) based on the results of their exams after the first four years of studying.

The third part deals with students' duty to prepare themselves assiduously «to join the mining, factory, and mint service» ([Ustav Gornogo uchilishcha., 1774](#)). Aiming to provide the young Mining school with the necessary literature, the Berg-Collegium expressed its hope that students «will not stop working diligently on their translations of foreign books related to mining and factory work in the spare time» ([Ustav Gornogo uchilishcha., 1774](#)).

In the fourth part the duties of the chamberlain are outlined, in particular, it is said that «his main purpose will be to make sure that the mining students, whom he was entrusted to supervise, were in perfect peace, contentment and quietness while in school, and kept completely away from all the vices not befitting noble and honest people» ([Ustav Gornogo uchilishcha., 1774](#)).

The conclusion of the Charter is maintained in the same solemn style that is characteristic of the introduction. High mission of the Mining school as an educational institution was formulated in it: «Berg-Collegium hopes that the chosen teachers will not fail to perform their duties with diligence, and in return, the students will show their progress in sciences, which they will use to prove their love and readiness to work hard towards the general welfare of their Fatherland; gratitude, honesty, legitimacy and their own benefit requires them to do this duty» ([Ustav Gornogo uchilishcha., 1774](#)). The idea of serving the Motherland was formed, first of all, by the activities of the directorship of the educational institution, since “at all times the leaders of the Institute combined the qualities of theorists and practitioners of mining, making a huge contribution to the development of Russia ([Afanas'ev, 2005; Rudnik et al., 2019](#)).

Analysis of the two Charters of the last third of the XVIII century showed both similarities and differences between these documents. First of all, it is worth noting the general nature of the Charter as a document of its time. It includes a description of various aspects of the institution, such as internal regulations, curriculum, syllabus, etc., which are assigned to various documents in modern tradition. Charters define the life order of a closed educational institution, where the goal of educating a new person for a state service was at the forefront. It is interesting that the Charter of the Land Gentry Cadet Corps was provided for sending graduates to both military and state service, and the life of the Mining school that trained mining engineers was organized on a military model, which is reflected in the Charter.

In the Russian Empire at the beginning of the XIX century it was perfectly clear that the country needed to be included in the European political and economic processes. This was a period of Alexander I's reign (1777–1825). The new state policy had set new challenges for education. Higher education institutions were ordered to teach sciences that were necessary for the state needs. Educational institutions became centers of scientific research and disseminators of scientific views.

The period of reforms of Alexander I is reflected in the development of the new Charters of educational institutions. In 1804, the Imperially Established Charter of the Mining Cadet Corps (January, 19) and the Imperially Established Charter of the Imperial Moscow University (November, 5) were published. Being under the command of The President of the Berg-Collegium, the Mining Cadet Corps was subordinate to the Department of Mountain and Salt Matters of the Ministry of Finance and had a multi-level educational system. Due to the creation of ministries, Moscow University came under the control of the Minister of Public Education.

The second Charter of the Mining Cadet Corps (January, 19, 1804) consisted of 45 articles which can be grouped thematically into the following parts: I. Management of the Corps (articles 1-7); II. Composition of students (articles 8-11); III. Composition of teaching and mentoring staff (articles 12-13); IV. Educational process: subjects, examinations, practice, internships (articles 14-27); V. Service divisions and positions: provisor, treasurer, police chief, secretary, medical ranks (articles 28-38); VI. Treasury of the corps (articles 39-45).

Due to the transformation of the Mining School into the Mining Cadet Corps in 1804, organizational structure in the new Charter was more clearly defined. The following positions were outlined: Corps director (subordinate to the President of the state Berg-Collegium), Corps commander (subordinate to the director), officers, teachers, surveyor (carried out educational functions), *berggeschworners* (mining jurors), shift master (subordinate to the surveyor);

non-commissioned officers (made by the director from the excelled cadets). The first thing considered when forming the teaching staff was the moral qualities of teachers. Careful selection of them was due to the importance of mining engineers in ensuring the state's interests ([Bondareva, 2017](#)).

The number of pupils studying at state expense increased from 24 to 60, while the age of those who enter the Corps (at least 12 years) and the amount of knowledge «of primary sciences» (arithmetic, reading and writing in Russian, German, French, and drawing) were set out. The educational process consisted of three stages: primary classes, middle classes (compared with basic school education) and upper classes (higher technical education). For example, in the upper classes mathematics «and its application to the mining and factory work» was studied. The list of subjects expanded: in addition to technical disciplines, music, dance and fencing had appeared, so that graduates who were sent to remote factories «could spend their free time with pleasure» ([Ustav Gornogo Kadetskogo Korpusa..., 1830](#)).

Mining engineers were sent to remote, sparsely populated regions of the Russian Empire (Siberia, the Urals, and the Far East) to search for and explore minerals, build mines and factories. Graduates of the Corps were the only bearers of cultural norms accepted in the state. Many of them became statesmen or authors of outstanding works in various fields of knowledge: E. P. Kovalevsky (1792–1867) – Minister of Public Education; I.P. Tchaikovsky (1795–1880) – Director of the St. Petersburg Institute of Technology; E. G. Chebaevsky (1790–1874) – inspector of the Nerchinsk Mining School, inspector of Yekaterinburg Mining school; D.I. Sokolov (1788–1852) – ordinary Professor at St. Petersburg University. Famous musicians P. I. Tchaikovsky (1840–1893) and A.A. Alyabyev (1802–1852) came from the families of mining engineers ([Bondareva, 2017](#)).

The Charter of 1804 pays special attention to the organization of practice. At the end of the course the students stayed for a year to conduct various experiments and to visit enterprises: the Mint, Foundry, Sestroretsky arms factories, etc. Then they were sent to factories and mines as trainees for two years to study the full production cycle, «starting from the very beginning». The best trainees were given the opportunity to complete training in European countries at mining plants, factories, and manufactories.

It can be concluded that the Mining Cadet Corps was focused on providing professional technical education and training specialists in the field of mining and metallurgy.

The Imperially Established Charter of the Imperial Moscow University (November 5, 1804) consists of 16 chapters, the paragraphs are numbered consecutively and include 188 points. Chapter I. On University in general. Chapter II. On Rector. Chapter III. On Professors and their positions. Chapter IV. On Adjuncts and their positions. Chapter V. On Honorary Members. Chapter VI. On University Council and Meetings. Chapter VII. On meeting Secretaries. Chapter VIII. On educational grants and Institutions. Chapter IX. On trials and getting University merits. Chapter X. On Students in general. Chapter XI. On Inspector and state-financed Students. Chapter XII. On Pedagogical Institute. Chapter XIII. On Board Of The University. Chapter XIV. On University court. Chapter XV. On management and supervision of Schools. Chapter XVI. On printing and censorship of books.

In comparison with the closed educational institution that was the Mountain Cadet Corps, whose Charter strictly regulated the management system, the Charter of Moscow University granted broad autonomy to all participants of educational process: annual election of the rector by ordinary professors; establishment of the University Council – the highest instance for academic and legal affairs – which had wide powers and had to meet monthly (§§ 47-49); creation of faculty councils chaired by rector or dean (§ 63). The Charter established the professor's right to choose «a book of his own composition or of another famous scholar» for his lectures ([Ustav Imperatorskogo Moskovskogo Universiteta..., 1830](#)). Students completing their studies at the University could apply for one of the «University merits» of their choice: University candidate's degree, master's degree, or doctorate. To earn a degree, students had to go through the required trials (§§ 96-103).

The Charter of Moscow University determined the number of faculties: I moral and political Sciences, II physics and mathematical Sciences, III therapeutic or medical Sciences, IV philology. Analyzing the features of the document language, we note that the description of the structure of Moscow University of this period contains terminology relatable to the modern one: rector, vice-rector, dean, professor, Council, faculty, meeting secretary, honorary member, improvement of teaching, lecture schedule, etc. However, some terms have gone out of modern usage: ordinary



professors, extraordinary professors, adjunct. A number of terms in the modern language have acquired other meanings: university candidate, candidate's degree, textbooks, trials (master's, doctoral), position, etc.

The main task of university education was to train teachers of high schools, colleges, and University teachers. For example, those who have earned a master's degree «remain at the University, are required to teach lessons to Candidate Students, and if the Council decides so, to teach in the university auditorium in the appointed date and time» ([Ustav Imperatorskogo Moskovskogo Universiteta., 1830](#)).

Realizing their educational goals, both educational institutions guided by the statutes brought up new citizens for the needs of the state. The analysis of the Charter of Moscow University of 1804 and the Charter of the Mining Cadet Corps of 1804 showed a tendency to divide higher education into University and higher technical education. It is no coincidence that in 1833 the Mining Cadet Corps was renamed as the Mining Institute and remained in the status of Institute until 2012.

In the XX century, the ideas of upbringing and education of the technical intellectuals were developed on the pages of the journal "Notes of the Mining Institute", which was being published since 1907. As the editor-in-chief of the journal and the rector of St. Petersburg University V.S. Litvinenko noted, "Notes of the Mining Institute" allow professionals to exchange views on the development of geology, mining, metallurgy, oil and gas business, ecology, economics and many other areas ([Litvinenko, 2017; Pashkevich, Petrova, 2017](#)).

Relevance of educational programs for new citizens for the needs of the state rooted in the Charters is confirmed by international experience of organization of University education. This is evident, for example, in the history of creation of the State University of Sao Paulo (Brazil) in the XX century. After the First World War, a wave of emigrants from different countries brought a new perspective to Brazil. Progressive elite of society considered it necessary to develop not only the economy, but also the scientific and cultural life of the country. Before that, in the nineteenth century there were only separate educational institutions in Brazil that trained lawyers, doctors, and engineers.

The State University of Sao Paulo was founded in 1934. Founders of the University (Julu de Mesquita Filu – journalist and editor-in-chief of the state newspaper of S. Paulo and Fernando de Azevedo – educator and sociologist) proposed the goal of the University to produce independent scientific knowledge and to conduct objective research. Young and talented scientists from France, Italy and Germany were invited to Brazil, where philosophical, philological, and natural sciences faculties were founded and became central to the new University.

In 1932, Brazilian Ministry of Education developed Charter of Brazilian universities that was focused on secular education. Introduction to the Charter of the State University of Sao Paulo (1934) defines the following goals: 1 – to promote scientific research, encourage literary and artistic creativity; 2 – to transmit knowledge and cultural values through education; 3 – to train personnel for professional activities through science, literature and art; 4 – to promote science, literature and art; 5 – to organize national and international cooperation ([Ustav Gosudarstvennogo Universiteta San-Paulo, 1934](#)). Remarkably, the Charter has a confirmed authorship: names of the authors, Zhetulyu Vargas and Gustavo Capanema, are included in the text. The Charter is organized according to a specific plan: first, it directly assesses the general role of science and art; and second, it aims to use the latter for teaching. The Charter style is strict, formal, and officialese.

## **5. Conclusion**

Summing up, a Charter of an educational institution of the last third of the XVIII – early XIX centuries, as well as in later times, was an important historical and cultural document that regulated educational and pedagogical activities. Comparative analysis of the Charters of the Mining University (1774 and 1804) allowed us to trace the continuity in the structural and substantive organization of these documents. Comparison of the Charters of the Gentry Corps and Moscow University with the Charters of the Mining University demonstrated how the higher education system was formed in Russia.



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