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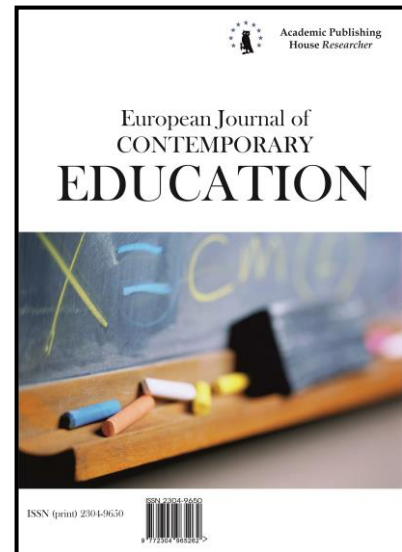
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The Problems of Contemporary Education

Influence of Change in Content of Physical and Sport Education as Case Study on Level of Dynamic Function of Spine among Secondary School Female Students

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Abstract

The aim of a pillar research was to find a change in a content of a physical and sport education through a targeted application of a physical program for three months, with a focus on a dynamic function of female students' spine. The monitored group consisted of the female students of an adolescent age (age 16.32 ± 0.42 years, height = 169.56 ± 6.33 cm, weight = 57.32 ± 8.76 kg) of the town, Banská Bystrica who attended the Secondary Health School. From the point of view of data acquisition methods, standardized tests for a physical education and a medical practice were applied. The results in the dynamic spine function of the female students were recorded in an initial assessment during a supervisory period in the most cases of deviations from the standard, in the noncompliance standard in all tests, which means that weaknesses in the dynamic spine function were recorded among all probands. During a final assessment in the supervisory period were recorded only minimal changes, statistically insignificant ($p > 0.05$) in all tests, except for right and left lateroflexion ($p < 0.05$, $Z = -2.1181$, $r = 0.43$), while in an experimental period after application of the physical program we recorded significant changes with a high effect of an effect size, indicating that the results were not influenced by statistical data ($p < 0.01$, $Z = -3.0594$, $r = 0.62$) in all five assessed areas of the dynamic spine function. This project was supported by VEGA 1/0242/17, "Physical activity as prevention of functional disorders related to the musculoskeletal system of secondary school students".

Keywords: physical program, posture, physical and sport education, student.

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1. Introduction

A good functional condition of a muscular and skeletal system requires an optimal matching of postural and phasic muscle groups, which is manifested in a muscular balance of the muscular and skeletal system. In accordance with requirements of the European strategy aimed to improve a health status of a population in Europe, it is essential to put into practice primary prevention, where the most promising and effective are internationally recognized physical programs, targeting specific age groups. Nowadays, the physical programs play an important role in improving the skeletal and muscular, even in a school population (Cools et al., 2003; Heyman, Dekel, 2009; Azabagic et al., 2016; Brzek, Plinta, 2016; Gurín et al., 2016), which can be appropriately used in the physical and sport education, with an intention of a health-oriented fitness, which function is a preventive effect of a formation and increasing of civilization diseases, which also include functional disorders in the area of the skeletal and muscular system, which are increasing in structural changes, mainly into ascending hypokinesia (Petersen et al., 2006; Müller et al., 2008; Lemos et al., 2012; Tomková, Palašáková-Špringrová, 2013; Kurková et al., 2015; Kurková, Nemček, 2016; Mitova, 2015; Madarász, Bácsné, 2016), where the most common symptom is a pain (Bendíková et al., 2016; Noll et al., 2016).

The skeletal and muscular system is a phenomenon, on which also depends on a quality of life, not only among adults, but also among children and youth, many of which are disorders associated with posture, particularly by deflection a spinal axis in a sagittal or lateral plane. Therefore, in this context, it is important to highlight the Deep Stabilization System (HSS) of the spine, which is one of the most important functional factors of the posture. The HSS consists of deep spine extensions and a ventral group (m. transversus abdominis, m. obliquus internus, m. multifidus, m. longissimus and m. iliocostalis), pelvic floor muscles and diaphragm forming a central tendon. They have a significant protective function against forces acting on the spine. Its disorders are a significant etiopathogenetic factor of formation vertebrogenic disorders. At the same time, the spine extensions are excitedly activated by deep neck flexors and muscular interplay between the diaphragm, abdominal muscles and pelvic floor, which stabilize the spine from the front by means of an intra-abdominal pressure. The stabilizing muscular function is associated with a quality of central nervous system processes, which are very often disturbed, causing a muscle imbalance in a muscle engagement during the stabilization function.

Buran (2002) states that the muscle imbalance is considered to be the most important cause of the chronic pain in the muscular system and spinal disorders. It also adversely affects the posture, physical stereotypes, muscle coordination and increases vulnerability to injury, wound, and in addition to acting on the changes of static muscular system, limits an extent of movement in joints and their mobility, which aggravates by age and can also cause the vertebrogenic spinal disorders (Véle, 2006). The insufficient level of flexion is also limited by the manifestation of other mobility abilities, which results in increasing demands for economic secure, which results in an earlier onset of a fatigue. In this context, it is necessary to point out an optimum level of the spinal mobility, which is considered as one of the basic prerequisites for the posture as an external manifestation of the interaction between the postural and phasic muscles.

The physical and sport education is currently focused on a value class of a health and active attitude of the students to their own health, which is more and more clearly conditioned by social factors. The physical and sport education through the School Education Program provides teachers and pupils with an opportunity to prefer physical activities for health, fitness (Rozim, 2012; Nagy, Müller, 2016), but also to fulfill an interest in movement (Dobay, 2015) and a diversification of an innovative content of lessons, as stated by Borbély, Müller (2008), Bendíková (2016, 2016a), Uvinha, Velardi (2014), towards the health and its prevention.

2. Aim

The aim of the research was to verify the change of the contents through the impact of the three-month physical program on the dynamic function of the spine among secondary school female students in the context of the teaching physical and sport education. We assumed that the deliberate intervention of the three-month physical program was significantly positive in the area of the dynamic spine function among female students during the experimental period.

3. Methodology

The monitored participants of case study consisted of 12 female students (age 16.32 ± 0.42 years, height = 169.56 ± 6.33 cm, weight = 57.32 ± 8.76 kg) of the second year of the Secondary Health School of Banská Bystrica, whose choice was intentional in the relation to a presence of the functional disorders in the area of the skeletal and muscular system with intention to reduce the spine functionality. Table 1 presents the primary characteristic of the participants of the case study.

Table 1. Primary characteristics of the participants of the case study (n = 12)

Factors	n	Age	Height/cm	Weight/kg	BMI
Girls	12	16.32 ± 0.42	169.56 ± 6.33	57.32 ± 8.76	19.94 ± 2.84

Legend: BMI – Body mass index

Nowadays, Slovak Education Program is according to the Education Act, hierarchically the highest targeted program of the education, which includes frame model of graduate, curriculum of school curriculum and its framework curriculum. The Slovak Education Program should consist of 70 % of the overall content of the education and should be compulsory for schools. The School Education Programs should consist of 30 % of the content of education and the schools create them, based on basis of conditions, focus of school, traditions, staff possibilities and interests of students. Each school has the possibility to offer the education program with its own structure of subjects and its own study plan, which is approved by the school representatives for the physical and sports education and is part of the school's work plan (Bendíková, 2016).

The implementation of the pilot research was carried out in four primary stages, where the first phase (September – December, school year 2016/2017, supervisory period), the physical and sport education was conducted according to the specified School Education Program. The change of the content of teaching according to the valid guidelines and the direct intervention of the physical programs with the health focus on improving the dynamic function of the spine within the classes of the physical and sport education took place subsequently in the period of January – April, 2017, experimental period, twice a week (Tuesday and Thursday) for 45 minutes by the teacher of the physical and sport education.

The assessment of the dynamic function of the spine with five tests (Schober test, Stibor test, Otto inclination and reversal test, Thomayer test and lateroflexion) was performed by the physiotherapist standardized method for the medical and physical practice (Labudová, Thurzová, 1992; Vojtaššák, 2000), where the development of the spine is assessed with a gradual relaxation, symmetry of the paravertebral muscles and chest. During bowing is monitored a spine curve designed to form a smooth arc.

The obtained quantitative data of the monitored variables of the dynamic spine function were processed by a casuistry, while using theoretical (analysis, synthesis, comparison and generalization) and mathematical-statistical methods (\bar{x} – arithmetic mean, s – standard deviation, $R_{\max - \min}$ – variation range, m median), where we used the non-parametric Wilcoxon test ($W_{\text{test}} p < 0.01$, $p < 0.05$) non-parametric assay for the dependent observation (double-selection) to determine the statistical significance of the difference between the observed variables between the initial and final scores. The practical and material significance was judged by effect size (r).

4. Results and Discussion

According to the aim of the research, we present part of the results, which are the subject for further, accurate processing. The presented results cannot be generalized, but it is necessary to understand them in their overall context as indicative and initial from the point of view of the health prevention.

Based on the partial aim and tasks of the work, we present part of the results that are subject to further more accurate monitoring and processing within the presented project. The mentioned results cannot be generalized, but it is necessary to understand them in an overall context as an orientation for transformations that take place in education, as well as physical and sport education

in primary and secondary schools in Slovakia, with an intention for the health and health-oriented fitness, as well as on specific competencies.

In assessment of the Schober symptom, we recorded during the initial assessment in the supervisory period an achievement of the standard norm according to Vojtaššák (2000) among 4 female students. However, 3 female students were only slightly behind the lower limit of the standard norm (4.0 cm), only female student number 5 showed the spine flexural rigidity in the standard norm of 5.4 cm. Other female students were below the standard norm. The most striking was female student number 9, whose elongation was only 2.9 cm, which is 1.1 cm below the standard norm. The mean assessed value in the initial assessment in the supervisory period was 3.83 cm (Table 2), where in the most cases we found the wrong spine arch, which was not smooth as is believed to be caused by the weakened paravertebral muscles in the dorsal part of the spine of the female student. The final assessment in the supervisory period showed only minor changes that were not statistically significant ($W_{\text{test}} p > 0.05$).

On average, we even recorded a worsening of 0.03 cm. The initial assessment values in the experimental period were almost identical to those, in the experimental period. In the experimental period, however, we recorded a significant difference of the assessed values after the application of the three-month physical program. In addition to female student number 3, all other female students achieved the standard form of elongation of the specified distance between points of the spinal area. Even though, the female student number 3 did not reach the standard norm, we considered the shift as positive as we recorded an improvement of 0.7 cm. On average, the difference between the initial (3.38 cm) and final (4.73 cm) assessment of the Schober symptom in the experimental period was 0.9 cm, resulting in the statistically significant change to 1 % significance level ($W_{\text{test}} p < 0.01$, $Z = -3.0594$, $r = 0.62$) with the high effect size, therefore the results were not affected by the statistics. The most significant improvement was observed among the female student number 10 whose assessed final value compared to the initial assessed value was 1.4 cm higher.

Table 2. Intraindividual and average values of Schober test (n = 12)

	Schober test (norm +4.0 till +6.0 cm)												
Factors/n	1	2	3	4	5	6	7	8	9	10	11	12	x/cm
Initial 1	3.8	3.3	3.1	3.9	5.4	4.2	4.5	3.6	2.9	3.7	3.5	4.1	3.83
Final 2	3.9	3.5	2.9	4.0	5.4	4.1	4.2	3.6	2.7	3.8	3.3	4.2	3.83
W_{test}	(p > 0.05)												
Initial 1	3.8	3.4	3.1	4.0	5.3	4.1	4.3	3.8	2.8	3.8	3.5	4.1	3.83
Final 2	4.4	4.3	3.8	5.1	5.6	5.2	5.0	4.6	4.0	5.2	4.3	5.3	4.73
W_{test}	p < 0.01												
Effect size	Z = -3.0594, r = 0.62												

While testing of the mobility of the dorsal and thoracic spine using the Stibor test, we recorded during the initial and final assessment very similar values in the supervisory period, as well as in the first test, where there were not statistically significant changes ($W_{\text{test}} p > 0.05$). Similar values were also assessed in the initial assessment in the experimental period. In these assessments, we found the achievement of reaching the standardized norm (Vojtaššák, 2000) for several female students. The standard norm was not reached among the female students number 2, 3, 4 and 9. However, we believe that all the female students were at the limit of the standard norm. By intervening of the physical program we recorded positive progress in all female students (Table 3).

Table 3. Intraindividual and average values of Stibor test (n = 12)

		Stibor test (norm +7.5 till +10.0 cm)												
Factors/n		1	2	3	4	5	6	7	8	9	10	11	12	x/cm
Initial 1		7.5	7.2	7.1	7.4	9.1	7.9	8.2	7.7	6.9	7.6	7.5	8.1	7.68
Final 2		7.6	7.2	7.3	7.3	9.1	7.8	8.0	7.8	6.8	7.8	7.5	8.3	7.71
W_{test}		(p > 0.05)												
Initial 1		7.5	7.1	7.1	7.4	9.0	7.9	8.1	7.9	6.8	7.7	7.5	8.4	7.71
Final 2		8.6	8.4	8.2	8.8	9.5	9.2	9.3	8.7	8.6	8.6	8.7	9.6	8.85
W_{test}		p < 0.01												
Effect size		Z = -3.0594, r = 0.62												

The average improvement between the initial (7.71 cm) and final (8.85 cm) assessment was 1.14 cm. This improvement was statistically significant at 1 % significance level ($W_{\text{test}} p < 0.01$, $Z = -3.0594$, $r = 0.62$) with the high effect size value, therefore the results were not affected by the statistics. The similar findings were also reported in the study by Bendíková, Stackeová (2015).

The Otto test of the inclination and disinclination was during the initial assessment in the supervisory period as reduced mobility in the thoracic part of the spine. The obtained values were on average 0.66 cm below the standard norm (Vojtaššák, 2000). The exception was again female student number 5 who during the initial assessment in the supervisory period reached the values of the standardized norm. The similar findings were also found among female students number 7 and 12. The analogous values were assessed in the final assessment in the supervisory period, where we did not see statistically significant changes ($W_{\text{test}} p > 0.05$). The initial assessments of the experimental period were again very similar to the previous two assessments, namely the average value was 5.37 cm. During the final assessment of the Otto test with the average value of 6.32 cm, we recorded in the experimental period a positive increase in all female students that was statistically significant ($W_{\text{test}} p < 0.01$, $Z = -3.0594$, $r = 0.62$) with the high effect size value, therefore the results were not affected by the statistics. On average, the female students improved by 0.95 cm (Table 4), except for the female student number 8 who was missing 0.1 cm to the standard norm. However, we evaluated her progress positively (0.7 cm). The positive influence of the physical program was reached among all other female students, in the given test.

Table 4. Intraindividual and average values of Otto test (n = 12)

		Otto test (nor 6 cm)												
Factors/n		1	2	3	4	5	6	7	8	9	10	11	12	x/cm
Initial 1		5.4	5.2	5.0	5.1	6.2	5.3	6.0	5.2	4.7	4.9	5.0	6.1	5.34
Final 2		5.4	5.1	5.1	5.0	6.2	5.2	5.9	5.2	4.7	5.0	5.1	6.2	5.34
W_{test}		(p > 0.05)												
Initial 1		5.3	5.2	5.1	5.1	6.1	5.3	6.0	5.3	4.8	4.9	5.2	6.1	5.37
Final 2		6.1	6.2	6.1	6.4	6.5	6.4	6.5	5.9	6.3	6.6	6.2	6.6	6.32
W_{test}		p < 0.01												
Effect size		Z = -3.0594, r = 0.62												

Thomayer test, which was implemented, helped us to assess the torso flexion. While the initial assessment of the supervisory period, we recorded limited movement of the spine. Only one female student (6) reached the standard norm during the initial assessment of the supervisory period, thus touching the fingers on the mat (Vojtaššák, 2000). While final assessment of the supervisory period were the assessed values similar, where the female student number 7, even reached the above standard norm. However, the changes were minimal, statistically insignificant ($W_{\text{test}} p > 0.05$, $Z = -1.5403$, $r = 0.31$) with the little effect size, therefore the results were not

influenced by the statistics options. The difference between the initial (5.0 cm) and final (0.75 cm) assessment of the experimental period was more significant. The standard norm was reached by 5 female students in total and others came close to the standard norm. On average, our female students improved by 4.25 cm in the experimental period (Table 5), which was a statistically significant change ($W_{test} p < 0.01$, $Z = -3.0594$, $r = 0.62$) with the high effect size. The most significant improvement was recorded among the female student number 9, as it was up to 7.0 cm. Even though, the mentioned female student did not reach the standard norm, as was missing 2.0 cm, we considered this change to be highly positive. Notable is the fact that the female student number 5, who had the best spine mobility results in the previous tests, did not reach the standard norm in the given test. However, this may be associated with shortened back muscles of the thigh muscles (Véle, 2006).

Table 5. Intraindividual and average values of Thomayer test (n = 12)

		Thomayer test (norm 0 cm)												
Factors/n		1	2	3	4	5	6	7	8	9	10	11	12	x
Initial 1		5.0	8.0	9.0	6.0	5.0	0.0	1.0	4.0	9.0	8.0	7.0	3.0	5.42
Final 2		5.0	7.0	9.0	7.0	5.0	-1.0	-1.0	3.0	8.0	9.0	5.0	3.0	4.92
W_{test}		$p > 0.05$												
Initial 1		6.0	8.0	9.0	6.0	6.0	-1.0	0.0	3.0	9.0	7.0	4.0	3.0	5.0
Final 2		3.0	2.0	4.0	1.0	2.0	-3.0	-2	0.0	2.0	1.0	0.0	-1	0.75
W_{test} Effect size		$p < 0.01$ $Z = -3.0594$, $r = 0.62$												

While assessing the right and left lateroflexion, we observed during the initial assessment of the supervisory period a limited movement of the female students' spine on both sides as the average assessment was established above the standard norm (Vojtaššák, 2000). Only two female students of our monitored group were within the range of the standard norm. While the final assessment of the lateroflexion in the right ($W_{test} p < 0.05$; $Z = -2.1181$, $r = 0.43$) and left ($W_{test} p < 0.05$, $Z = -2.1181$, $r = 0.43$), we observed statistically significant changes in the mean value of the effect size, therefore the results were not affected by the statistics. These changes could the female students reach by the exercises during the period of 2.5 weeks, before the end of the supervisory period, which according to the School Education Program, were devoted to the areas of the health (gymnastic ball, overballs and bosu). The mentioned exercises included several elements of the spine movements on the sides, which could improve the lateral movement of the spine. While the initial assessment of the experimental period, the female students achieved approximately the same values as in the previous assessment. Subsequently, the following application of the physical program with the health focus, we recorded a significant increase of the spinal mobility on both sides, except for the female student number 10 who did not reach the standard norm. On average, the right lateroflexion was improved by 2.38 cm and left lateroflexia by 2.34 cm, as both changes were statistically significant ($W_{test} p < 0.01$, $Z = -3.0594$, $r = 0.62$) (Table 6) with the high effect size, therefore the results were not affected by the statistics. The similar findings were reported by Lee, Park, Kim (2013) and Bendíková, Stackeová (2015).

Table 6. Average values of lateroflexion of the participants of the case study (n = 12)

		Lateroflexion test (norm +20 till +22 cm)							
Initial/Final side	Initial 1		Final 2		Initial 3		Final 4		
	R	L	R	L	R	L	R	L	
x/cm	18.53	18.65	19.06	19.13	19.09	19.17	21.47	21.57	

While in the supervisory period, we recorded statistically significant changes of the spinal function of the spine, only at right and left lateroflexion ($W_{\text{test}} p < 0.05$, $Z = -2.1181$, $r = 0.43$), in the experimental period after applying the physical program, we recorded significant ($W_{\text{test}} p < 0.01$, $Z = -3.0594$, $r = 0.62$) changes in all of the assessed areas of the dynamic function of the spine with the high effect size value (Table 7, 8).

Table 7. Statistical assessment of changes in experimental period in area of dynamic spine function (n = 12)

Tests	Z-value	p- value	significance	Effect size (r)
Schober test	-3.0594	0.00222	p < 0.01	0.62
Stibor test	-3.0594	0.00222	p < 0.01	0.62
Otto test	-3.0594	0.00222	p < 0.01	0.62
Thomayer test	-3.0594	0.00222	p < 0.01	0.62
Lateroflexion R	-3.0594	0.00222	p < 0.01	0.62
Lateroflexion L	-3.0594	0.00222	p < 0.01	0.62

Table 8. Changes of area of individual symptoms (n = 12)

Group / factors	Content	Th	Sch	St	Ott	Lateroflexion	
						R	L
	SEP	0.50	0.03	0.03	0.00	0.53	0.48
n = 12	PP	4.25	0.90	1.14	0.95	2.38	2.34
W_{test}		p < 0.01	p < 0.01	p < 0.01	p < 0.01	p < 0.01	p < 0.01

Legend: Th – Thomayer test, Sch – Schober test, St – Stibor test, Ott – Otto inclination and disinclination test, Lateroflexion R – right, L – left

Based on the above findings, we confirm the established hypothesis, in which we hypothesized that the intervention of the three-month physical program with the health focus will significantly affect in the dynamic function of the female students' spine in the experimental period.

5. Conclusion

The objective empirical research by monitoring changes of the dynamic function of the spine of the muscular and skeletal system contributes to the dissemination of the knowledge about the application of the physical programs with the health focus in the teaching of the physical and sport education, in terms of the possibility to apply the content changes within the School Education Program at secondary schools. The results show in our monitored indicators of the dynamic spinal function positive changes and values, which were statistically significant among the female students in all tests as we evaluate it positively.

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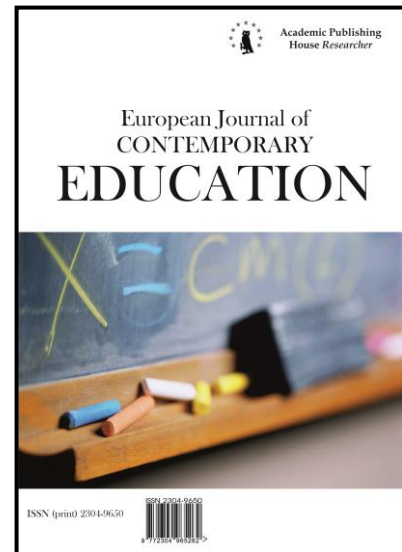
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Creativity and Creative Activity in High-School Students of General-Education Organizations in the Republic of Kalmykia

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Abstract

The article presents the results of an interdisciplinary and integrative study of creativity and creative activity in high-school students. The authors attempted to describe the abovementioned phenomenon considering the influence of a traditional large Kalmyk family, ethnical-cultural identification, self-actualization, role and functions of social environment, including the type of educational institution and extracurricular education. The study employed an innovative psychological diagnostic system that included authors' original developments. The obtained results can be extrapolated not only to the studied region (Republic of Kalmykia) but also to other territories with multiethnic and ethnical-cultural population.

The study allows expanding the scientific knowledge about creative skills in the youth, their psychological diagnostics and stimulation of their development.

Keywords: integrative approach, creativity, personality of high-school students, interdisciplinary approach, creative activity, traditional family, ethnical-cultural identification, youth.

1. Introduction

The problems of scientific research and development of creativity and creative activity in high-school students of the general-education organizations of Kalmykia gain close attention and support from the administrative departments of the Republic. The quality of intellectual and personality potential of high-school graduates is considered as a human resource for innovative transformations in social, economic and cultural life of the Region for the following decades. Two crucial research components are activated for this goal.

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The first research component is related to the choice of scientific perspective. Multilevelled and ambiguous interpretations of the concepts of creativity and creative activity in the national and international psychological-pedagogic literature urge each researcher involved in this topic to state her scientific and methodological priorities in detail. However, in this case, the selected monotheoretical perspective automatically narrows the range for sharing the conceptual bases and practical results with the large research community. In such situation, even successful attempts to conduct empirical studies of project type in the scale of a region (republic) will be partially discredited. The results that are limited by a single paradigm might be considered as local, being only locally significant and requiring comparative analyses of samples from other regions and additional interpretations from the perspective of other scientific approaches and theories. In turn, intercepting various conceptual bases in a single integral diagnostic program would lead to an integrated methodology and would make the scientific foundation of the study interdisciplinary relevant.

The second component of a researcher's scientific perspective is related to the specifics of the studied cohort. This implies the answers to the following questions: Is creativity of high-school students related to the level of academic difficulty in the educational institution and with the nature of its educational environment, in general? Who is more creative, young men or women, and whose education should be supported more in the future? Which factors of family and general social way of life influence the manifestation of the creative potential during the transition from the school environment to the adult one (city or rural location, number of children in the family, presence or absence of extracurricular education in creative activities, etc.)?

The period of high-school and university youth is abundant in crises. Crises («changing the roots», «equator», «transition») follow one right after another: right upon the finish of one crisis, the next one already awaits a young person during a new life turn. «What is this crisis?», was the question of G. Allport, the founder of the American humanistic psychology. His answer was: «It is a situation of emotional and cognitive stress that requires significant changes in the ideas about the world and oneself in a short amount of time» (Allport, 1998). How can one handle such task without an ability to focus potential creative abilities to overcome yet another age-related, social-psychological or social-economic challenge?

The choice of the integrative approach towards studying creativity and creative activity in students' early youth appears to be timely and viable due to at least two significant factors (Sokalskiy, 2014). Firstly, orienting the system of general and professional education in the Republic of Kalmykia at the development of young personnel would require systematically organized preparation of the students for performing creative activity by involving their creative potential. Secondly, it would call for special work for expanding and integrating the theoretical bases for diagnosing creativity as an intellectual skill and an ability to transform a life situation in response to an internal need. Such approach would exclude the educational amateurs' attempts to «make everyone creative» by introducing the school students to the folk traditions and amateur artistic activity (Rabochaya kontseptsiya..., 1998). Choosing integrative approach would allow using not only the instrumental and interpretative resource of the psychological disciplines (differential, social, developmental and pedagogic psychology), but also of the adjacent fields, such as sociology, demographic studies and pedagogics.

The selected perspective – transconceptual integration of various scientific positions in studying skills (giftedness, creativity, creative activity) in the context of young age – allowed transmitting a highly significant scientific idea for its integration in practice. The essence of this idea consists in the fact that making a system of different theories allows excluding superficial knowledge about nature and manifestations of general and special skills, giftedness and talent. This would minimize premature, consciously and precariously extoling influence of the educational system on the personality development and general life choices of young people that demonstrate accelerated intellectual development.

The integrative approach creates a unified perception of the problem of employing and actualizing the creative potential of a personality; this problem requires a multiaspect research approach in the context of the period of youth in the human development. Due to this, it is highly reasonable to group the research material around the concepts and categories that are typically used by researchers and practicing teachers that are interested in the problems of creative skills and their perfection.

Among those researchers, the key role for our studies belongs to the paradigms of V.N. Druzhinin and E.P. Ilyin.

V.N. Druzhinin has pointed out that one can make advances in studying creativity and creative activity only by integrating the achievements of different psychological approaches towards studying creativity and creative activity (Druzhinin, 2007). In his opinion, such paradigm, being fortified from the interdisciplinary perspectives, would help resolving the contradictions in the scientific paradigms and related psychological paradoxes of personality establishment and development in different age periods.

According to V.N. Druzhinin, radical qualitative changes in the mechanism of development of creative skills and creative activity occur in adolescence and youth («the second phase»). During this age, a «specialized» creativity establishes on the basis of general creativity; it is related to a specific field of activity (Druzhinin, 2007: 219). A young person chooses a professional example that he follows and mimics as an ideal. «The second phase finishes with rejecting her own mimicked creations and negative attitude towards the former ideal. An individual either remains at the stage of mimicking forever, or transitions to original creativity» (Druzhinin, 2007: 220).

The researcher points out that «the studies of creativity in older age groups should use stating experiments and biographical method» (Druzhinin, 2007: 220). Developmental experiment provides positive results for 3-6-year-old children, and sometimes for the conditions of professional education.

E.P. Ilyin (2009) studied the problem not only at the interdisciplinary, but also at the integrative level; he synthesized rational grains from intellectual-emotional, existential, psychoanalytical and gestalt approaches.

As a result, scientific knowledge and practice gained an integral innovative system; the distinction between the concepts of creative activity and creativity, which were typically defined in a straightforward manner in the national psychological literature, became more specific and strict. He provided new insights on the questions of: ways of managing creative activity, collective creative activity and creative activity in a collective, as well as creative activity in the context of different ages. The retrospective review (from XIXth century to the present) of creative activity styles and their correlation with the types of creators is informative in the applied manner. The author solved these problems by addressing the wide spectrum of opinions of international and national scientists. The value of a literature review consists in the fact that it analyzes the newest opinions that have not been reflected in the previous scientific publications in our country.

2. Materials and methods

The study had been conducted during several years with various intensity in three gymnasiums and three general-education schools located in regional centers of the Republic of Kalmykia or close to them. The sample fully reflected the general specifics of the cohort, i.e. high-school students of the Republic of Kalmykia. Despite the fact that, formally, the study was conducted outside of the city, its results could be considered valid for the whole territory. On the one hand, it is true because the Republic of Kalmykia has only two small cities, apart from the capital – Gorodovikovsk (8.8 thousand people) and Lagan (13.1 thousand people). On the other hand, school students from the city of Elista are voluntarily transferring to the 10-11th grades of the gymnasium in Troitskoe village.

The aim of the study was to explore the relation between creativity and constitutional, social-demographic and individual-personality traits of high-school students. The three selected aspects allowed employing the diagnostic inventory that was developed for studying creativity and creative activity from the conceptual perspectives of scientific, practice-oriented and humanitarian paradigms.

The study of the relation between creativity and constitutional, social-demographic and individual-personality traits of high-school students included a sample of 530 students of 10-11th grades – 248 young men (46.8 %) and 282 young women (53.2 %). They studied in the gymnasiums (363 high-school students, 68.5 % of the sample) and general-education schools (167 high-school students, 31.5 %). The predominant number of gymnasium students was defined by the specifics of the study subject. It is considered that the nominally advanced academic level in gymnasiums is a condition for attracting and developing intellectually gifted children within those schools.

The study used the following diagnostic methods: survey (a survey developed by E.A. Sokalskiy with consideration of ethical-psychological characteristics of the participants); testing (Eysenck's personality Inventory adapted by A.G. Shmelev (Ishov, 2004); creativity scale of the Personality Self-actualization survey by A. Maslow (Aleschina et al., 1987); short test of creative thinking (STCT, figure form) by P. Torrance adapted by E.I. Scheblanova and I.S. Averina (Kratkiy test..., 1995); and projective method (unfinished sentence, adapted for obtaining the information about the family). The procedures of statistical verification were used for the statistical analysis.

We used R. Fischer's φ^* test for the statistical analysis. Distribution of the characteristic in the general sample was close to normal. The choice of Fischer's φ^* test was not random. Firstly, we are planning on expanding the sample further to over 1,000 respondents; secondly, this criterion allows precise estimation of factors' significance and their interaction.

The description of the study results is primarily provided for the sample of the participants that have the diagnostics materials in the majority of the tests (this sample included 151 people). The empirical data collected in a large sample (530 people) were used as a confirmation of the revealed patterns and connections, especially for the analysis of texts of the surveys and half-projective method of unfinished sentences.

Furthermore, the article presents a partial description of study materials for the grant of the Russian Foundation for Humanities and the Ministry for Education and Science of the Republic of Kalmykia, project No. № 14-16-08001 «Creative skills of young people: psychological aspects» conducted in 2014-2015, and a detailed plan of further work on analyzing the data that were obtained in the sample of over 1,000 people. The study of creativity with the aim of its goal-directed amplification in specially created conditions was supported by a republican grant and encouraged by the Kalmykia's educational system. It required valid arguments in favor of revealing the nature of creativity, the forms of its manifestation, direct and indirect factors of its stimulation and containment in the context of the scientific achievements and practical advances in the work with gifted school students.

3. Discussion

Republic of Kalmykia is a subject of Russian Federation and the only region in the European part of Russia where the local population (Kalmyk people) has Eastern origin. Together with this, the population of this steppe region is mostly multiethnic (over 30 nationalities) and multiconfessional (Buddhists, Christians and Muslims). These characteristics make Kalmykia a specific field for experimental studies and define the choice of the interdisciplinary approach with its possibilities to provide a wide scientific and cultural context for interpreting the empirical data.

According to the Constitution of the Republic of Kalmykia (Steep Law Code) from the 5th of April 1994, there are two equally-righted languages in the steep Region – Kalmyk and Russian. Possessing such linguistic wealth creates additional favorable conditions for the development of young people's creative skills. Such situation realizes the new stage of the program for the national restoration of the native Kalmyk language, the development of the national culture, rituals, traditions and beliefs. The key role here belongs to the educational system packed with regional-level programs with a dominating ethnical-cultural component. Their innovativeness and prospective success are recognized at the governmental level in Russia.

The regional level of designing educational programs was conducted in fundamental studies in pedagogics, ethnical pedagogics and culture studies by such renowned scientists of Kalmykia, as N.Ts. Bitkeev, G.N. Volkov, A.B. Pankin, as well as their colleagues and successors B.A. Bicheev, B.B. Dyakieva, O.D. Mukaeva, and others. In this context, one should note the studies in the ethnical psychology of the Kalmyk people by Z.S. Badmaeva on the national-psychological specifics of Kalmyk people (Badmaeva, 1997) and A.B. Imkenova on their ethnical identity (Imkenova, 1999). The described personality type of Kalmyk people highlights mostly social personality traits and qualities that were reflected in the Ethnical psychology textbook by V.G. Krysko (2002). The description specifically highlights romantic or sentimental perception of reality, closeness to nature, rich cultural relationships, persistence, courage and bravery, ability to be content with small things, overcome difficulties, etc.

However, the works of Z.S. Badmaeva and A.B. Imkenova state the insufficiency in the description of the specificity of Kalmyk mentality, their creativity in everyday life that manifests

though the works of folk art, as well as the achievements of musical and oral folk art (Platonov, 2007; Stefanenko, 2000).

Another study on a similar topic was conducted by B.K. Zhumagalieva (2002) in East Kazakhstan. Based on the studies of ethnical-cultural traits and interhemispheric asymmetry in Kazakhs and Russians, the author revealed and described the specifics in cognitive styles of settled and nomadic nations and the differences in their worldviews. This work is of scientific interest because it approaches the debated issues of selecting a valid inventory, as well as interpretation and generalization of the obtained results of the comparative analysis.

4. Results

4.1. Analysis of the diagnostic material from the perspective of humanistic and cognitive approaches to studying creativity and creative activity

In order to reveal the correspondence of the creativity characteristics described with diagnostic inventory, which was developed from opposing psychological perspectives, i.e. life-scientific (P. Torrance) and humanitarian (A. Maslow), we analyzed diagnostic materials that were obtained with the figure task of the short test of creative thinking (STCT) adapted by E.I. Scheblanova and I.S. Averina (Kratkiy test..., 1995); and the creativity scale of the Personality Self-actualization survey by A. Maslow (Aleschina et al., 2017). We selected the Originality scale of the STCT as the one that reflected the essential characteristics of creative activity, according to P. Torrance – «manifestations of sensitivity to problems, deficit of knowledge, the disturbance of its balance, uselessness, etc.; acknowledgment of these problems, search for their solutions and proposal of hypotheses; evaluations, changes and reevaluations of the hypotheses; and finally, statement and presentation of the resulting solution» (Kratkiy test..., 1995: 4). Unlike quantitative record of the originality characteristics as a trait of creativity in the STCT, the creativity characteristics of the Personality Self-actualization survey were the result of conceptual personal choice of alternative statements, such as: «In difficult life situations it is necessary to search for radically new solutions», «The most important aspect of our life is to create something new», «I often make spontaneous (random) solutions», «I easily make risky decisions», etc.

Firstly, we analyzed the materials of the Creativity scale of the Personality Self-actualization (PSA) survey, and then of the Creativity scale of the STCT. Moreover, the creativity characteristics according to the PSA were mostly interpreted as a *generalized* characteristic of a person with the urge for personality self-actualization and its creative potential. Creativity characteristics of the STCT expanded the diagnostic picture by revealing the *level of manifestation* of the creative potential in young people in a more specific aspect. The comparison of creativity characteristics between the two methods was considered as a level of correspondence or dissociation between high-school students' potential creative abilities and the capability to use them for solving the problems of personal and professional self-identification. The analysis of the normality of distribution of the two characteristics revealed that the curve of the Originality scale of the STCT was different from the Creativity scale of the PSA in terms of its minor shift towards the lower scores.

Such observed shift of the scores on the Originality scale towards the lower pole might be interpreted as follows. The obtained diagnostic picture that demonstrates a dissociation upon the analysis for the normality of distribution of the scales points to the presence (generalization) of the creative potential in high-school students without its full actualization for solving the problems of early youth. As for the pedagogical activity aimed at achieving the educational results in high-school age in accordance with the requirements of Federal State Educational Standard (FSES), it is reasonable to discuss specially organized work in this direction with pedagogical staff and directors of the educational organizations.

The information obtained through the comparison of Creativity and Originality scales should be considered as fundamental during the development of recommendations for educational specialists in psychological-pedagogic assistance and development. These recommendations can be provided primarily for the strategic direction of psychological-pedagogic work aimed at developing creativity in high-school students. It is possible that this would require rethinking the directions of the work in favor of prioritizing the development of flexibility and innovativeness of thinking, rather than artistic content of education. Flexibility and innovativeness of thinking are required by the problems that young people should solve at the stage of self-identification during youth.

Top-priority pedagogical task will therefore include: extracting the generalized creative potential by using it in the system of psychological preparation for taking the Unified State Examination (USE); solving the problems of professional self-identification and career choice; changing the content of the mentoring work with high-school students to make it more similar to solving the self-identification problems that are stated in the governmental standards in the chapter on personality-related results of education.

Analysis of the significance of differences in the gender-role characteristics did not reveal any differences between the samples. The discovered fact reflects a well-known scientific axiom about the absence of difference in the intellectual development (creativity is initially considered as a characteristic of intellect) between men and women (Table 1).

Table 1. Quantitative characteristics of differences between the samples of young men and women on the Creativity scale of the PSA and Originality scale of the STCT, Fischer’s ϕ^* test

Characteristics Scales and levels	Men n=82		Women n=69		n=151 ϕ_{emp}	Significance of differences
	%	ϕ_1	%	ϕ_2		
Creativity scale of the PSA						
High	14.63	0.784	15.94	0.820	-0.220	Nonsignificant
Average	71.95	2.026	75.36	2.104	-0.078	Nonsignificant
Low	13.42	0.750	11.26	0.686	0.392	Nonsignificant
Originality scale of the STCT						
High	3.65	0.387	5.80	0.485	-0.600	Nonsignificant
Average	59.76	1.769	59.42	1.760	-0.055	Nonsignificant
Low	36.59	1.299	34.78	1.262	-0.226	Nonsignificant

The comparisons of creativity and originality characteristics between the samples of high-school students from the educational organizations with different types of academic differences revealed significant differences (Table 2).

Table 2. Quantitative characteristics of differences between the samples of high-school students from different types of educational organizations on the Creativity scale of the PSA and Originality scale of the STCT, Fischer’s ϕ^* test

Characteristics Scales and levels	Gymnasiums n=103		Schools n=48		n=151 ϕ_{emp}	Significance of differences
	%	ϕ_1	%	ϕ_2		
Creativity scale of the PSA						
High	10.68	0.666	25.00	1.047	-2.180	$p<0.05$
Average	74.76	2.090	70.83	2.000	0.515	Nonsignificant
Low	14.56	0.784	4.17	0.413	2.123	$p<0.05$
Originality scale of the STCT						
High	1.94	0.277	10.42	0.657	-2.174	$p<0.05$
Average	66.02	1.897	45.83	1.487	2.346	$p<0.01$
Low	32.04	1.203	43.75	1.446	-1.390	Nonsignificant

Defining the nature of the relation between the scales of the two tests provided a rationale for using them autonomously for solving the problems of correspondence of the diagnostic characteristics in different groups of respondents.

The correlation analysis between the Creativity scale of A. Maslow’s PSA test and Originality scale of the STCT was conducted with Pearson’s correlation coefficient for the sample of 151 high-school students. The correlation analysis showed a high level of relation between the scores of the two scales ($r=0,207$; $p<0,001$), which made it possible to infer the conclusions about creativity solely based on the data of the STCT scale.

It is necessary to further analyze the results of the tests for the significance of differences in Creativity between the students of the general-education school and educational organizations of the advanced level (gymnasiums). Psychological studies repeatedly showed the absence of significant differences in creativity between the city and the village school students, and between the students attending general-education school and educational organizations of the advanced academic level. However, we conducted such analysis and it was mostly of explanatory and divulgatory nature.

In a small sample, the drawings that resulted from creative thinking in P. Torrance's STCT did not reveal differences in creativity characteristics of originality and flexibility in the solutions of nonstandard problems. The same correspondence was analyzed in a large sample (1,800 people) with consideration of insignificant but recurring facts of prevalence of the female sample of high-school students upon all characteristics related to creativity. A large sample would help clarifying whether such phenomenon is actually present.

4.2. Analysis of the diagnostic material from the perspective of different approaches towards studying creativity and creative activity

Other data of the conducted study are currently being thoroughly analyzed and interpreted. The obtained results can be grouped in four sections that are connected by the content orientation of the conducted work.

The first section is constituted by the results of the data analysis that reveal the *connection of high-school students' creativity characteristics with psychological and constitutional characteristics* (i.e., temperament type). To this end, we used H. Eysenck's Psychological Inventory (EPI) in order to define the temperament type. The results obtained in a large sample of participants of a single age group (over 1,000 high-school students) substantially enrich the cohort of cross-cultural studies conducted within the national research in differential psychology.

First of all, the normality of distribution was evaluated for the scores on the scales of Extraversion, Introversion and Neuroticism for the sample of high-school students. Discussing the distribution of the obtained data also helps the authors to explain and describe the revealed phenomena and their mechanisms. It is also necessary to correspond these results with other studies in differential psychology on similar topics. Such paradigms and approach allow extracting the largest amount of information for developing psychological and pedagogic recommendations.

The second section of the presented data reflects the specifics of the *relation between creativity characteristics and social-demographic characteristics*, such as high-school students' gender (young men and women), their ethnical-cultural affiliation (including the consideration of mixed marriages among their parents), family size (big/small families). An originally developed survey was used for collecting the diagnostic material.

Analysis of the obtained and processed empirical data allowed revealing a number of statistical patterns and tendencies that defined the establishment and development of creative skills in high-school students. Primarily, they include the type of family, in which the students were raised. Here, large families (with three or more children) have a priority; 43.4 % of the sample (530 high-school students) fall into this category. The results of the comprehensive survey demonstrate that the students from the participating schools in Ketchenerovskiy and Yustinkiy districts mostly come from large traditional (Kalmyk) families – 57.2 %. In the school of Yashkul' this parameter is equal to 42.7 %. In the school of Troitskoe, 33,3 % (one third) of high-school students come from this category of families; however, this school has the highest number of respondents from average-sized families (52.8 %). The second and third positions in this category belong to the high-school students from Yashkul' (41.6 %), Ketchenerovskiy and Yustinkiy (33.3 %) districts. The number of small families in the evaluated school varies from 9.5 % to 15.7 % (Table 3).

Table 3. Quantitative characteristics of the distribution of families with different number of children in the regions with compact residence of the native population, %

Schools	Yashkul'	Troitskoe	Ketchenerovskiy and Yustinkiy districts
Families			
Small	42.7	33.3	57.2
Average	41.6	52.8	33.3
Large	15.7	13.9	9.5

It is necessary to point out that the lifestyle, rituals and tradition, folklore, crafts, family behaviors and mentoring process of nomadic Kalmyk people have long attracted the attention of researchers of Mongolian culture, ethnography researchers, experts in the oral folk art and writers. The studies and descriptions of Kalmyk families, parent-children relationships and other family bonds have a special place in their works and diary entries. In the present study, these problems remain relevant and important. The works of Kalmyk researchers state and argue the advantages of a traditional Kalmyk family (Sharmandzhiev, 2014). Such advantages include so-called «cults», such as the cult of family hearth, father and mother, children and ancestors – founders and successors of the family. Since ancient times, a large family with many children was considered as the primordial value of nomadic Kalmyk people. The divorce was accepted only in one case – in the absence of children.

The third section includes the results of *corresponding the respondents' creativity characteristics with their individual personality traits*, such as academic performance, and intensiveness and productivity of their extracurricular activities of their choice. They were evaluated by an originally developed survey. High academic performance was defined by the respondents' statement of having mostly «5» and «4» school grades (on a 2-5 scale); the average level included «5», «4» and «3» grades; and the low level was defined by the presence of «3» and «2» grades. High level of intensiveness and productivity of extracurricular activities of the students' choice was defined as a combination of extracurricular activity (at least two different directions) with effective performance in competitions, school Olympiads and other competitive events of different levels.

The highest level of academic performance («excellent», «excellent and good», «good» grades) was observed in secondary schools of Ketchenerovskiy and Yustinskiy districts – 47.6 %. The level of education quality in Yashkul' and Troitskoe schools was almost equal – 25.8 % and 25 %, respectively. The second place in the academic performance (with «excellent», «good» and «satisfactory» grades) belonged to the high-school students from general-education schools of Yashkul' (66.3 %), Troitskoe (63.9 %), Ketchenerovskiy and Yustinskiy districts (47.6 %). Low level of academic performance was revealed in a small number of students in the schools of Troitskoe (11.1 %), Yashkul' (6.8 %) and Ketchenerovskiy and Yustinskiy districts (4.8 %) (Table 4).

Table 4. Quantitative characteristics of the distribution of high-school students with different levels of academic performance in rural regions of the Republic of Kalmykia, %

Schools	Yashkul'	Troitskoe	Ketchenerovskiy and Yustinskiy districts
«5», «5 and 4», «4»	25.8	25.0	47.6
«5», «4», «3»	66.3	63.9	47.6
«3» and «2»	6.8	11.1	4.8
Did not reply	1.1	0	0

Among this group of characteristics, we additionally analyzed the statements of the method of Unfinished sentences that were aimed at studying verbal manifestations of emotional state of concern. The participants were required to finish the following statements: «At the moment, I am most worried about...», «Recently, I have mostly been concerned about...», «This year, I mostly worry about...», «My biggest concern is...», «I am very afraid that...». The prediction was that high-school students with different (high, average or low) levels of creativity and academic performance would present different modalities.

The study revealed the array of needs and interests of high-school students of the general-education organizations. The majority of participants (with the similar number for the gymnasiums) preferred extracurricular activities in amateur sports sections, including chess. Here, the students of Ketchenerovskiy and Yustinskiy districts were ranked first – 45.8 %. The high-school students of Yashkul' were ranked second with a rather large gap between them and the first place – by 16.6 % less. The participants from Troitskoe school were ranked last – 25.1 %. The same

tendency of choosing sports as extracurricular activity was observed for the students of youth athletic centers: 25.5 % in Yashkul' school, 19.2 % in Troitskoe school, and 18.1 % in schools of Ketchenerovskiy and Yustinkiy districts.

Even less high-school students attended youth art schools: 10.4 % in Yashkul' school, 7.7 % in Troitskoe school, and 3.6 % in schools of Ketchenerovskiy and Yustinkiy districts. However, it is necessary to consider that within the schools of Ketchenerovskiy and Yustinkiy districts there were extracurricular art workshops that were attended by 9.6 % of participants. Other directions of the system of additional (extracurricular) education, such as the ones that developed leadership, communicative and other social personality traits and qualities were not largely reflected in the results of the comprehensive survey (they ranged from 1.9 % to 2.6 %).

The obtained results were certainly affected by unreasonable cancellation of youth musical and art schools in a number of regions of the Republic. It is especially obvious on the example of the schools of Ketchenerovskiy and Yustinkiy districts. Here, the percentage of high-school students that attended youth musical school was 10.8 %, while the same percentage was higher in the schools of Yashkul' (15.1 %) and Troitskoe (17.3 %) where the segments of extracurricular education were integrated in the regular educational process in school. To some extent, such situation was compensated by the pedagogical staff members that organized vocal, instrumental and choreographic groups, studios and workshops.

The fourth section of the diagnostic data is analyzed from *the position of respondents' ethnical affiliation to the ethnical-cultural environment*. What is the rationale behind addressing this delicate topic, which might raise issues of political correctness?

Firstly, there is a straightforward request from the educational and cultural institutions of the Republic that restores its ethnical-cultural identity, which has remained at the verge of extinction for a long time during Stalin's repressions (the «Ulusy» operation, 1943).

Secondly, it is obvious that general education is intentionally satiated with ethnical-cultural component (learning the Kalmyk language as native, along with the Russian language, in the schools of the Republic; stimulating the mentoring work that employs ethnical-cultural component; organizing national regional linguistic, literature and folk competitions, including «Dzhangariada», etc.).

Thirdly, the Republic provides financial support to the research projects that include the ethnical-cultural components. Their successful completion is guaranteed by the high standing of the Institute of Kalmyk Philology and Eastern Studies within Kalmyk State University and Kalmyk Institute of Humanitarian Studies, which is affiliated to the Russian Academy of Sciences.

Fourthly, there are objective reasons for dividing the sample into groups that are close to Kalmyk, Russian, Ukrainian and other ethnical cultures, due to the established traditions of close proximity in the residence of people of different nationalities in the rural area with the traditions of settled farming. For example, Ketcheneriy is mostly populated by Kalmyk people, Troitskoe – by Russians, and Sadovoe – by Ukrainians.

The fifth section is formed by *the factor analysis of all characteristics*. It was conducted with STATISTICA software. The distribution of the diagnostic data upon the factors would allow establishing the hierarchy of the influence of various complex environmental conditions on the creativity characteristics. This would provide an opportunity to clarify the range of directions for developing detailed recommendations for teachers, high-school students and their parents, which they can use for considering, activating and developing students' creative abilities at the stage of early youth during the transition to the new social environment.

5. Conclusion

As a result of the study that was conducted in general-education organizations of the Republic of Kalmykia (including high-level ones and ones with ethnical-cultural orientation), the authors developed, validated and verified a research-scientific project that allowed performing an innovative study and stimulating the development of creative skills in school students. Originality and effectiveness of the developed innovative project are characterized by the following aspects, traits and qualities:

1. Originality and specificity of theoretical, methodological and practice-oriented validation of the defined set of problems. The defined goal is reached by the integration of various psychological approaches, along with the advances of adjacent scientific disciplines. Using the

interdisciplinary approach allows synthesizing new knowledge that was obtained at the border of various sciences.

2. Comprehensive diagnostic inventory. During the empirical experimental work, the authors corrected and rationalized an adequate diagnostic inventory of comprehensive nature, which actively employed the measuring and testing materials from both life-science and humanistic approaches and which required the integration of authors' original developments.

3. The context of developmental psychology in the study. Novelty and productivity of the developed project consists in the study's focus on the age of early youth, i.e. the period when high-school students transit from school childhood to adult life. Psychological characteristics of creativity, which are extended to the intellectual, personal and social aspects of young people's lives, are considered to be the guarantee of their successful self-identification and the potential of human resources for the following generations.

4. Consideration of the traditional national structure of family life. A family, the climate in this social structure and the type of parent-children relationships lay an important part in the establishment and development of high-school students' creative skills and creativity as a personality trait. According to the conducted studies, high-school students from traditional large Kalmyk families present higher levels of creativity. This phenomenon was revealed throughout the Republic territory, especially in places with compact residence of the Kalmyk people.

5. Possibilities of introducing the materials of the study in different Russian regions and abroad. Since the study program was verified not only in the steep region but also in West Kazakhstan, it is reasonable to extrapolate the developed research project to the appropriate educational organizations of some countries from the Eurasian Economic Union in accordance with their specifics.

E.A. Sokalskiy (2012, 2013a, 2013b, 2014, 2015a, 2015b), the primary developer of the study, initiated the distribution of study materials that were presented as monographs, textbooks and handbooks, and articles, along with presenting the results of its applied integration in school education during scientific events in Moscow, Ufa, Irkutsk, Elista, etc.

The team of authors is working on many other interesting research ideas.

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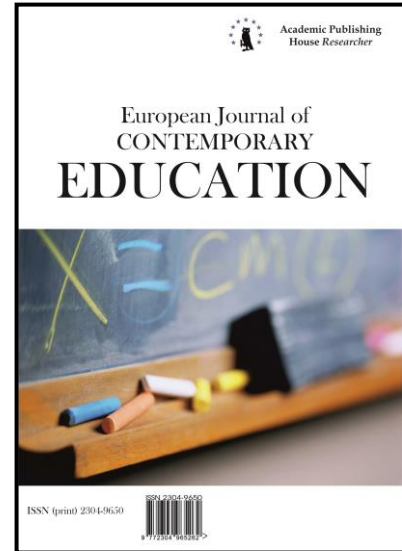
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The Models of Higher Education in Russia and European Countries at the beginning of the XXIst century: the Main Directions of Development

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Abstract

The article examines current trends in the development of the national models of higher education in Russia and European countries. The paper reveals the key problems of their functioning in the context of the processes of globalization, standardization, and integration into the pan-European and global educational space. These processes are described through the prism of the national interests of the states. Emerging from the comparative description, content presentation and qualitative analysis, the article assesses the level of development of the national models of higher education, i.e., Russian, European and American. This allowed identifying key similarities, as well as the most important differences, which mainly stem from the difference in the state regulation of national educational systems. It is the role of the state that is leading in the formation of national educational systems and the creation of high-quality models of higher education. The state is also responsible for the transformation and adaptation of these models. The models target providing the national and world labor market with highly professional human resources.

Based on the comparative aspects outlined in the article, as well as on the qualitative analysis data, the authors have come to the following main conclusions regarding the trends and prospects for the development of the Russian higher education sector:

a) Firstly, the Russian model of higher education was built during an accelerated transition from a one-level to a multilevel education. The result of this shift is the labor market disbalance,

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which nowadays does not allow the formation of the adequate perception of specialists holding a “bachelor’s degree” which is unfamiliar and obscure to many employers;

b) Secondly, the Russian educational system, and the higher education model, replicate the Western European and American approaches without considering the realities of the national educational market and the labor market. Therefore, the high proportion of the population with higher education cannot provide the necessary socio-economic development potential of the country;

c) Thirdly, the reform of the Russian model of higher education should continue but not in terms of accelerating the processes of its integration into the world educational system. There is much evidence that the correct direction lies within the domain of creating incentives and conditions that will ensure the training of highly skilled professionals correlating with the market demand.

Keywords: education, higher education, models of education, European policy in the field of education, Bologna process, modernization of education, European educational models, Russian model of higher education, multilevel educational system.

1. Introduction

The sphere of higher education in all countries of the world, including the Russian Federation, is undergoing fundamental changes. The 21st century saw an unprecedented increase in the quality level of the higher educational system. Education becomes a more complex, global system, but at the same time, the role of international recognition of national educational systems’ quality or individual components of these systems is growing.

In the last decade, new actors and objectives, conditions and factors, programs, norms, standards, criteria for assessing the results of the functioning and development of the world and national educational systems have emerged. Globalization, integration, standardization and internationalization are an important driving force behind these changes, resulting in the formation of various national models of higher education. These models search for the most effective constructional option to improve the quality level of the educational system or its individual components.

Current national models of higher education target the formation of highly intelligent human resources that have the necessary competencies for modern markets. There is much evidence that intended future experts should be capable of continuous independent development, the renewal and reproduction of knowledge. In this regard, the sphere of higher education in modern conditions should be maximally involved in the so-called “world technology race”, associated with the competition of knowledge and requiring constant modernization ([Strategicheskiye zadachi strany...](#)). Researchers ([Kuchukov, 2010](#); [Curaj, 2012](#); [Gluzman, 2018](#)) argue that “amortization of knowledge” in today’s conditions of science and technology development occurs every year and a half.

It is this periodicity, in the authors’ view, that should be considered as the defining “benchmark” for reviewing the goals and improving the structure of the national models of higher education. As a response to such trends at the beginning of the 21st century, in Russia, as in many countries in the world, major changes in higher education are taking place in the context of the pan-European integration processes.

The Russian sphere of higher education emerges in the works of educational experts ([Demidenko, 2005](#), [Nesterov, 2012](#), etc.) as a key to solving urgent cultural and socio-political problems, as well as eradicating the problems of the economic, scientific and technical spheres. This system needs a radical reform today. For many decades of the XXth century, the sphere of higher education in Russia was conservative, and its model was not open to change. Only in the 1990s, the vector of its development was changed towards a competency-based, open to innovation paradigm. But it should be recognized that these trends, however, to a lesser extent, manifested themselves in the national models of higher education in other countries.

In modern conditions, the situation has dramatically changed, the rate of change has significantly increased. It requires an accelerated evolution of educational models on a national scale. However, it is well known that accelerated evolution very often causes unexpected and, in some cases, negative consequences. These outcomes require special attention of science experts and should target the improvement of Russian educational models and their quality in comparison

with similar processes and phenomena in foreign countries. The study of this problem in the context of the sphere of national higher education is the focus of the paper. The authors are sure that these problems are of great importance. It is necessary to emphasize the fact that today the search for the most effective educational models and directions for their further development appears as one of the topical and at the same time debatable directions of the modernization of higher education (not only in Russia but also in other countries). The directions of educational development encompass both theoretical-methodological and practical aspects.

Proceeding from the thesis, the authors assume that during higher education models' development the countries of the world continue to maintain their national specifics, despite the impact of globalization processes. However, the influence of universal educational integrative tendencies and the requirements for the genesis of a unified educational space increasingly exhibit common typological features. Within the framework of this hypothesis and in accordance with the stated goal of the research, the results of which are presented in this article, the authors highlighted such problems as studying the current state of the Russian national educational models and the models in European countries. The authors also identified promising directions for their development, describing the problems and factors affecting the evolution of the educational system, as well as conducted comparative analysis of key trends in the genesis of higher education models.

2. Materials and methods

The research stems from the methodological foundations of applying the systematic, historical, evolutionary, descriptive, comparative, structural approaches. These approaches allowed the authors to interpret the problem under study in the context of its numerous components. The components determine the processes of formation, functioning and evolution of higher education models. In accordance with the provisions of the system approach, the authors used a set of methods and techniques to test the hypothesis and solve the set tasks, which are as follows:

- the analytical and synthetic study of scientific sources related to the problem under analysis;
- the logical methods of the analysis of the phenomena under discussion, i.e., interpretation, comparison, concretization, generalization, extrapolation, synthesis, universalization;
- the method of problem-content analysis;
- the method of analogies, observation, analysis of secondary data, the methods of quantitative and qualitative processing of actual data.

To fix the differences in the development of higher education models in Russia and other countries, the authors applied research methods which included both primary observation and secondary “abstract study” methods. They presuppose the systematization and analysis of data submitted by Russian experts (Grebnev, 2004; Maykova, 2004; Sorokina, 2004; Pokholkov et al., 2004; Demidenko, 2005; Lobovskaya et al., 2005; Razumova, 2009; Kislitsyn, 2010; Nesterov, 2012; Tsiguleva, 2014; Komleva, 2017; Vorozheykina, 2017; Gluzman, 2018, etc.) and foreign experts (Gapinski, 2010; Winter, 2010; Meny 2014; Hotson, 2016; Enders *et al.*, 2016; Praneviciene *et al.*, 2017; Matthews, 2017, etc.). Because of the limited volume of the publication space, the authors highlighted here only the works of scientists and researchers who have publications in leading scientific periodicals (encompassing those included in international citation bases). The authors also used monographic and dissertational studies, methodological online resources and analytical expert reports of international organizations, e.g., “Modernization of Higher Education”, “Higher Education in the EU”, “National Reforms in Higher Education”. These distinguished works provided an empirical basis for the study.

The quantitative study of the data stems from statistical indicators presented by such sources as the reports on the world educational system's situation (the Organization for Economic Cooperation and Development – “Education at a Glance, 2017”), analytical data (Monitor ICEF – “Megatrend, 2017”) which describe international educational industry. Simultaneously, to objectively identify the causes and factors that influenced the development of national models of education, the authors supplemented the quantitative analysis of the data. The authors applied the methods of qualitative analysis, and problem and content analysis to present the resulting picture in a descriptive context (Education at a Glance, 2017; Megatrend, 2017).

To determine the sample, the authors applied the technique of nonrandom explication of materials in correlation with the thematic, chronological and geographical factors. The geography of the study emerges from studying educational models operating in Russia, as well as Western European countries, predominantly, and Eastern European countries, to a lesser extent. From the chronological point of view, the main period of the study is limited to the time framework of 2000-2018. To carry out a more detailed study of the causes, trends and factors that influenced the development of higher education models in Russia and other countries described in the paper, the authors highlighted the genesis of the educational structures at the end of the XXth century (namely in the 1990's).

3. Results

One of the major findings is the fact that the study highlighted the quantitative analysis of statistical data. The data are to some extent the markers for the development of national models of higher education. This assumption is further developed in the article in the qualitative analysis' part. In the context of the data study presented in the "Education at a Glance" report (2017) published by "The Organization for Economic Cooperation and Development", the authors discovered that there are five countries, which occupy leading positions in the development of higher professional education at the end of 2017 (see Figure 1). These countries are as follows:

a) Canada. In this country in 2017, 57 % of Canadian population received higher education. This is a spectacular achievement compared with 2012 when only 52 % graduated from higher education organizations.

b) Russia. Compared with 2012, the country dropped from the 1st to the 2nd place (54 % and 56 % in 2012 and in 2017, respectively),

c) Israel (46 % and 50 %), Japan (45 % and 50 %)/

d) The United Kingdom (42 % and 46 %), and the United States (46 % in 2017) shared the 5th position, although in 2012 they were not among the five top-leaders.

e) Australia (44 % in 2017, in 2012 Australia was not among the five top-leaders).

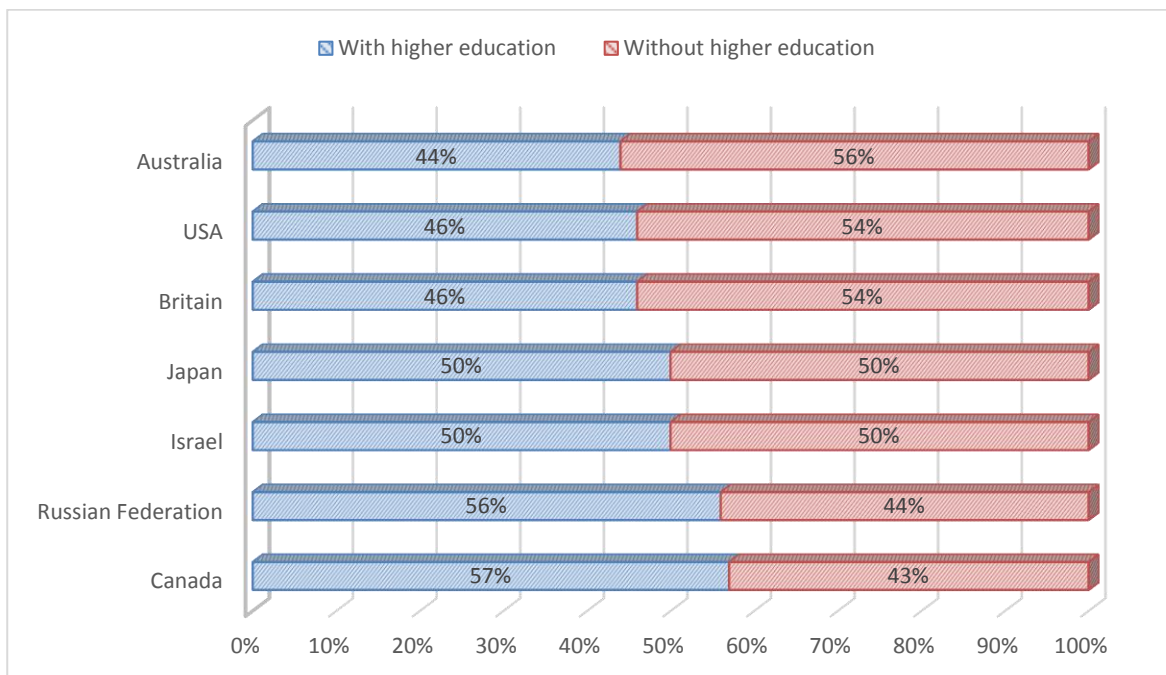


Fig. 1. The proportion of the population with higher education in the leading countries in 2017 ([Education at a Glance, 2017](#))

The comparison with the data for previous years (beginning with the 1990s) indicates that by now there has been an almost twofold increase in the number of people receiving higher education. Such a significant interest of the world population was undoubtedly reflected in the evolution of

higher education models. The models act as a catalyst for the rapid development of higher education in quantitative and qualitative dimensions at the beginning of the XXIst century.

During the analysis of theoretical materials (Lobovskaya et al., 2005; Razumova, 2009; Kislitsyn, 2010; Nesterov, 2012; Tsiguleva, 2014; Komleva, 2017), the authors identified that the beginning of the XXIst century emerges as the period of the active modernization of European policy in the sphere of education. It determined the strategies for the development of national educational models, including the strategies for the development of higher education. The development encompassed such conceptually important basic vectors in the field of education as: continuity, openness, the complexity and fundamentality of education, the globalization of the educational space and standardization improving the quality of educational results (“A Memorandum of Lifelong Learning”, 2000, “Education and Training 2010”, “Strategic Framework for European Cooperation in Education and Training”, ET 2020, etc.). The main principles that determined the content of modern models of higher education were as follows:

a) the provision of continuous and universal access to basic knowledge and educational skills necessary for inclusion in a single professional, economic, educational, information society;

b) the provision of models of education with new methods of teaching and active training, encouraging a creative approach to learning to ensure its continuity, fundamental and integrated purposes, meeting the requirements of the “knowledge society”;

c) the increased investment in human resources; the development and introduction of new systems for assessing education to improve its quality;

d) the development of methods and practices of mentoring and counseling to ensure practice-oriented education, free access of everyone to information on educational opportunities in Europe;

e) ensuring professional mobility of training staff and students and, at the same time, bringing educational opportunities closer to home through a network of training and advisory posts, as well as information technology opportunities to preserve the professional potential of specialists in the field.

In accordance with the objectives and specific directions, the functioning of the models of national education in the countries of the European Union (Progress towards ..., 2009) at its highest level should reach the following quantitative indicators by 2020: among the population aged 30-34, the proportion of people with higher education should exceed 40 %; at least 15 % of adults should be engaged in lifelong learning (Higher education in the EU...; the Modernization of Higher Education, 2014; National Reforms...).

The process of integration and globalization contributed to the creation of world standards. The cause of these standards is urgent since the 1980s. The world organizations working in this field are the International Organization for Standardization, the Initiative Center for Educational Research (CERL), the European Center for the Development of Professional Training (CEDEFOR). But the development of the standardization mechanism emerged from within the framework of national educational systems, which determined the existence of different approaches to educational standards. Accordingly, it is possible to single out the so-called Russian, European and American approaches (Matthews, 2017; Nesterov, 2012; Pokholkov et al., 2004; Razumova, 2009; Tsiguleva, 2014). In Russia, the development of a national model of higher education stems from an approach to the standardization, associated primarily with the state regulation of educational content. Russian standardization emerges from the historically conditioned necessity of ordering its significant and variable content. There was a radical change in the structure of educational standards at the end of the XXth century when the state controlled the standards. The opposite approach is observed, for example, in the USA model. The European model determines the desire to balance the content standardization of education on the part of the state and the independence of regions and educational institutions. European educational experts develop and approve of the requirements system at a local level while maintaining their accountability to the state control, as well as public participation and influence. Comparing with Russia, the degree of public participation and influence in Europe can be estimated as sufficiently high (Komleva, 2017; Vorozheykina, 2007; Gluzman, 2018).

In the context of the historical aspect, it should be noted that the significant steps outlined in the Bologna Declaration (1999-2018) (Bologna Process ...) were aimed at making the national higher education models more transparent and being as comparable as possible with the same type of educational cycles in the world (bachelor’s – master’s degree, subsequently expanded to a three-

level educational cycle). The mutual recognition of academic qualifications emerged from the introduction of a single system of easily convertible credit units and comparable degrees, as well as the same forms of recording the qualifications. The creation of common criteria for assessing the quality of teaching and education, integrated training programs and research. It contributed a lot to the greater attractiveness of the European educational system. The Bologna process targeted the creation of a unified zone of European higher education by 2010, which, it must be admitted, does not yet function in full force. However, it is the common belief of some experts that the European educational model is much ahead of the Anglo-Saxon education tradition (Kislitsyn, 2010).

To achieve the objectives, the higher education models were subjects for re-evaluation at national and European levels. Educational experts reorganized and changed the higher education program. They significantly developed the system of higher education based on scientific research. Educational experts improved the quality and standardization system, a common terminology system, the compatibility of educational institutions, programs and degrees.

There is much evidence that the inclusion in the Bologna process did not mean for most leading European countries (unlike Russia) the beginning of a new stage of radical reforms in higher education. Bologna process in Europe resulted in the further improvement of already existing models. There is much concern that the magnitude of the tasks that the Bologna Process laid down, the absence of effective algorithms and other methodological foundations, naturally revealed the complexities and contradictions in the construction of a unified system for obtaining higher education in the participating countries. Obviously, they emerged, in particular, in the UK, Germany, and also in Finland. The need for significant changes in the national educational models of higher education did not immediately come to the fore among the heads of universities' authorities and ministries in some states.

For example, in Finland, in the process of reforming the national model in the direction of its harmonization with the pan-European level, there was a discrepancy between the demand and the supply of educational services ([Higher Education in the EU...; National Reforms...](#)). The existing inflexible system of entrance exams, the extended period of study, the high drop-out rate, unhealthy competition among universities and polytechnic institutes were minimized only after the country's educational system transitioned to a two-stage model ([Ahola et al., 2003; Gapinski, 2010](#)). Significant problems in reforming the national model of education were also noted in Germany, where modernization faced such contradictions as transitions from bachelor's, master's and doctoral phases. There were problems of a misconnection between higher education and professional activity. Of much importance is the fact that before the beginning of the harmonization processes German universities offered single-level educational programs, i.e., analogues of the previous Russian system. In Germany, technical departments' students graduated with a diploma in science or could obtain a master's degree, i.e., Magister Artium. The students of social and theological universities and departments, majoring in liberal arts and humanities, were to take the state examination (Staatsexamen) within the framework of independent qualification (for civil servants or state-controlled jobs). But unlike in Russian higher educational system where the mass transition to a two-level model occurred simultaneously in 2011, in Germany bachelor's and master's degrees were emerging gradually, with the parallel preservation of the traditional one-level structure and new learning structures ([Ahola et al., 2003, Kislitsyn, 2010, Tsiguleva, 2014; Gapinski, 2010; Winter, 2010](#)).

At the same time, during the unification of the national model, the researchers of the Technical University of Dresden ([Bologna Process...](#)), as well as several other research groups ([Focus on Higher Education in Europe...; European higher education area...](#)), recorded critical shortcomings in this area. The main topical points of these issues are as follows:

- the subjectivity of the intensity perception of the learning process by students and teachers;
- clarity shortcomings in the modular construction, the exam system, the learning objectives, the recognition of results achieved outside the learning process and the inability to learn according to an individual plan;
- the contradictions of some requirements to curricula general requirements for universities in Germany, especially in regional universities;
- unlike in traditional diploma-oriented system of education, there was less freedom in organizing the educational process, as a result, less attention was paid to students' practice;

- almost half of the problems in the search for work by bachelor graduates arose from the fact that employers required diplomas of a different type;
- the recognition by German universities of studies' results in foreign universities is hampered;
- the problems concerning the difference of German studying plans with the plan of a foreign university.

The existing difficulties in modernizing and harmonizing the national model led Germany to the fact that the country began to experience a deficit of highly qualified specialists, which in subsequent years (2015-2017) was largely compensated by attracting foreign students and creating conditions for their demand in Germany. Unlike German policy, the policy of reforming the traditional national educational model in the UK, which still maintains its stability, now, encompasses the combination of independent actions, which is clearly discernible in parallel with the European harmonization and unification course. One of the surviving advantages of British higher education national model, according to the researchers (Winter, 2010; Meny 2014, Hotson, 2016), is an extremely flexible curriculum. Students can study a wide variety of disciplines, even if they are taught at different faculties.

It should be noted that the two-level system of training introduced within the framework of European harmonization processes was traditional for the British model of higher education. The only significant problem in this area for the country is the need for the continued integration of single-level master programs into the structure proposed by the Bologna Declaration. Most of the countries of Eastern Europe preferred a gradual transition to a two-level education system. This preference stems from the fact that, unlike the western sector, they had the most obvious differences in this area. For example, in Poland, along with the traditional five-year course of study, three-year professional training programs emerged giving the right to receive a bachelor's degree. At the same time, some countries paid more attention to the elaboration of detailed legislative acts and "roadmaps" regulating all aspects of the transformation at the state level.

By the beginning of the XXst century, it is possible to distinguish two established directions of the modernization of national higher education models, i.e., intensive and slow. Thus, the intensification of international cooperation, the processes of globalization and internationalization in the international educational market, and the participation in the programs of the European Union (such as Tempus and others), stimulated several European countries to actively revise and unify, at an accelerated pace, their educational systems. In Italy, Norway, the Netherlands, the harmonization processes have led to rapid changes in legislation which assisted the adaptation of a single European model. Other states actively analyzed the issues of integration into the Bologna space with the aim of joining the ongoing processes and increasing the competitiveness of national educational models, stretching the educational reforms for several years. The summit of the implementation of the reforms of national models occurred in the period 2010-2012 (Bologna Process...). By 2015, 49 countries (not only from Europe) and the European Commission have become participants of the Bologna Process, which have committed themselves to reforming national systems and models in accordance with the main provisions of the document (European Higher Education Area...; National Reforms...). In 11 countries that signed the Bologna Declaration initially, the process of reforming the national models of higher education is fully implemented at the state level. However, in other countries, there are significant differences in its implementation. For example, on a voluntary basis, the Bologna process is currently being implemented in countries such as Belarus, Egypt, Israel, the Palestinian territories, Kyrgyzstan and Tajikistan (Komleva, 2017; Vorozheykina, 2007).

As of early 2018, virtually all European countries harmonized their national models of higher education in accordance with the requirements of multilevel training. At the same time, some countries, with a focus on national traditions and the identity of educational models, are following the transformation of traditional five-year programs (in the field of engineering, natural sciences, medicine, etc.) into mono-training programs, culminating with a master's degree corresponding to all-European requirements. Others (for example, Finland, as stated above) at the state level recognized the inadequacy of the three-year bachelor's cycle for graduate preparation and decided on the master's degree as the main one, which, if possible, should be received by all university students.

As for Russia, in the process of modernization of the higher education model, the country has chosen its own unique trajectory and strategy, in contrast to European countries. Russia abolished the legislatively agreed percentage of budget spending on education, retained state support for only a small part of universities, put the education prices on the shoulders of citizens, simultaneously, fixed and detailed the standards of education at the state level, defining the basis for an objective assessment of the level of education and qualifications of graduates independent from the forms of education. However, the model of national education, which historically existed for quite a long time and functioned in a closed, inert mode, acted as a catalyst for some problems faced by Russia in the implementation of harmonization processes:

- a) the inertia of the perception of the bachelor's degree by the labor market;
- b) the unwillingness of some Russian universities to act as an equal partner in mobility programs;
- c) the lack of flexibility, adaptability of training programs;
- d) the inadequate readiness of many universities and educators to form new graduates' competencies aimed at mobility in the labor market.

The surveys of students and potential employers confirm the above theses. For example, the survey of graduate students of the Russian Academy of Science and Technology (the researchers interviewed 213 of their students studying in the social and humanities department) and the interview with the Peoples' Friendship University of Russia graduates (268 students studying natural science and technology) shows the following results of the graduates' satisfaction with the quality of the education received. The research also indicates the key problems of Russian education from the point of view of students (Table 1).

Table 1. The structure of answers of students of final graduate courses of the Russian Academy of Sciences and the Peoples' Friendship University of Russia (the question: "What is the main reason for choosing the university where you studied")?

	Variants of Answers						total amount
	education at a prestigious university	training in state-financed opened places	availability of a research base in the university	the availability of employment programs in the university	availability of social and domestic facilities in the university	other	
graduate students studying at social and humanities department	69 32,4%	21 9,9%	15 7,0%	55 25,8%	43 20,2%	10 4,7%	213 100%
graduate students studying at science and technology departments	62 23,1%	29 10,8%	77 28,7%	38 14,2%	50 18,7%	12 4,5%	268 100%
Total	131	50	92	93	93	22	481
<i>The number of degrees of freedom 5, the value of the criterion $\chi^2 = 41,507$ (The critical value of χ^2 at the significance level $p = 0.01$ is 15,086)</i>							

The prestige of the education received, the availability of employment programs and the availability of a social base are the main reasons for choosing a university, according to the students of the social and humanities departments. For students of technical departments, the universities' own research base is more important. All other reasons for choosing an educational institution remain the same. It should be noted that the descriptions of Russian higher education key problems almost completely coincide (Table 2).

Table 2. The structure of answers of students of final graduation courses of the Russian Academy of Sciences and the Peoples' Friendship University of Russia (the question: "What is the main problem of Russian higher education, in your opinion")?

	Variants of Answers						Total Amount
	Educational standard, which equals all abilities	The lack of independent choice of disciplines	The weak interrelation of the obtained knowledge with the future	Obsolete educational programs	The weak interest of the labor market in graduates of universities	other	
graduate students studying at the social and humanities department	0	59	31	62	53	8	213
	0%	27,7%	14,6%	29,1%	24,9%	3,8%	100%
graduate students studying at science and technology departments	21	77	30	78	50	12	268
	7,8%	28,7%	11,2%	29,1%	18,7%	4,5%	100%
Total	131	50	92	93	93	22	481

The number of degrees of freedom 5, the value of the criterion $\chi^2 = 20,008$ (The critical value of χ^2 at the significance level $p = 0.01$ is 15,086)

In addition, the authors conducted a survey of the employers (the heads of personnel services or directors of small, medium and large enterprises operating in the manufacturing and industrial sectors located in Moscow and the Moscow Region). The distribution of answers on satisfaction with a set of professional competencies with which graduates of higher education institutions come to the labor market are presented [Table 3](#).

Table 3. The structure of the answers of employers (the question: "Are you satisfied with the quality of the basic professional competencies with which graduates of Russian universities come to the labor market?")

	Variants of Answers					Total Amount
	Certainly YES	Probably YES	Probably NO	Certainly NO	Difficult to answer	
The representatives and heads of small enterprises	31	33	45	63	3	175
The representatives and heads of medium-sized enterprises	27	40	66	39	5	177
The representatives and heads of large enterprises	18	22	57	40	7	144
Total	76	95	168	142	15	496

The number of degrees of freedom 8, the value of the criterion $\chi^2 = 17,741$ (The critical value of χ^2 at the significance level $p = 0.05$ is 15.507)

Most employers and their representatives (more than 62 % of the total number of respondents) answered that they were not satisfied with the quality of the basic professional competencies of graduates of higher education institutions. As far as the main factors that may be

the reason for the low quality of the acquired professional competencies are concerned, employers identify the following (Table 4).

Table 4. Structure of employers' answers (the question: "What, in your opinion, are the main reasons for the low quality of the basic professional competencies of university graduates?")

	Variants of Answers (possible to specify a few)					Total Amount
	Obsolete programs	Weak connection between theory and practice	Universities do not develop labor mobility among students	Graduates of universities do not have unique knowledge and cannot compete in the labor market	Difficult to answer	
The representatives and heads of small enterprises	40	159	14	39	5	257
The representatives and heads of medium-sized enterprises	71	88	37	56	8	260
The representatives and heads of large enterprises	90	82	41	76	3	292
Total	201	329	92	171	16	809
<i>The number of degrees of freedom 8, the value of the criterion $\chi^2 = 78,692$ (The critical value of χ^2 at the significance level $p = 0.01$ is 20.09)</i>						

Most respondents who represent small enterprises indicated that the problem of the low quality of the professional competencies of university graduates consists in a weak link between theory and practice. For small businesses, this is especially important, since the organization of labor in them involves the combination of professional positions. This, in turn, means that the training programs in higher education institutions are largely outdated, and, accordingly, the graduates of universities do not have any unique skills, so their competitiveness in the labor market is very low.

The results of the analysis show that the Russian system of education differs from other national systems. The major difference lies in the term of study, the number of disciplines studied during a semester and the choice of the educational trajectory by the student. Neither the EU nor other national models of higher education, individually, have a single national curriculum or educational standard. However, in the EU, up to 50 % of subjects are selected by students individually. It is also necessary to consider the existing, rather significantly different cultural and historical paradigms, the history of the development of the educational system in Europe and Russia.

So, starting from 2011, higher professional education in Russia, as the authors have already noted, integrated the "Bachelor-Master" structure in its model with the accelerated pace. The foundations of this transfer were fixed by the Federal State Educational Standards, i.e., the orientation toward learning outcomes expressed in the competence format and considering educational activities in credit units. At the same time, only 50 % of the bachelor's curriculum emerged as the basic one. For the master's program "Variable Part" was more than 70 %. It should also be noted that, even in the "mandatory" part of the program, except for a few positions in the course of humanities and socio-economic disciplines, the first place belongs to nonfixed training courses and the requirements to the competencies formed as a result of studying the corresponding cycle of disciplines.

In the Russian model, several factors, including the already isolated historical one, significantly restrict the multilevel education that is being introduced. Now, Russian higher

education in practice remains close to the one-level approach, having absorbed not the trends of the European educational model, but the original integration of the historically established Russian model with the Anglo-American model as the basis for its development. Unlike in Western universities, in Russian universities, the bachelor's degree is not yet fully adapted to national educational traditions. The training period is 4 years which is by 1 year less than in the previous form of training. Most employers still consider this to be an incomplete higher education (Tsiguleva, 2014). Thus, in Russian conditions, one can talk about the creation of a hybrid model within the framework of general European trends.

4. Discussion

Describing the results of the analysis, confirming the hypothesis, it should be recognized that while acquiring typical features, at the same time, higher education models in the world retained their national specifics. During the reforms of the late XXth and early XXIst centuries, in contrast to the European decentralization processes, in the USA, UK and Russia there has been a generally stable system of centralization of higher education with some degree of unification within the framework of the development of European models. The general trend, manifested during the reform, is state regulation (with some degree of sovereignty) and the management of higher education processes with the actualization of social forces (including various subjects of the educational process).

There is some evidence that some experts made inaccurate predictions saying that clearly expressed specificity of universities and specialized institutions in Western and Eastern Europe, as well as in Russia will not allow the countries to integrate these types of educational institutions into national systems and this will hamper the harmonization of national models of higher education which at some point will face a state of “skidding” in the XXIst century. The inaccuracy of these predictions is evident from the analysis performed in 2018 (Gluzman, 2018). The new qualitative stage of the development of national models in the process of pan-European and world integration is characterized by the emergence of universities and other kinds of training structures of integrated training which develop the principle of multilevel higher education. They combine research and training specialists in a wide range of professions; they offer interdisciplinary units that provide unique opportunities to acquire new integrative knowledge and conduct interdisciplinary research. It should be recognized that the reforms of the European education have substantially modified the system for organizing the training of specialists in higher education in Western and Eastern Europe, as well as in Russia. The main integration emerged in the direction of providing broad interdependent and interconnected interdisciplinary training. The current structure of universities and organizations of high education practice various flexible patterns, depending on the specifics of the models of education (mostly in Western Europe, less in Russia). They vary the educational material if necessary, provide students with a choice in the study of disciplines, organize complex scientific research, i.e., prepare multifarious educated, mobile experts.

During the modernization of national educational systems in several European countries, the tendency to create variative multilevel models of continuous higher education has clearly manifested itself. The advantage of these models is that they do not lead to a uniform level of theoretical and practical training, aimed at promptly meeting the needs of the education system and personal needs of students themselves. Let us emphasize that the Russian educational model moves in this direction and there is a need for the further development of this model. During the reform, there have also been significant changes in the content and structure of higher education. The ratio of educational, special-subject and professional components of specialist training has cardinally changed. From a varying degree of intensity, the tendencies to establish the optimal scientifically grounded balance among the disciplines of different cycles, theoretical and practical blocks, began to appear. More attention was paid to the specialization of students, which in many universities began to be implemented almost from the first studying years.

The current state of the national models of higher education in Russia and Western Europe allows offering a variety of forms of nontraditional or alternative education: distance learning, various forms of correspondence and summer-time education. The implementation of the concept of a “world university” based on an international information network also applies to current trends in the development of national models towards harmonization and globalization. The active

quantitative and qualitative development of indicators and parameters of national models as objects of a single European educational space also reveals problems that remain in this area. There are several negative tendencies in the development of national models of higher education in Western Europe. According to scholars (Enders et al., 2016; Komleva, 2017; Lobovskaya et al., 2005; Praneviciene et al., 2017), they are as follows:

- the high commercialization of a part of higher education institutions, a strong orientation to the needs of the market and global capital with a decrease of the scientific component;
- a deliberate decline in the level of mass education (the master’s program is designed for a very small percentage of students);
- the acquisition of fragmented knowledge, and yet the insufficient level of fundamentality of preparation;
- the limitation of public funding for higher education.

Concluding the analysis, the authors emphasize the fact that the experience of reforming the national models of higher education in Western Europe, is more sensitive to the requirements of the Bologna Process. This situation may be explained by the historical conditions. The situation in Western Europe is today of considerable scientific and practical interest for Russia, where, within the framework of the development of the national and original model of higher education educational experts continue to actively search for forms and mechanisms of integration, internationalization resulting in a unified educational space. At the same time, due to the historical traditions, there are a lot of difficulties related to the adaptation to the given processes of the national educational system. In the authors’ opinion, it is the historical factor that allows outlining new directions and setting a unique vector for the development of the national model, considering the acquired experience, the methodology and practice in the field, the fundamental nature of the content of higher education.

Nowadays, Russia has several institutions of higher education that have taken an active part in implementing the reforms of the Bologna process for many years, while demonstrating a varied approach and the gradual introduction of innovations, considering their correlation with the quality content of education. For example, Lomonosov Moscow State University is implementing a multistage (for economists) and traditional one-stage instruction with a training period of up to six years (for physicists). The University also develops the systems of the preparation of these specialists in correlation with the fundamental nature of the competencies and their specific knowledge. For several decades, Moscow Institute of Physics and Technology has a multilevel training program. Bauman Moscow State Technical University, Saint Petersburg Electrotechnical University and other leading universities of Russia are engaged in shared programs with the participation of employers, providing innovative models of “bachelor’s degree in a major field” and “master’s degree in engineering” (Grebnev, 2004; Maykova, 2004; Sorokina, 2004).

When analyzing the effectiveness of reforming the Russian system of higher education, it is necessary to dwell on the obvious shortcomings of Russia’s integration into the single European educational space and the adaptation of foreign experience in this field. Among them, experts (Pokholkov et al., 2004; Komleva, 2017, etc.) point out the trends which are as follows:

- a) a decrease in the attractiveness of Russian higher education and the drop in the demand for it because of the lack of practical orientation of educational programs;
- b) the threat of a massive outflow of human capital to foreign countries while entering the single European space. This may be accounted for the high level of Russian people’s mobility to the West;
- c) the problematic employment of graduates with bachelor’s degrees due to the lack of real customers and consumers in the Russian labor market who will recognize the bachelor’s and master’s degrees as relevant academic qualifications;
- d) the decline in the quality of Russian higher education, the disruption of its established structure and the loss of fundamentalism due to the mixing of the module teaching of various disciplines and the violation of the logic of their study.

Therefore, the introduction of the main provisions of the Bologna Declaration today is still a difficult problem in the context of the development of the Russian model of higher education. This model differs substantially from the Western European model both historically and informatively, structurally and organizationally. Obviously, it would be inappropriate for Russia to copy the

European educational models that are completely inadequate to Russian educational traditions (and they differ sufficiently among themselves). To overcome the difficulties mentioned above an extremely specified and detailed scientific-methodological and evolutionary research is required. This process requires a clear problem analysis in the projection to the Russian historical experience. The analysis will allow the experts to determine the most optimal vector of qualitative development.

5. Conclusion

One of the major findings is the fact that the national Russian model of higher education, which has retained its closeness and inertia for a long time, has become more open to innovations, changes, and the implementation of cooperation. This is, undoubtedly, the positive result of European integration and the development of foreign national models. It is very important that in the accelerated modernization and harmonization of the Russian model it is advisable to reduce the speed of changes, turning the vector not in the direction of quantitative indicators but the development of qualitative parameters. Russia cannot irretrievably lose the rich experience of domestic higher education accumulated for many centuries, including the structure of education, the connection with practice, which has proved its effectiveness over many decades.

Another important finding is that in the quest for integration in the global higher educational system, Russia must not forget the national interests. The higher vocational education of Russia has a stable basis in the form of fundamental content and can now react more actively to the changing needs of society. Russian vocational training can offer the experience, structure, tested forms and methods of organizing the educational process, ways of assessing knowledge to the attention of European countries. Positive experience stems from Russian special practices of academic competitions, honor students with academic achievements, an individual approach to the process of admission to universities, expressed in the variability of the forms of examinations.

Studying foreign experience of the globalization of higher education, its exchange among countries and its methodical adaptation to the practice of national models of education will contribute to solving the problem of training even higher-quality specialists of a broad and integrative profile in all countries of the world. It is in this context that the authors see the further development of national models of higher education in Europe. Only in this case it can be expected that innovations within the framework of the Bologna process will allow the preservation of the uniqueness of the national models of higher and general education, enrich them with new experiences, innovations, contributing to the attractiveness, competitiveness of the higher education sphere, its fundamental nature in ensuring the progressive socio-economic development both in national contexts and in the global dimension.

Within the framework of this article, the authors carried out a comparative analysis of the circumstances and development trends of national models of higher education in Russia, in the countries of the European Union, as well as in the USA. The authors analyzed the educational models from the qualitative and quantitative point of view. The data obtained will be used to develop new methodological approaches to assessing the quality of national higher education models, which the authors plan to present in their further research on this topic.

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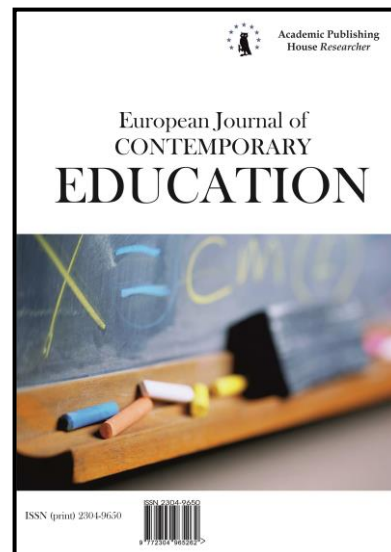
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Academic Rights of Students in Russia and Abroad (USA, European Union)

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Abstract

The article presents the results of a comparative analysis of the composition of academic rights of students in Russia, the United States and the European Union countries, their legislative regulation and practice of implementation in universities. The following conclusions were made:

(1) the wording of the rights, their thematic groups in Russia and abroad have significant differences, despite the fact that upon the entry into the Bologna process, the relevant changes were made to the Federal law and by-laws of RF;

(2) there have not been created conditions in the higher education system of Russia for the implementation of students' academic rights in accordance with the principles and objectives of the Bologna process, in particular, the right to design and implement an individual learning trajectory, students' participation in creating of the content of education, usage of ECTS to transfer from one university to another, implementation of "short bachelor programs", recognition of the previous non-formal and informal level of education, involvement of students in the process of assessment of the quality of education at all stages, priority of the results of international accreditation of educational programs when making government decisions towards a university, etc.;

(3) in the Russian educational system, many universities, despite the possibility established by the Federal Law, do not provide students with additional academic rights, while outside Russia it widespread to give students so-called "contract" rights, which are granted to a student in accordance with an educational contract and university code (eg Student Rights, Responsibilities and Code ...);

(4) compared to foreign students, Russian students are less active in exercising and defending their academic rights.

To improve the current situation, it is proposed to make changes to the current legislation of the Russian Federation regarding clarification, additions and expansion of the legal status of participants in the educational process, to deliver responsibilities through creation and compliance

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with regulatory, economic and organizational conditions and mechanisms for the implementation of academic rights of students in universities, to enter into academic regulations and regulatory documents of universities additional academic rights similar to those in the United States and the countries of the European Union; to bring into this process associations of higher educational institutions of the Russian Federation, including student associations to monitor, implement and lobby the students' academic rights; to encourage students to be active in exercising their academic rights during their study at the university.

Keywords: students' academic rights, domestic and foreign universities, the Bologna process, the practice of implementation of students' academic rights; perfecting the mechanisms for implementing and safeguarding the academic rights of students.

1. Introduction

The composition of academic rights granted to students and ensuring their implementation are one of the indicators of the level of socio-cultural development of a country and its higher education, its compliance with the principles of civil society, the Bologna process and, ultimately, they affect the perception and the image of Russia in the world, her rating among other countries. Analysis of the composition and practice of the implementation of academic rights of students, especially compared with advanced foreign practices, the educational systems of the countries participating in the Bologna process can highlight not only the problems of a particular educational system (social, regulatory, psychological and pedagogical), but also ways of harmonization domestic and foreign educational systems, removing barriers to globalization of education, expanding cultural and educational ties, academic mobility, improving the legal and regulatory framework, organizational conditions, content and methods of higher education.

At the same time, comparative studies on the implementation of academic rights of university students in Russia and abroad are practically not being carried out today. The analysis of the practice of exercising such rights is carried out separately within a particular country, educational system, and most often, it is a research into an isolated set of right. Among Russian studies, one should take note of the following works:

- the work of I.Yu. Belova, who considers the social and legal guarantees of the provision of academic rights and freedoms of teachers and students in Russian universities (Belova, 2015). The researcher conducted surveys of students and teachers of one of the technical universities of St. Petersburg, which showed low interest of students in exercising their rights, the presence in this area of a number of problems of organizational, regulatory and personal nature; there have been identified conditions under which academic rights and freedoms of teachers and students can be guaranteed. It is significant that the author considers academic rights and freedoms of students in close connection with academic rights and freedoms of the faculty;

- studies on the implementation of the constitutional right of citizens of the Russian Federation to have education (Tretyak, 2011), (Timofeeva, 2015), (Shmurygina, 2006). N.V. Tretyak discovered conceptual contradictions of the current legislation to the provisions of the Constitution of the Russian Federation with regards to determining the subject of the constitutional right to education and ensuring the accessibility of vocational education, there is a downward trend in appeals to the courts of the Russian Federation regarding the protection of the right to education; little demand in Russian for international legal protection mechanisms in the sphere of education (Tretyak, 2011). According to A.A. Timofeyeva, currently in Russia, the rights of citizens, declared by the Constitution, do not correspond to the political reality (Timofeeva, 2015). The reason for this is not only the imperfection of the current legislation, but also its incomplete compliance with the international legal obligations of Russia, as well as the decline in the quality of education, the social status of the teacher, understaffing and aging of the teaching staff, the narrowly pragmatic (market) approach to education, constriction of access for young people to higher education, channeling access towards vocational education (Shmurygina, 2006);

- studies, revealing the key problems in the implementation of individual student rights in the Russian Federation are (Kirillovich, 2017a), (Kirillovich, 2017b), (Bratanovsky, 2016), (Alekseyeva, 2016). The analysis of legal acts and law-enforcement practice made by A.A. Kirillovich led to the conclusion that "in the present period, the practice of regulating relations for the re-enrollment of students in educational institutions (especially those who are dismissed for insufficient reasons) does not fully comply with the requirements of the current Federal legislation

for education”, the charters of universities in this aspect have low potential of regulatory opportunities (Kirillov, 2017a);

- studies that examine solutions of actual problems and tasks of higher education in the context of the implementation of students' academic rights (for example, problems of evaluating students' academic achievements (Kishore, 2015).

It is noteworthy that Russian scientists are more interested in procedural academic rights (on re-enrollment, transfer, transfer from paid tuition to budget, protection from unreliable information, etc.), while in foreign studies there is a pronounced humanitarian vector: in the context of this vector certain mechanisms are being developed to stimulate “student participation” (“students' engagement in school”) (Veiga et al., 2012), eliminating racial and ethnic inequalities in education (Skiba et al., 2009), respecting privacy (Gearan, 2006); (White, 2006), development and implementation of ethical and behavioral codes of students and teachers (Bach, 2003); (Mawdsley, 2004), aligning the rights and duties of students (Gibbs, 1992).

At the same time, the trends of globalization in education suggests comparative studies of the academic rights of students and on this basis the harmonization of Russian and international practice of implementation of rights. This article presents the results of a comparative study of the content and practice of implementation of the academic rights of students in Russia, the European Union and the United States.

2. Materials and Methods

The material for the study:

- legislative and regulatory documents in the field of higher education and the implementation of students' academic rights: international (Sorbonne Declaration, 1998), Russia (Konstitutsiya Rossiyskoy Federatsii, 2014); (Federal'nyi zakon ..., 2012); USA (Civil Rights Act, 1991); (Higher Education, 2008); (Family Educational, 1974); (Office for Civil Rights, 1972), EU countries (Constitución Española, 1978); (Ley Orgánica, 2001); (Real Decreto, 2007); (Real Decreto, 2010);

- reviews of international and Russian legislation in the field of implementation of academic rights of students (Nasonkin, Tkach, 2007);

- materials of Russian and foreign educational practice: statistics (Poskanzer, 2002), reports (Hendrickson, Gibbs, 1986), scientific and journalistic articles (Kaye et al., 2006); (Rafferty, 1993), open Internet resources (Student rights in higher education...); (Student Rights, Responsibilities and Code ...), judicial acts (Sudebnyye i normativnyye akty...); (Ahmed v. University of Toledo...); (Woods v. The Wright Institute) and other materials.

To achieve the goal of the study, the following methods were used:

- content analysis of wordings of academic rights of students in Russia and abroad;

- a comparative analysis of Russian and foreign judicial acts for the protection of specific academic rights of students;

- a comparative analysis of Russian and foreign legislation from the standpoint of the principles of the Bologna process.

3. The discussion of the results

We have conducted a content analysis of the composition of academic rights of students in Russia and abroad (USA, EU countries). The analysis was conducted on three groups of rights (Constitutional, Regulatory, Institutional), within which the thematic groups were selected, taking into account the key principles of the Bologna process (Accountability and quality assurance, Lifelong Learning, Social accessibility of higher education, Student-Centered Education.) The content analysis results are presented in Table 1.

Table 1. The wording of the academic rights of students in the legislative documents of Russia, the United States, the European Union countries

Group of rights	Wording of academic rights in US law	Wording of academic rights in European law	Wording of academic rights in Russian law
Student constitutional rights			
Student civil rights	Right to free speech and association rights	The right to freedom of information and freedom of expression (France) The right to freedom of expression, freedom of assembly and association at a university (Spain)	The right to freedom of conscience, information, free expression of one's own views and beliefs
	Right to free religious and unaccepted speech		
	Right to expression through clothing		
	Right to free speech on public forums		
	Right to approve release of student information		
	Right to personal autonomy		
Student privacy rights	Right to privacy in higher education	Right to privacy in higher education	The right to respect human dignity, protection from all forms of physical and mental violence, personal abuse
	Right to use pseudonyms on public internet forums		
	Right to protection from written or verbal abuse		
	Right to privacy of student records Right to notice of information disclosures	Right to the protection of student information	The right to protect personal data
Student equality rights	Right to protection from sex discrimination in higher education Right to the protection from sexual harassment in education Right to sex equality in the provision of student activities Right to the disclosure of athletics plans and expenditures Right to protection from ability discrimination in facilities Right to protection from race discrimination Right to protection from racial segregation Right to affirmative action Right to freedom from discrimination in affirmative action Right to protection from discrimination based on national origin in education Right to protection from age discrimination Right to equal treatment of student groups	Right to equitable recruitment, admissions, readmissions, testing, education, instruction and assessment Right to equal treatment among equal students Right to equity where some students are at an educational disadvantage	

	Right to protection from testing policies which racially segregate	Right to equity where some students are at an educational disadvantage	
Regulatory Rights			
Student rights in admissions	Right to basic institutional facts and figures before admission on the Department of Education (DOE) website. Information required on the DOE website includes: tuition, fees, net price of attendance, tuition plans, and statistics including sex, ability, ethnic and transfer student ratios as well as ACT/SAT scores, degrees offered, enrolled, awarded, transfer credit policies and articulation agreements.	Right to basic institutional facts and figures before admission	The right to familiarize oneself with the certificate of state registration, with the charter, with a license for educational activities, with a certificate of state accreditation, with educational documentation, other documents regulating the organization and implementation of educational activities in an educational organization
	Right to protection from ability discrimination in admissions Right to protection from sex discrimination in admissions Right to protection from ability discrimination in admissions Right to protection from racial discrimination in admissions Right to testing in admissions accommodations Right to protection from subjective interviews Right to protection from differential testing requirements Right to protection from admissions quotas based on demographics Right to race conscious affirmative action in admissions to correct for discrimination	Right to equitable recruitment, admissions, readmissions, testing, education, instruction and assessment Right to exam accommodations for certified temporary and permanent medical conditions	The right to organize admission tests taking into account the peculiarities of psychophysical development and state of health The right to choose an organization offering educational activities, forms of obtaining education and forms of education after receiving basic general education or after reaching the age of eighteen

	<p>Right to protection from reverse discrimination</p> <p>Right to adherence to registration materials</p>		
Student rights in readmissions	<p>Right to equality in readmissions (Discrimination may be alleged regarding both the initial removal and also in the case that other students are not readmitted under like circumstances).</p>	<p>Right to transfer from one university to another</p> <p>Right to receive a copy of their diploma, thesis, score and details about the score</p>	<p>The right to transfer to another educational organization that implements an educational program of the appropriate level</p> <p>The right to transfer for study another profession, specialty and (or) direction of training, another form of education</p>
Student rights in academic advising	<p>Right to fulfillment of promises made by advisors</p> <p>Right to fulfillment of promises and verbal promises by advisors</p>	<p>Right to the availability of academic, professional psychological and social counseling with educational objectives</p> <p>Right to institutional consultation with student organizations on issues in higher education</p>	
Educational package rights Student-Centered Education	<p>Right to learn</p>	<p>Right to a student centered educational environment</p> <p>Right to opportunities to develop personally</p> <p>Right to opportunities to develop socially</p> <p>Right to flexible learning paths and a minimum number of optional courses</p>	<p>The right to develop their creative abilities and interests, including participation in public events</p>
	<p>Right to adherence to class syllabi</p>	<p>Right to participate in programs and services in accordance with advertised program objectives</p> <p>Right to have registration periods of at least on working week after the posting of scholarships or programs</p>	<p>The right to choose an educational program when entering a university</p>

	<p>Right to the advertised course content</p> <p>Right to the advertised level of course instruction</p> <p>Right to uniformity across class sections</p>	<p>Right to the availability of information related to stated educational objectives</p> <p>Right to access teacher, course, seminar, program, practicum, internship, residency evaluations as public info</p> <p>Right to receive a five-page syllabus within the first two weeks of the semester containing: course objectives, general competences or outcomes students will achieve, curriculum, course timeline of readings and assignments evaluation and examination methods</p> <p>Right to receive the syllabus in either an electronic format or a physical copy</p> <p>Right to information on the scale used for evaluation of skills</p>	<p>The right to familiarize with educational documentation, other documents regulating the organization and implementation of educational activities at the university</p> <p>The right to study other academic disciplines and practices of educational programs of the university ***</p> <p>The right to participate in the creation of the content of their professional education **</p> <p>The right to choose elective disciplines *</p>
	<p>Right to the advertised content covered in sufficient depth</p>	<p>Right to be provided educational materials while attending institutions of higher education</p> <p>Right to freely access all educational materials available in university libraries or institutional websites</p>	<p>The right to free use of library and information resources, educational, industrial, scientific base of the university</p>
		<p>Right to study in one's native language or a language of international communication if offered</p>	<p>The right to study in Russian</p>
Student classroom rights	<p>Right to a course syllabus</p>	<p>Right to adherence to the syllabus unless the teacher has the students' agreement</p>	<p>The right to study to an individual curriculum ****</p>
	<p>Right to attention to course objectives</p>		
	<p>Right to protection from the misuse of time</p>	<p>Right to an eight-hour school day</p>	
	<p>Right to fair grading in accordance with the course syllabus</p>	<p>Right to be evaluated in accordance with advertised curriculum evaluation criteria</p> <p>Right to be evaluated with criteria in line with advertised course objectives</p>	
	<p>Right to protection from ability discrimination in learning</p>	<p>Right to equal treatment among equal students</p>	
	<p>Right to ability accommodation in classroom facilities</p>	<p>Right to exam accommodations for certified temporary and permanent medical conditions</p>	

The rights of student research activities		The right to voluntary scientific and practical research (France)	The right to participate in research activities
		The right to study at the university any topic chosen by the student within the time limits established by law (Spain)	
		Right to postpone and resume studies	The right to publish work in the bulletins of the educational organization for free
		Right to at least one free copy of the student record including diplomas, certificates and transcripts	
		Right to retain property and copyright for results of research, artistic creation and innovation unless contracts exist	
Academic mobility rights	The right to study for at least 1 semester in a foreign university	<p>Right to access social mobility programs and resources</p> <p>The right to study for at least 1 semester in a foreign university</p> <p>The right to recognition of educational results and qualifications based on the European system of transfer and accumulation of credit units</p>	<p>The right to trips for training, internships, research, including within the framework of academic exchange, to other educational and scientific organizations, including foreign universities and scientific organizations</p> <p>The right to study academic disciplines and practices in other organizations ***</p> <p>The right to recognition of results (in the order established by the university) of disciplines and practices studied in other organizations</p>
Student rights in discipline and dismissal	<p>Right to protection from ability discrimination in discipline and dismissal</p> <p>Right to due process in disciplinary action</p> <p>Right to due process in disciplinary with the potential to lead to a monetary loss</p> <p>Right to due process in disciplinary with the potential for a loss of liberty</p> <p>Right to a clear notice of charges in the disciplinary process</p> <p>Right to a prompt notice of charges in</p>	Right to student involvement in institutional decision-making	<p>The right of the student council to act as a student's representative in the implementation and protection of his academic and other rights.</p> <p>The right to readmission to an educational organization that implements basic professional educational programs in the manner prescribed by legislation on education</p>

	<p>the disciplinary process Right to a hearing before an expert judge Right to inspect all documents in disciplinary hearings Right to record disciplinary hearings Right to a written statement of findings in disciplinary hearings Right to unbiased ruling in disciplinary hearings Right to fairness in disciplinary hearings Right to hearing before discipline Right to investigation and consideration of circumstance</p>		
Student group rights	Right to equality in the provision of student activities	Right to equal treatment among equal students	The right to use in the manner prescribed by local regulations, medical and recreational infrastructure, cultural facilities and sports facilities of an educational organization
	Right to the disclosure of athletics plans and expenditures	The right to be informed about the planned and incurred expenses for university sports (UK)	
Student residence or residence hall rights and campus police	<p>Right to have visitors in residence hall rooms Right to sex equality in housing standards Right to protection from racially segregating testing policies Right to disability accommodation in residence facilities Right to protection from gender segregation in residence Right to protection from age discrimination in residence Right to protection from dorm search and seizure Right to clearly defined terms of dorm search and seizure</p>	In a number of EU countries - rights are similar to those in the USA	<p>Internal local acts of the university govern the rights and obligations of students living in a dormitory. The internal regulations of the university determine the rules of conduct on the territory of the university</p>

<p>Student rights in recruitment</p>	<p>Right to protection from sex discrimination in the workplace Right to equal pay for sexes in the workplace Right to protection from forced pregnancy leave Right to the protection from sexual harassment in the workplace Right to active protection from sexual harassment in the workplace Right to protection from ability discrimination in the workplace Right to protection from ability discrimination in employment recruitment Right to protection from ability discrimination in workplace discipline and dismissal Right to protection from age discrimination Right to protection from race discrimination in employment Right to protection from discrimination based on national origin in employment</p>	<p>Right to opportunities to acquire skills required to find and retain employment The right to state support to find employment ("social year") (Germany) The right to support and facilitate career development (Denmark)</p>	<p>The right to combine education with work without detriment to the development of the educational program, the implementation of the individual curriculum The right to receive information from an educational organization on the labor market of the Russian Federation in the professions, specialties and training areas that students master</p>
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Institutional rights of students			
Accountability and quality assurance rights	Right to effective teaching	<p>Right to a quality education</p> <p>Right to educational quality standards which are assessed and accountable</p> <p>Right to a quality education (with quality standards in place)</p> <p>Right to quality standards for teachers and course resources for use in quality assurance and evaluation</p> <p>Right to quality standards for support resources for use in quality assurance and evaluation</p> <p>Right to participate in evaluation of teachers, courses, seminars, programs, practicums, internships, residencies</p> <p>Right to have evaluations used for assessment of quality and objective achievement</p> <p>Right to information on criteria and methods used to identify and evaluate professional practice</p> <p>Right to information on criteria used to evaluate the quality of academic classes and program</p> <p>The right to participate in the development of criteria for monitoring the quality of education, university policies (Spain)</p>	Providing conditions for learning, taking into account the peculiarities of psychophysical development and health
Rights Lifelong Learning	The right to the recognition of qualifications and degrees	<p>The right of a person who carried out professional activities for five years to request proof of the professional skills that can be taken into account as part of the knowledge and skills required to obtain a higher education diploma (France)</p> <p>The right to choose the date of completion of education (Argentina)</p> <p>Equal access and opportunities for a variety of forms of education; access to an open network form of continuing education (Sweden)</p>	<p>The right to readmission to an educational organization</p> <p>The right to an academic leave *****</p>

Contract Rights	Right to contract rights	Right to an educational contract	
	Right to a continuous contract Right to a continuous contract during a period of continuous enrollment	Right to a continuous contract during a period of enrollment, without a change in degree requirements	
	Right to adherence to institutional documents		
	Right to protection from arbitrary or capricious decision making		
	Right to have institutions follow their own rules		
	Right to adherence to bulletins and circulars Right to adherence to regulations Right to adherence to course catalogues Right to adherence to student codes Right to adherence to handbooks		
	Right to notice of degree requirement changes		
	Right to fulfillment of verbal promises		
Student information on rights			Right to information on all student rights and responsibilities Right to institutional policies which inform students of their rights
		Right to information transparency and accessibility	
	Right to basic institutional facts and figures before admission Right to information about the full cost of attendance Right to information on use of student fees Right to information on the justification of policies Right to information regarding course objectives and content	Right to receive, upon admissions, a Student Guide containing information on: student rights and responsibilities materials and services provided by the university evaluation methods justification and methods used to establish fees university and faculty facilities details about student organizations ways of accessing scholarships and other financial facilities Right to know how tuition, fees and other charges are determined or justified Right to be informed about the number, type and amount of each fee charged Right to access regulations,	According to the orders of the Ministry of Education and Science of Russia, the university is obliged to post information on the amount of tuition fees on the website

		decisions, meeting minutes and any other legal documents at the institution	
Student safety rights	<p>Right to care regarding the safety of students</p> <p>Right to protection from injury on campus</p> <p>Right to protection from injury in facilities under campus jurisdiction</p> <p>Right to protection from foreseeable crime on campus</p> <p>Right to protection from injury caused by other students</p>	<p>Right to medical coverage while attending institutions of higher education</p> <p>Right to be provided free medical assistance</p> <p>The right to social protection, including medical care due to illness (Spain)</p>	<p>The right to the protection of life and health</p> <p>Right to semester breaks</p>
Rights of social accessibility of higher education	<p>Right to financial aid information disclosures</p> <p>Right to standards terminology in financial aid forms</p> <p>Right to detailed federal student loan information</p> <p>Right to detailed third party federal student loan information</p> <p>Right to information about the full cost of loan repayment</p> <p>Right to financial aid awareness campaigns for underrepresented students in high education</p>	<p>Right to equity where some students are at an educational disadvantage</p> <p>Right to free educational and professional guidance, counseling, tutoring and monitoring for subsidized students</p> <p>Right to subsidized tuition for students from historically marginalized and low socio-economic backgrounds</p> <p>Right to housing accommodations, unless a student studies in their place of residence</p> <p>Right to a 75% discount for access to events organized by public institutions</p> <p>Right to subsidies for housing accommodations for low income or historically marginalized backgrounds</p> <p>Right to transportation while attending institutions of higher education</p> <p>Right to a 50% + discount on public transportation</p> <p>Right to meals while attending institutions of higher education</p>	<p>The right to full financial support of education by the state in the event of a budget admission</p> <p>The right to reward for success in educational, physical education, sports, social, scientific, technical, creative, experimental and innovative activities</p> <p>The right to switch from paid tuition to free (budget support) *****</p> <p>Right to defer military conscription</p>

<p>The rights of students to participate in the management of the university and in the management of the quality of education</p>	<p>Right to student involvement in institutional decision-making</p>	<p>Right to student involvement in institutional decision-making Right to representative participation in university executive and deliberative bodies Right to 25%+ representative participation in the university senate and faculty council Right to representative participation in faculty counsels and university senates or governance structures Right to representative participation in management of social services, accommodations and scholarships Right to representatives participation in government departments involving students Right to representative participation in choosing and appointing an institutional president or head Right to student representative elections free of interference from instructors and administrators Right to serve as a student representative for up to four years regardless of academic performance or attendance Right to be informed and consulted by student representatives on matters in institutional governance</p>	<p>The right to participate in the management of an educational organization in the manner prescribed by its charter The right to participate in the election of the university rector (president) The right to participate in student government</p>
<p>The rights to respect, protection and equality of rights</p>		<p>Right to equitable recruitment, admissions, readmissions, testing, education, instruction and assessment Right to equal treatment among equal students No difference in the rights of European citizens and foreign students (admission, benefits, subsidies (France))</p>	
		<p>Right for student organizations to develop an annual report on institutional compliance with code Right to an annual response to the compliance report including proposed</p>	

		improvements and a timeline	
	Right to a grievance filing process	Right to grievance reporting, hearing and appeals processes Right to submit grievances and expect recourse for identity theft Right to submit grievances and expect recourse for abuse of power Right to submit grievances and expect recourse for arbitrary and capricious decision making Right to appeal grades before a committee. The instructor who issued the grade may not sit on this committee. Right to request a review of complaints by specialized bodies Right to be present during appeal hearings Right to protection from retribution when making a complaint (whistle blower protections) Right to have all written or online requests registered Right to have all written and online requests answered	The right to appeal against the acts of an educational organization in accordance with the procedure established by the legislation of the Russian Federation
	Right to limited fiduciary care (institutional care in the student's best interest)	The right to the assistance of a lawyer - ombudsman, ensuring and protecting the rights of students through appropriate procedures (Spain)	

* from the list offered by the university

** subject to the observance of Federal state educational standards of secondary vocational and higher education, educational standards in the manner prescribed by local regulatory acts (this right may be limited by the terms of a targeted education contract)

*** in the order established by the university

**** within the mastered educational program in the manner prescribed by local regulations

***** in the manner and on the grounds established by the Federal executive body that develops state policy and legal regulations in the field of education

***** in the manner prescribed by the Federal executive body responsible for the development of public policy and the legal regulation in the field of education

We also conducted a comparative analysis of Russian and foreign judicial acts regarding the protection of the academic rights by students (Table 2).

Table 2. Comparative analysis of judicial acts on the protection of the academic rights by students

Academic law	Foreign judicial acts	Russian judicial acts
Right to protection from arbitrary or capricious decision making	<i>Healy v. Larsson</i> (1974) found that what applied to private intuitions applied also to public	The appeal to the Moscow City Court of December 22, 2014, case No. 33-37960, the court overturned the order on expelling a student, since, contrary to the requirements of the legislation and local acts of the university, the university expelled the student during the period of his hospitalization
Right to privacy of student records	In the AlBaho Case, a French criminal court found three senior academics at the École Supérieure de Physique et de Chimie Industrielles de la Ville de Paris (ICPSE) guilty of email espionage.	
Right to have institutions follow their own rules	<i>Goodman v. President and Trustees of Bowdoin College</i> (2001) ruled that institutional documents are still contractual regardless if they have a disclaimer.	In the Decision to the appeal No. 33-5923-2015 of July 1, 2015, the court concluded that a compelling reason for not attending classes only shows that the student does not properly implements the curriculum, but his absence cannot serve as a basis for the termination of educational relations. In the Appeals Definition of the Altai Regional Court of June 2, 2015, case No. 33-5044 / 2015, the order to expel a student was declared illegal by the court, because the student was not given enough time to pass exams and tests.
Right to fulfillment of promises made by advisors	<i>Healy v. Larsson</i> (1974) found that what applied to private intuitions applied also to public	
Right to a continuous contract	<i>Mississippi Medical Center v. Hughes</i> (2000) determined that students have an implied right to a continuous contract during a period of continuous enrollment suggesting that students have the right to graduate so long as they fulfill the requirements as they were originally communicated. Degree requirement changes are unacceptable	Resolution of the Moscow City Court of August 24, 2015 No. 4a-2129/15: the contract on the provision of educational services was recognized as an administrative agreement, and not a civil contract. Therefore, all references of the educational organization to the Civil Code of the Russian Federation were rejected by the court, since only facts supporting the violation of the administrative procedure for concluding and terminating a public contract were relevant to the case.
Right to fulfillment of verbal promises Right to fulfillment of	<i>Dezick v. Umpqua Community College</i> (1979) found a student was compensated because	

promises and verbal promises by advisors	classes offered orally by the dean were not provided.	
Right to notice of degree requirement changes	<i>Brody v. Finch University of Health Sciences Chicago Med. School</i> (1998) determined that students have the right to notice of degree requirement changes. If a student, for instance, is absent for a semester and is not continuously enrolled they need to know if degree requirements have changed.	
Right to protection from racial discrimination in admissions	<i>United States v. Fordice</i> (1992) prohibited the use of ACT scores in Mississippi admissions, for instance, because the gap between ACT scores of white and black student was greater than the GPA gap which was not considered at all.	The appeal determination of the Moscow City Court of November 26, 2015 case No. 33-44446 / 2015: the plaintiff argued that the local regulations on the basis of which he was enrolled were discriminatory and the tuition fee established for students from CIS countries violates norms of law proclaiming that higher education should be equally accessible to all. The court refused to satisfy the claims, since the plaintiff could not provide evidence that he was given access to education on other conditions than for the citizens of the Russian Federation.
Right to uniformity across class sections	<i>Scallet v. Rosenblum</i> (1996) found that "tight control over the curriculum was necessary to ensure uniformity across class sections"	
Right to protection from the misuse of time	<i>Riggin v. Bd. of Trustees of Ball St. Univ.</i> found that instructors may not "wast[e] the time of the students who have come there and paid money for a different purpose".	
Right to protection from sex discrimination in admissions	Supreme Court in <i>United States v. Commonwealth of Virginia</i> (1992) found that a woman mistakenly admitted to a men's military college was entitled to remain enrolled.	
Right to protection from age discrimination	<i>Prostrollo v. University of South Dakota</i> (1974), for instance, found that the institution may require all single freshmen and sophomores to live on campus. They did not discriminate between age groups	
Right to information on use of student fees	<i>Van Stry v. State</i> (1984) found institutions may not use student fees to support organizations	

	outside the university. This implies that students have a right to know what activities they are being allocated towards.	
Right to information on the justification of policies	<i>Rosenberger v. Rector and Visitors of the University of Virginia</i> (1995) found student fees must be allocated in a viewpoint neutral way. They cannot be based on religious, political or personal views and they cannot be levied as a punishment.	
Right to protection from ability discrimination in discipline and dismissal	<i>Foster v. Board of Trustees of Butler County Community College</i> (1991) found that students are not entitled to due process rights when appealing rejected admissions applications. They are not yet students.	Appeal definition of the Voronezh Regional Court of October 9, 2014 № 33-5431. The court overturned the order on the expulsion of a student from the Academy for health reasons, since incorrect documents were provided to confirm the state of health. Case 2-4571 / 2018 of June 22, 2018, the Syktyvkar City Court of the Republic of Komi found illegal and subject to cancellation the order of the Volga State Educational Institution of Higher Education on the application of a disciplinary sanction to V.Surin, student of law faculty, in the form of a reprimand, since all the conditions for the imposition of a disciplinary sanction were not met
Right to free speech and association rights	<i>Papish v. Board of Curators of the Univ. of Missouri</i> (1973) and <i>Joyner v. Whiting</i> (1973) found students may engage in speech that do not interfere with the rights of others or of the operation of the school. Because schools are places of education they may regulate speech by time, manner and place as long as they provide free speech zones for students as long as they are not used to limit expression.	
Right to free religious and unaccepted speech	<i>Texas v. Johnson</i> (1989) found that “if there is a bedrock principle underlying the first amendment, it is that the government may not prohibit the expression of an idea simply because society finds the idea itself offensive or disagreeable.	

Right to free speech on public forums	<i>Online Policy Group v. Diebold, Inc.</i> , 2004 Regulation may take place to prevent illegal activities	
Student rights in readmissions		Administrative case on the legal claim by the prosecutor of the Central district of Krasnodar to Kuban Medical Institute: the failure of the university to notify the student of the expiration of the validity of state accreditation and the need to transfer to another university
Право на академический отпуск		The appeal determination of the Moscow City Court of November 20, 2014 case No. 33-43376: to deem legal the order to expel a student from the university due to his unmotivated academic leave (the student had financial difficulties) because the plaintiff did not provide any explanation for his non-participation in the educational process, which was the basis for the disciplinary sanction in the form of expulsion
Right to protection from ability discrimination in discipline and dismissal		Appeal definition of the Saratov Regional Court of October 1, 2014 case No. 33-5507: the student was expelled from the university for smoking in the dormitory. The order on the expulsion was deemed illegal, since the disciplinary penalty imposed on the claimant does not correspond to the severity of the violation, the disciplinary measure was applied without taking into account the plaintiff's previous behavior and lack of disciplinary punishment in the past, without taking into account other students' opinion.

4. Conclusion

The content analysis of students' academic rights allowed us to divide all rights into 3 groups: constitutional, procedural, and institutional. Comparative analysis showed that in the United States, compared with Russia, students have more academic rights related to the prohibition of various types of discrimination, as well as protection from arbitrary (subjective) decisions, from oral and written orders issued by university staff.

In Russian legislation, more attention is paid to the procedural rights of students. These procedures are not about interaction with teachers, but about re-enrollment, transfer, having academic leave, etc. At the same time, there is no necessary and substantial detailing of the procedures for institutional interaction of the student with the university (due attention is not paid to the contractual rights of student).

In contrast to the EU countries, Russian legislation does not specify the rights of students to receive high-quality education, high-quality teaching, and students' participation in developing quality criteria and quality monitoring processes.

In the judicial practice of the United States and the European Union students are more actively exercising their rights and more often use judicial protection. Significantly more students went to court for the protection of their academic rights. In Russia, there are 3 main reasons for going to court to protect academic rights: illegal expulsion from a university (use of disciplinary sanctions), illegal charging of tuition fees, refusal of a university to provide the necessary documents (for example, academic transcript). Cases of appeals on issues of discrimination are very rare, and they are not ruled in favor of the student-plaintiff; there are no rulings imposing penalties on the university for violating the non-discrimination right.

The findings suggest that it is necessary to improve the mechanisms and practice of the implementation of academic rights of students in the Russian Federation both in terms of the regulatory framework and the organization of the work of universities to better inform students and respect their academic rights and increase the activity of students in their implementation.

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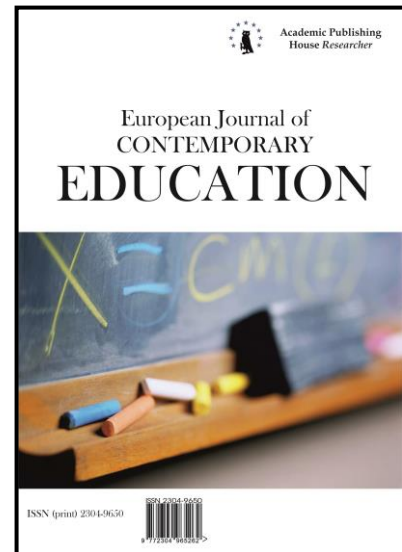
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University Graduates' Soft Skills: the Employers' Opinion

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Abstract

The relevance of the issues addressed in the article is determined by the importance of organizing the dialogue between education and business to ensure the high quality of training specialists. Soft skills are considered from the standpoint of the unity of requirements for training, evaluation and development of human resources. The main focus is on analyzing the attitude of employers towards soft skills, approved by the Ministry of Education and Science of the Russian Federation for the preparation of bachelors and masters: the significance of soft skills for employees of the enterprise (organization); the level of the formation of soft skills among university graduates who apply or work at the enterprise; functions (tasks), in which the relevant competences are important. This article presents the results of a survey of employers on the soft skills of university graduates, in which 36 people took part – heads of organizations and representatives of personnel services from different spheres (health, culture, education, radio electronics, petro chemistry, housing and communal services, tourism, construction, etc.), different forms of ownership and the enterprise (organization) size. The survey was conducted in the form of an individual interview. The key positions of the interview were to identify the employers' opinion on the importance of soft skills for the employees of the enterprise (organization); the level of the formation of soft skills among university graduates who apply or work at the enterprise; functions (tasks), in which the relevant competences are important.

Keywords: higher education, soft skills, labour market, social mandate.

1. Introduction

Increasing of the importance of the formation of universal competences (soft skills) in the training of specialists who have higher education is determined by their high relevance in the

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modern labor market. The competent approach in personnel training, selection and evaluation of personnel, in contrast to other approaches, focuses on identifying certain characteristics (qualities) of the person that provide the ability to do something, successfully cope with individual tasks and activities in general. Based on the analysis of a number of approaches that consider competence from different angles of view (Raven, 1977, Currie, 1999, Stasz, Brewer, 2011), in this article by competence we mean a new formation of the subject of activity, formed in the process of vocational training, which is a systemic manifestation of knowledge and abilities, and personal qualities, which allow to successfully solve the functional problems that make up the essence of professional activity (Karpov, 2011). Competences (skills) are components (units) of competence. They reflect the ability to solve specific functional tasks. The allocation of skills is carried out on the basis of the analysis of activities, the identification of the functional tasks to be solved and the skills corresponding to them.

2. Materials and Methods

Over the last period of time, a lot of work has been done to justify the importance of the competence approach and to determine the list of soft skills (Ananyeva, 2016; Ansimova, Kuznetsova, 2016; Davletshina, 2017; Luksha et al., 2016). The Russian Ministry of education has approved a list of eight groups of skills that have their own specific content for bachelors and masters. Currently, the scientific laboratory of Yaroslavl State Pedagogical University named after K. D. Ushinsky "Development of evaluation materials to measure the formation of soft skills of students during mastering educational programs for bachelors, masters and specialists" is working on the development of tools to evaluate the conditions of formation and formation of soft skills.

The attitude of employers to the selected skills for the organization of interaction between business and education in order to improve the quality of education is becoming very relevant nowadays.

This article presents the results of the survey of employers regarding the soft skills of university graduates. In total, 185 employers took part in the survey, among them employers of the public sector (67 people or 36.2 %) and non-public (118 people or 63.8 %). The general totality of public sector employers included institutions of the social sphere, health care, education, youth policy, and municipal administration. The general totality of employers of non-public sector included employers of commercial structures of the region (leading companies and small and medium-sized businesses). Managing directors and personnel managers were interviewed. The survey was conducted in the form of an individual interview.

The key points for discussion were related to the following:

- the importance of soft skills for employees of the enterprise (organization);
- the level of formation of soft skills of university graduates apply or work at the enterprise;
- functions (tasks), in which the relevant skills are important.

The results of the interview were recorded in a special protocol with the consent and in the presence of the interviewee.

3. Findings

All representatives of employers showed high interest in the interview process, made a number of valuable suggestions and comments. The analysis of the results allows us to see the selected soft skills through the eyes of employers and make a number of comments.

Almost all of the proposed for evaluation soft skills received a high enough evaluation of their importance for the successful performance of professional activities (see Table 1, Figures 1 and 2).

Table 1. Assessment of the level of significance for the activities and level of formation of the soft skills among university graduates by employers

№	The soft skill	Evaluation of significance for the success of activities (10-point system)	Evaluation of the formation among university graduates (10-point system)
Soft skill 1. Systems and critical thinking			
1.1.	Ability to search, to do critical analysis of information and apply the systematic approach to solving problems	7.8	4.5
1.2.	Ability to carry out critical analysis of problem situations on the basis of the systematic approach, to develop an action strategy	8.2	4.6
In total for Soft skill 1 «Systems and critical thinking»		8	4.6
Soft skill 2. Development and implementation of projects			
2.1.	Ability to determine the range of tasks to achieve the goal and to choose the best ways to solve them, based on the existing legal norms and available resources and restrictions	7	4
2.2.	Ability to manage the project at all stages of its life cycle	6.4	3.8
In total for Soft skill 2 «Development and implementation of projects»		6.7	3.9
Soft skill 3. Teamwork and leadership			
3.1.	Ability to carry out social interaction and realize own role in the team	9	6
3.2.	Ability to organize and manage teamwork, developing the team strategy to achieve the goal	6	3.6
In total for Soft skill 3 «Teamwork and leadership»		7.5	4.8
Soft skill 4. Communication			
4.1.	Ability to carry out business communication in oral and written forms in the state language of the Russian Federation and foreign language(s)	8.6	4.8
4.2.	Ability to apply modern communication technologies, including foreign language(s), for academic and professional interaction	6.8	4.8
In total for Soft skill 4 «Communication»		7.7	4.8
Soft skill 5. Intercultural interaction			
5.1.	Ability to perceive the intercultural diversity of society in socio-historical, ethical and philosophical contexts	5.6	4.2
5.2.	Ability to analyze and take into account the diversity of cultures in the process of intercultural interaction	5.6	4.2
In total for Soft skill 5 «Intercultural interaction»		5.6	4.2
Soft skill 6. Self-organization and self-education			
6.1.	Ability to manage time, build and implement a self-development path based on principles of education throughout life	8.6	4.6
6.2.	Ability to identify and implement priorities of own activities and ways to improve them on the basis of self-assessment	6.6	4
In total for Soft skill 6 «Self-organization and self-education»		7.6	4.3
Soft skill 7. Health care			
7.1.	Ability to maintain a proper level of physical fitness to ensure full social and professional activities	6.8	4.4

Soft skill 8. Health and safety			
8.1.	Ability to create and maintain safe living conditions, even in emergency situations	7.8	4.6

For all indicators (soft skills), the distribution of expert evaluations significantly differs from the uniform one at the significance level of 0.01 (i.e. it is very significant). The maximum evaluation of the degree of significance for the experts was 9. Thus, all of the proposed for the evaluation soft skills (on the basis of average values) can be assessed as extremely significant (average value – 7.2, and the smallest average expert value – 5.6). Soft skills which have average values above 7 can be considered decisive for the success of the employee. The leading position in the evaluation of significance is taken by Soft skill 1 “Systems and critical thinking”, which has the average value 8.0 (ten–point system), Soft skill 8 “Health and Safety” – 7.8 points, Soft skill 4 “Communication” – 7.7 points, Soft skill 6 “Self-organization and self-education” – 7.6 points, Soft skill 3 “Teamwork and leadership” – 7.5 points.

If we consider the evaluation of significance in terms of skills for the bachelor and master degrees, then there is a certain predominance of the importance of the soft skills for bachelor's success of activities, according to employers. Judging by the comments made during the interview, these skills are more common and more practical.

The most significant soft skills are: “Ability to carry out social interaction and realize own role in the team” (Soft skills 3 for bachelors) – 9 points, “Ability to manage time, build and implement a self-development path based on principles of education throughout life” (Soft skills 6 for bachelors) – 8.6 points, “Ability to carry out business communication in oral and written forms” (Soft skills 4 for bachelors) – 8.6 points, “Ability to carry out critical analysis of problem situations on the basis of the systematic approach, to develop an action strategy” (Soft skills 1 for masters) – 8.2 points.

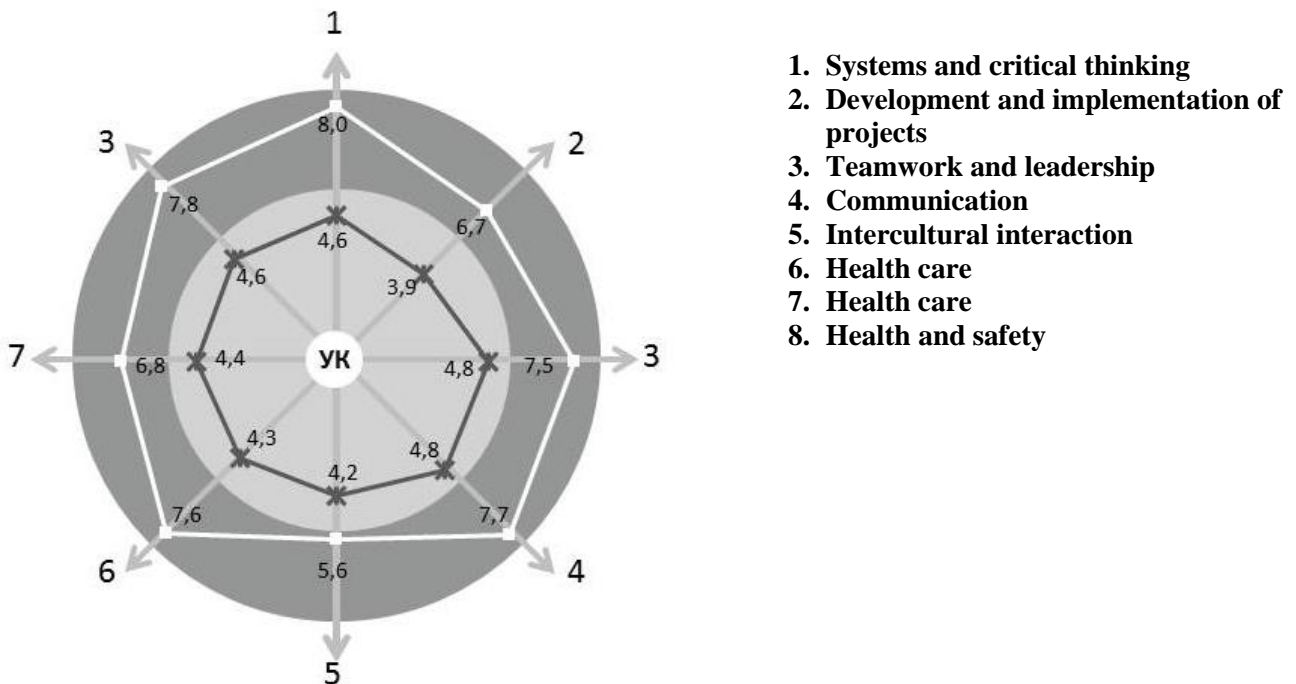


Fig. 1. Evaluation of the level of significance for the activity and the level of formation of the Soft skills among graduates by employers

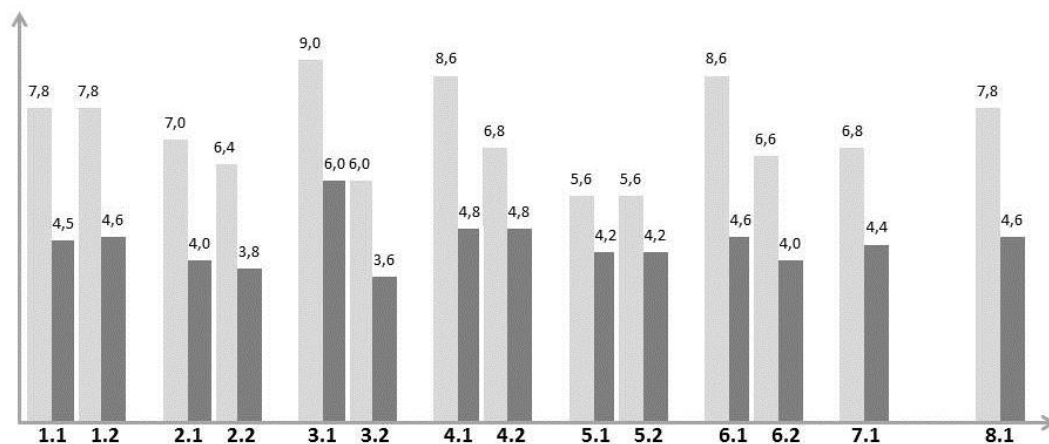


Fig. 2. Evaluation of the level of significance for the success of activities and the level of the formation of Soft skills among university graduates by employers in the context of requirements for bachelors and masters

The light line in the diagram is the evaluation of the significance of the Soft skills for the success by employers. A dark line is the evaluation of the level of the formation of Soft skills among graduates of higher education institutions by employers.

The light color on the chart indicates the evaluation of the significance of Soft skills for the success by employers. The dark tone indicates evaluation of the level of formation of soft skills among university graduates by employers.

The analysis of the level of evaluations of the formation of soft skills among university graduates shows that they are lower than evaluations of the level of significance for the success of the activity. Higher in comparison with other soft skills, employers evaluated the level of the following soft skills: “Ability to carry out social interaction and realize own role in the team” (Soft skills 3 for bachelors) – 6 points, “Ability to carry out business communication in oral and written forms” (Soft skills 4 for bachelors) – 4.8 points, “Ability to apply modern communication technologies for academic and professional interaction” (Soft skills 4 for masters) – 4.8 points), “Ability to manage time, build and implement a self-development path based on principles of education throughout life” (Soft skills 6 for bachelors) – 4.6 points, “Ability to carry out critical analysis of problem situations on the basis of the systematic approach, to develop an action strategy” (Soft skills 1 for masters) – 4.6 points, “Ability to create and maintain safe living conditions, even in emergency situations” (Soft skills 8) – 4.6 points.

Table 2. Ranks

Group		N	Average rank	The sum of the ranks
SS1	assessment of the importance	185	271,64	50252,50
	evaluation of graduates	185	99,36	18382,50
SS2	assessment of the importance	185	260,77	48242,00
	evaluation of graduates	185	110,23	20393,00
SS3	assessment of the importance	185	258,36	47796,50
	evaluation of graduates	185	112,64	20838,50

SS4	assessment of the importance	185	258,94	47904,00
	evaluation of graduates	185	112,06	20731,00
SS5	assessment of the importance	185	228,80	42328,50
	evaluation of graduates	185	142,20	26306,50
SS6	assessment of the importance	185	268,18	49612,50
	evaluation of graduates	185	102,82	19022,50
SS7	assessment of the importance	185	253,76	46945,00
	evaluation of graduates	185	117,24	21690,00
SS8	assessment of the importance	185	267,71	49526,50
	evaluation of graduates	185	103,29	19108,50

Table 3 shows the differences between the assessment of the level of importance of soft skills for activities and their presence in graduates. These differences are significant.

Table 3. The differences between the rating of importance for the successful implementation of activities and assessment of formation of competences of graduates

Statistical criterion ^a								
	SS1	SS2	SS3	SS4	SS5	SS6	SS7	SS8
U Mann-Whitney test	1177,500**	3188,000**	3633,500**	3526,000**	9101,500*	1817,500**	4485,000**	1903,500*
W Wilcoxon test	18382,500**	20393,000**	20838,500*	20731,000**	26306,500**	19022,500**	21690,000*	19108,500**
Z	-15,665	-13,704	-13,253	-13,370	-7,942	-15,045	-12,434	-14,954
Asymptotic significance (2-sided)	,000	,000	,000	,000	,000	,000	,000	,000
a. Grouping variable: Group								
** - p < .01								

4. Discussion

The idea of searching for soft skills has deep roots, it can be clearly traced both in Russia (Bershadskaya, Serova, 2017; Karavaeva, 2017; Rebrin, 2013) and in a number of other countries (Erling, Richardson, 2010, Li, 2014; Wang, 2015; Zhao, 2015). Metaphorically, it can be compared with the search for a platform, the basis, predictors, affecting the success of activities in various

industries and spheres. Universality assumes that these skills provide the solution of typical tasks in different spheres of activity, on the one hand, and the possibility of successful implementation of professional skills, on the other.

In 1996, in the framework of the Council of Europe's program in Bern, the question was raised about the role of "key competences" that a trainee must possess in order to successfully live and continue his/her education. In particular, success in life, in professional work, family affairs and other social spheres requires the graduate of the school to have such key competences as autonomous action (independence and individual initiative), the use of tools (physical and socio-cultural means, including computer, natural language and etc.), functioning in socially heterogeneous groups (tolerance, willingness to interact with people who differ). In addition, political and social competences (conflict resolution by non-violent means and participation in the maintenance of democratic institutions), critical attitude to information in mass media and advertising, the ability to learn throughout life, etc. are highlighted.

The idea of soft skills is also based on the American tradition of differentiating professional skills into soft-skills and hard-skills. For a long time it was believed that hard skills should dominate in this dyad, the whole system of higher professional education was understood by their formation. But at the beginning of this century, American scientists proved that 75-85 % of professional success depends on soft skills and only 25-15 % on hard skills (Nelson-Jones, 2002). In other words, soft skills are a set of such personal characteristics that would facilitate effective interaction and cooperation between people involved in the business process.

It is the awareness of the importance of "soft", and then professional competences, that has turned the whole system of western higher education over the past 20 years. As for Russian universities, most of them are still focused primarily on the formation of future professional (hard) competences, despite the fact that the leading role in individual and corporate professional achievements in the modern postindustrial society is provided by "superstructural" (soft) skills.

The allocation of soft skills creates an important basis for the interaction of business and education: the organization of training and professional development of personnel, including evaluation of training programs and technologies (retraining, advanced training), evaluation of the quality of specialists training, the formation of requirements and procedures of selection and certification of personnel, self-evaluation and development of self-development programs. It is important to emphasize here that soft skills set the unity of the requirements for the training, evaluation and development of human resources.

The analysis of various sources devoted to attempts to identify and describe soft skills shows a wide variety of positions and points of view. A generalized view on the lists of competences allows us to say that soft skills somehow determine the ability to manage one's own professional activity and development, take responsibility, solve communicative tasks related to interaction, etc. They usually include social competences, intellectual competences, competences determining the organization and self-organization of activities.

A few years ago professional competences dominated in the general ranking of employers; the need for personal qualities was noted only by individual trade and financial organizations, which usually directly work with clients (Endovitsky, Titov, 2011). Among soft skills, employers prioritized those that are related to the direct content of employees' activities (Zeer, 2006). Malysheva and Nevraev (Malysheva, Nevraeva, 2006) found that for employers when hiring for job it is principal a university graduate to have special knowledge and professional skills, among personal qualities of a potential employee employers often called: susceptibility, dynamism, willingness to learn, readiness to start small.

As our research has shown, today employers consider soft skills to be significant for business. At the same time, they note the inadequacy of the formation of soft skills among modern university graduates for effective professional work. These results are similar to the results of a survey of employers conducted by M.A. Fedorova in 2016 (Fedorova, Tsygulyova, 2016), which showed that only 41.8 % of employers are satisfied with the level of development of research competences of university graduates employed at a certain enterprise. A similar trend is noted in the study of the Higher School of Economics. The modern system of higher education can not evaluate the personal qualities of students, soft skills, such as general communication skills, the ability to cooperate and work in a team, leadership, emotional stability, and others. Formal knowledge and competences obtained in the education system work much more effectively if they are supplemented by certain

personal qualities of students, which the education system can not measure. At the same time, formal skills and theoretical knowledge obtained during university studies may be less important for employers than personal qualities ("soft-skills"). It is no accident that many employers rely on preliminary testing, assessment centers, conduct numerous interviews with the candidate before hiring a graduate to work (Rudakov, 2016).

This study has a number of limitations. First, the materials presented in the article reflect the general attitude of employers towards the soft skills. We did not consider a number of typical comments by employers' representatives about the complexity of some formulations of the soft skills, about their ambiguity (for example, communication in Russian and foreign languages has different demand and formation), overestimation of the requirements for all graduates (not all should be leaders and be able to manage projects). This requires a more deep research. Also, a significant topic for discussion should be the finding the employers' vision of the ways of forming soft skills. Second, it is impossible to draw causal conclusions, as this study is cross-sectional. Third, since the data were obtained through interviews, this study is limited to how participants understood the subjects in the scales and whether they were honest in answering the questions.

5. Conclusion

Summing up we can say that soft skills are highly appreciated today by employers as significant for the success of their activities, but there is a dissatisfaction with the results of their formation among university graduates. And this is the most important basis for building a dialogue between education and business in the direction of ensuring the quality of training.

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Communicative Competence Formation of Teachers in the Sphere of Foreign Language Education in the System of the Advanced Training

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Abstract

The article gives the description of the notion “formation of teachers’ foreign language communicative competence in the system of the advanced training”. This competence is formed in the close connection with professionally oriented subjects in the process of the educational, scientific and practical activities in the field of foreign language education. Communicative competence is an integrative personal characteristic, which reflects peculiarities of teachers’ professional activity aimed at solving professional problems and promoting successful realization of communication with colleagues, foreign partners by using professional knowledge.

The research represents a new model of communicative competence formation in the process of the professional development of teachers in the system of the advanced training which presupposes the involvement of teachers in polycultural interaction in the process of solving professional tasks. These professional tasks are aimed at the improvement of educational, scientific and professional aspects of training.

Keywords: communicative competence, professional development, advanced training, foreign language education, teachers.

1. Introduction

In a globalizing world meeting the requirements of the new educational standards in the field of teachers’ professional training in the sphere of foreign language education during the advanced training is impossible without ensuring the adequate level of foreign language communicative competence. It is due to the fact that communication in a foreign language includes many aspects of teachers’ professional activity and promotes implementation of such communicative functions: an exchange of up-to-date professionally significant information, establishment of professional

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intersubjective relations, harmonization and coordination of interaction. Therefore, formation of teachers' foreign language communicative competence is a necessary condition of the successful solution of different professional problems. Meanwhile the process of formation of teachers' foreign language communicative competence, directed at ensuring professional interaction in a foreign language in the conditions of the advanced training, demands further studying and many researches of such scientists as E.I. Passov (2005), V.A. Slastenin (1997, 2004), E.N. Solovova (2006), P.V. Sysoyev (2016), A.V. Shchepilova (2017) prove it. However, we can see that there is some lack of theoretical investigations aimed at the formation of teachers' foreign language communicative competence in the conditions of the advanced training.

It should be noted that there is a certain scientific base considering the problem of formation of teachers' foreign language communicative competence. The analysis of some theoretical researches has shown that in recent years the scientists are interested in:

- theoretical bases of the competence approach (I.A. Zymnya, E.F. Zeer, A.V. Hutorskoy, T.I. Shamova (2006), etc.) and its implementation in the language education (N.I. Almazova, A.M. Akopova, etc.);
- specificity of communicative competence formation during a foreign language training (I.L. Bim, R.P. Milrud, J. Raven, P.V. Sysoyev, I.I. Haleeva, etc.);
- theoretical and practical aspects of the professional development in the system of the advanced training (I.V. Ilyina (2015), G.N. Podchalimova (2012), I.M. Podushkina (2014), V.A. Slastenin, etc.);
- theory and practice of teaching foreign language communication (N.A. Tarasuk (2017), I.I. Haleeva, S. Krashen, W. Rivers);
- working out of the estimation criteria of foreign language communicative competence during the professional training of different categories of learners (E.N. Solovova, O.G. Poljakov, N.S. Gribova (2015), O.M. Novikova (2014), etc.).

However, many issues of the formation of teachers' foreign language communicative competence in the conditions of their advanced training are insufficiently studied in the theory and methods of professional education.

The undertaken analysis of this problem reveals a contradiction in the foreign language learning process between the social order and the requirements for their professional communicative activity, and actually low level of formation of teachers' foreign language communicative competence.

2. Materials and methods

The methodological basis of the research is based on the conceptual ideas of modern pedagogics of higher education concerning the communicative processes in today's world and their role in implementation of education functions (I.A. Zymnya, V.A. Slastenin, I.I. Haleeva, etc.); communicative approach statements (N.I. Almazova, A.V. Hutorskoy, V.D. Shadrikov, etc.); communicative cognitive and communicative approaches ideas (A.V. Shchepilova, E.I. Passov, etc.), problem-activity approach (J.A. Efimova, F.M. Matjushkin, etc.), integrative approach (V.N. Shatsky, etc.).

Formation of teachers' foreign language communicative competence is fulfilled in the course of foreign language learning integrated with the professional cycle disciplines during educational, research and practical activities in the conditions of their advanced training and provides the use of means of speech impact adequate to a particular situation that promotes formation of innovative educational space and allows discovering teachers' personal and professional qualities in the conditions of the advanced training.

3. Discussion

The pedagogical model of formation of teachers' foreign language communicative competence in the conditions of the advanced training is based on the following principles of professional orientation, motivation, nonlinearity, integrity, communicative orientation, problematical character (Nikitina et al., 2015).

The model, as proposed, is based on a corresponding technology. In the research the concept "technology" is considered as "a complex, integrative process including people, ideas, means and ways of the organization of activities for the problem analysis and planning, implementation and

management of the problems solution covering all aspects of acquiring knowledge” (Slastenin et al., 2004: 131).

Let's focus on the key statements determining the efficiency of the technology application.

The first statement is concerned with the necessity of using authentic material characterized by functional variability and reflecting specificity of use of communicative means in situations of actual polycultural interaction. As a result learners should possess sufficient and necessary wealth of means of communication for the implementation of the tasks and fulfilling the goals in the main types of professional activity.

The second basic statement in the developed technology is about application of the mechanism of functional transfer from a native into a foreign language at mastering various communicative means.

The core of the offered technology is the algorithm based on the cognitive strategy of formation of communicative bases of foreign speech activity offered by S.V. Pavlova (Pavlova, 2002, 2007). Based on the strategy (its essence is stage-by-stage accumulation of sounding samples in a foreign language and development of communicative imagination), it is possible to represent the algorithm which includes the following steps:

- 1) creation of the motivation-stimulating environment involving the learners in the process of professional communication aimed at mastering the basic communicative functions in the professionally marked situations; 2) accumulation of samples of communicative acts in a native language for the purpose of integration of the received experience in a native language in the communication process in a foreign language; 3) comprehension, identification and differentiation of the basic professional functions of communication in a foreign language in a particular sociocultural environment; 4) designing and reproduction of the basic functions of communication in the professionally marked situations in a foreign language using support; 5) implementation of the basic functions of communication in the professionally marked situations in a foreign language without using support; 6) analysis and adjustment of communicative means according to constantly changing situations of communication in a foreign language; 7) creative actualization of the basic functions of communication in the professionally marked situations in a foreign language.

It would be appropriate to consider the application of the algorithm regarding a certain system of tasks. The objective of the specified system of tasks is teachers' preparation for effective professional interaction in a foreign language.

The special emphasis has been given to the tasks providing immersing of learners in the context of professional activity, showing samples of variable images functioning in the teacher's activity and peculiarities of their use depending on the specificity of the professionally focused situations.

Here are some typical kinds of the exercises carried out at various stages of the offered model of formation of teachers' foreign language communicative competence:

1. The stage of creation of the motivation-stimulating environment providing inclusion of the learners in the process of professional interaction aimed at mastering the basic communication functions in the professionally marked situations. At this stage of implementation of the algorithm a method of interest and emotions stimulation has a huge potential. Therefore at the stage documentary and feature films based on integration of a foreign language with such disciplines as «Intercultural communication», «Innovative technologies in linguodidactics» and others are widely used. For instance, the film «How to create communicative environment in the classroom» can be offered.

2. The stage of accumulation of samples of communicative acts in a native language aimed at integration of the received experience in a native language into the communication process in a foreign language on the basis of video and audio support (exercises on perception). At this stage doing the receptive exercises learners develop receptivity to samples of communicative behaviour by comprehension of the teacher's speech functions, analyzing his/her sounding speech and apprehending speech parameters functions. At the present stage learners watch video fragments in a native language, analyzing linguistic and paralinguistic means. There are some exercises:

- Analyze the dialogue between a teacher and a student and define how the teacher provides emotional support.

- How does the teacher's speech sound: a) monotonously, b) indifferently, c) friendly, d) neutrally?

- Are the pauses in the teacher's speech adequate to the communicative goals (excessive, insufficient, sufficient)? Prove your answer according to the conditions of the pedagogical situation and the purpose of communication.

- Listen to the dialogue once again and define what communicative parameters most effectively provide the achievement of the teacher's objectives?

- Listen to the teacher's remarks and underline the words with a logical stress in the marked sentences. Why are these words stressed?

3. The stage of comprehension, identification and differentiation of the basic communicative functions in a foreign language based on the use of video and audio support.

In this case comprehension, identification and differentiation of the basic communicative functions occur on the basis of the mechanism of functional transfer of these communicative functions from a native language into a foreign language. Analyzing the samples, learners indicate the peculiarities of a professional situation, teacher's adequate use of different parameters of the professional speech, point out similarities of communicative parameters in a native and foreign language, and carrying out functional transfer at perception and comprehension level. The samples anchored in the learners' consciousness are constantly reflected in the following stages of their work on professional speech at implementation of the regulating function during the training.

4. The stage of designing and reproduction of the communicative functions in the professionally marked situations in a foreign language taking into account linguistic and sociocultural specificity of the acquired language using support (imitating exercises). At this stage there is further accumulation of samples, differentiation of the basic communicative functions and imitation of the professional speech samples. The students learn to operate consciously various speech parameters, to compare adequacy of use of phonologic, intonation, lexical, grammatical and stylistic parameters in their own speech to the presented sounding samples. At the present stage reproductive exercises (full reproduction (imitation), partial reproduction) prevail. Functional transfer is based on verbalization of the accumulated communicative experience.

There are some examples of the exercises.

- Listen to the teacher's remarks and repeat them with the text support, paying attention to the use of intonation, lexical, grammatical and stylistic means.

- Reproduce the mute dialogue between a teacher and a student using adequate communicative parameters?

5. The stage of situational implementation of the basic communicative functions in the professionally marked situations in a foreign language without use of support for solution of communicative pedagogical tasks demands further mastering of communicative means.

At this stage learners are offered to reproduce fragments of the teacher's professional speech samples according to the model but with new purposes in the familiar situation.

- Role play the dialogue giving a particular attention to the professional characteristics of the speech.

- Calm the student worried about the examination mark and make recommendations how to improve his/her result.

6. A stage of analysis and adjustment of communicative means according to constantly changing situations of communication.

At the stage the purposes and directives change, communicative parameters vary. On completing the task the learners analyze the result and discuss it in groups. Thereby comprehension of teacher's professional speech parameters proceeds to develop based on the group analysis and adjustment of communicative means. The main exercises are reproductive-productive ones:

- Imagine that the teacher is convincing a poor student instead to use innovative training methods in order to increase the level of his/her knowledge. Discuss in groups, what changes will occur in teacher's speech.

- Discuss with your fellow students how successful you have managed to achieve the purpose of professional of communication using adequate means? What is to be changed, improved?

7. The stage of creative actualization of the basic functions of communication in the professionally marked situations in a foreign language assumes involving the learners in communicative creative activity in a foreign language with the use of communicative means. Learners make dialogues with students, gradually achieving the individual style of constructing

professional speech and expressing their own ideas. Upon completion of this stage teacher's speech is spontaneous, flexible and relevant to the purpose of the communicative situation. The ability to creatively and freely operate with the accumulated samples and speech skills is formed depending on conditions and purpose of the pedagogical situation.

At this stage the following productive exercises are used:

- Give emotional support to the student with a low level of linguistic abilities and offer him/her the most effective ways of perfection of the linguistic skills.

A special place in the technology is given to the formation of the teacher's abilities to express communicative intentions in implementing professionally significant pedagogical tasks.

This technology provides the organization of individual, pair and group work with the learners. Doing the tasks the learners are offered to organize communication with the subjects of pedagogical interaction representing various age groups.

The structure of teachers' foreign language communicative competence includes the following components: motivational, cognitive and operational (Slastenin, Podymova, 1997).

The basic criteria and indicators of the model are the following: motivational criterion (indicators: motivation towards professionally oriented teaching; professional interests in the sphere of foreign language education); cognitive criterion (indicators: linguistic knowledge in the sphere of foreign language education (lexical, grammatical and pronunciation aspects); professionally oriented pedagogical knowledge); operational criterion (indicators: ability to analyze situations of professional interaction; ability to solve professionally oriented problems in the sphere of foreign language education).

The basic pedagogical conditions of effective implementation of the model of formation of teachers' foreign language communicative competence in the conditions of the advanced training are: formation of positive motivation to mastering foreign language communicative competence; immersing in professionally directed communicative intercultural environment reflecting the problems of pedagogical specificity; interaction with representatives of the international community; use of interactive and research methods of training, maintenance of interrelation of group interactive and individual work; creation of a complex of training and methodical means reflecting specialized aspects of teachers' activity in the conditions of the advanced training (Shamova et al., 2006).

4. Results

Approbation and application of the research results were carried out at regional, all-Russian and international conferences in Kursk State University and Kursk State Medical University, at the faculty of the advanced training and professional retraining in 2015-2018. The period of the experimental work was rather long because it was necessary to check out the experimental materials and technologies at different stages of their implementation. The materials were constantly improved within this period in accordance with the contemporary demands reflected in the modern standards of foreign language higher education.

To verify the efficiency of the pedagogical model there was carried out a pilot training with 214 listeners of the faculty of the advanced training. During the experimental work the following problems were solved: 1) estimation of the initial level of formation of teachers' foreign language communicative competence in the conditions of the advanced training; 2) approbation of various forms of training sessions and estimation of their efficiency from the point of view of formation of all components of the foreign language communicative competence directed at development of cognitive, motivational and activity qualities in the advanced training listeners; 3) revealing the dynamics of formation of teachers' foreign language communicative competence in the conditions of the advanced training based on the developed criteria and indicators; 4) empirical monitoring of the pedagogical conditions and technology of formation of teachers' foreign language communicative competence in the conditions of the advanced training.

During the ascertaining experiment the following tools have been used: diagnostic tasks, questioning, testing, supervision, conversation, interviewing, documentation collection and analysis. All the listeners were divided into two groups: control group (CG) including 102 students and experimental group (EG) with 112 learners.

During the diagnostics of the level of the motivational criterion formation the technique «Motivation towards professional activity» developed by K.Zamfir in A.Rean's modification was

applied, and questionnaire survey was also carried out among the students who were asked to express their attitude towards such aspects of their professional activity: material satisfaction (a salary); career prospects; conflicts in the professional sphere; social status and advancement; moral satisfaction; self-development in the professional sphere.

The results have proved that the motivation level of teachers to foreign language professional communication in the conditions of the advanced training has been low (the data are represented in figure 1) and demands further formation.

In the experimental work a special attention was paid to cognitive criterion. So, listeners were offered to take part in a virtual space bridge with foreign representatives of pedagogical community.

Before the online meeting it was necessary to coordinate the space bridge theme, to study the material on the theme, to visit the university-partner web site, to formulate the questions to foreign participants, to design the scenario of the online meeting and to test it in class (offline communication). The theme choice for discussion was due to the aspect of foreign language communicative competence (e.g. «Peculiarities of professional pedagogical interaction in globalization conditions»). The listeners were suggested expressing their opinion on the theme, communicating with various social partners, representatives of the academic environment, workers of the methodical centers. The level of the cognitive criterion wasn't always enough to carry out the offered professional tasks (Table 1).

At the ascertaining stage the level of formation of operational criterion was also determined, as well as the ability to use foreign language communicative means according to the norms of the acquired foreign language was analyzed. The listeners were suggested watching video seminars on problems of foreign language education with the representatives of the USA educational centers. At the seminars the listeners and students from other countries introduced themselves and the educational institutions where they perform educational activity. Then the listeners analyzed and made comments on statements, estimated speech activity, prepared presentation in English, representing possible ways of solution of the given problems in the conditions of modern Russian and foreign high school. The analysis of the listeners' opinion showed a low level of formation of the operational criterion (Table 1).

To confirm the validity of similarities and differences in the values of the criteria of formation of teachers' foreign language communicative competence obtained during the ascertaining stage of the experimental work, it is necessary to apply methods of statistical data processing. The use of statistical criteria allows us to correctly and reliably justify the fact that the increase in the level of formation of teachers' foreign language communicative competence for each criterion in the experimental group is due to the use of experimental teaching methods.

Generalizing the data with a dichotomous scale enables to compare the experimental and control groups at the ascertaining stage using Fisher criterion. This criterion was applied in order to check up the dynamics of all the determined criteria in the process of the pedagogical experiments at its stages.

Table 1. Experimental data to determine the level of formation of teachers' foreign language communicative competence in the system of the advanced training *at the ascertaining stage*

Criteria and indicators of formation of teachers' foreign language communicative competence		Control group	Experimental group	Fisher criterion	Null hypothesis
1	2	3	4	5	6
1) motivational criterion	1. Motivation towards professionally oriented teaching	53	44	0,86	accepted
		49,1%	43,1%		
	2. Professional interests in the sphere of foreign language education	49	43	0,47	accepted
		45,4%	42,2%		
2) cognitive criterion	3. Linguistic knowledge in the sphere of foreign language education	38	39	0,46	accepted
		35,2%	38,2%		
	4. Professionally oriented pedagogical knowledge	23	21	0,13	accepted
		21,3%	20,6%		
3) operational criterion	5. Ability to analyze situations of professional interaction	31	30	0,11	accepted
		28,7%	29,4%		
	6. Ability to solve professionally oriented problems in the sphere of foreign language education	14	12	0,26	accepted
		13,0%	11,8%		

As an example, we apply Fisher statistical test for the indicator “motivation towards professionally oriented teaching” at the ascertaining stage of experimental work. We formulate the null hypothesis as follows: there are no differences in the levels of motivation towards professionally oriented teaching of the control and experimental groups. In turn, the alternative hypothesis is determined by the value of differences: the levels of motivation towards professionally oriented teaching of the control and experimental groups have significant divergence.

We calculate the empirical value of Fisher's test $\varphi_{\text{эмн}}$ for this criterion by the formula (1):

$$\varphi_{\text{эмн}} = \text{abs}\left(2 \cdot \arcsin(\sqrt{p}) - 2 \cdot \arcsin(\sqrt{q})\right) \cdot \sqrt{\frac{M \cdot N}{M + N}} \quad (1)$$

In the formula (1) p represents the share of students of the control group with the formed criterion "motivation towards professionally oriented teaching" and is defined by the formula (2)

$$p = n / N, \quad (2)$$

where n – the number of students in the control group with the formed criterion ($n = 53$), N – the number of students in the control group ($N = 108$). Consequently, $p = 53 / 108 = 0,491$.

Accordingly, q is the proportion of students with formed criterion in the experimental group and is determined by the formula (3)

$$q = m / M, \quad (3)$$

where m – the number of students in the experimental group with the formed criterion ($n = 44$), N – the number of students in the experimental group ($N = 102$). Consequently, $q = 44 / 102 = 0,431$.

Using the formula (1) we obtain the empirical value of Fisher criterion:

$$\varphi_{\text{эмн}} = \text{abs}\left(2 \cdot \arcsin(\sqrt{0,491}) - 2 \cdot \arcsin(\sqrt{0,431})\right) \cdot \sqrt{\frac{108 \cdot 102}{108 + 102}} = 0,86$$

For a significance level of 0.05, the critical value of Fisher criterion $\varphi_{0,05}$ according to a special table is 1,64. If we obtain the following inequality $\varphi_{\text{эмн}} \leq \varphi_{0,05}$, it is necessary to accept the null hypothesis with the level of significance 0,05; if $\varphi_{\text{эмн}} > \varphi_{0,05}$, it is necessary to reject the null hypothesis and accept the alternative one.

For the criterion "motivation towards professionally oriented teaching" we get the inequality: $\varphi_{\text{эмн}}(0,86) < \varphi_{0,05}(1,64)$. Therefore, the null hypothesis is accepted and, as a result, there has been revealed a reliable coincidence of levels of motivation towards professionally oriented teaching at the ascertaining stage with a five percent probability of error.

We calculate the empirical values of Fisher's test for the following criteria for students at the ascertaining stage of the experimental work. The results are presented in column 5 Figure 1 and allow us to draw a conclusion about a reliable coincidence of the levels of formation of teachers' foreign language communicative competence, as all the empirical values of Fisher's test were determined as smaller in comparison with the critical one.

The results of the ascertaining experiment as a whole testify that the listeners experienced communicative difficulties both in native and foreign languages on problems of foreign language education. The data received in the diagnostic research, specify that formation of teachers' foreign language communicative competence wasn't enough in order to solve professional problems in the sphere of foreign language education. Hence, application of the specially developed pedagogical model and its technological maintenance directed at the solution of this problem is required.

The logic of the forming experiment was to create for one of the groups an experimental situation in which on the basis of the corresponding pedagogical conditions there is a possibility to trace the degree of expression and stability of results of implementation of the developed pedagogical model.

The purpose of the forming experiment was to determine the pedagogical conditions and to check experimentally the efficiency of the technological maintenance of formation of teachers' foreign language communicative competence in the conditions of the advanced training.

At the forming experiment the special educational guide «Foreign language: Professional English for Teachers» was used in the course of teaching the discipline "Foreign language"; a special system of exercises modelling peculiarities of foreign language communication in the sphere of pedagogical education was used; communication and information means (materials from

professional websites in a foreign language, educational online platforms), and also audiovisual (documentary and feature films) were involved. Authentic materials represented natural situations of communication and reflected behavioral traits of subjects of communication in foreign language education.

Various kinds of exercises directed at formation of foreign language communicative competence were used.

During the forming experiment an innovative association has been organized – the club «Foreign language education without borders», providing communication with foreign participants of training courses and practice abroad by means of interactive technologies (social networks, blogs, wikis) for collecting information on pedagogical activity in foreign language education.

On completion of the experiment the level of formation of foreign language communicative competence was measured. The data received during the forming phase of the investigation was compared to the results received during the ascertaining phase of the investigation in control and experimental groups (Table 2).

Quantitative and qualitative interpretation of the control profiles results after the experiment by all three criteria shows constant increase in number of the listeners who have coped with all the tasks at high level and reduction in quantity of listeners, who have shown the average level; simultaneously the number of those who have coped with all the tasks at the average level increases, and the number of those who did the tasks at a low level decreases (Table 2).

Table 2. Experimental data to determine the level of formation of teachers' foreign language communicative competence in the system of the advanced training *at the final stage*

Criteria and indicators of formation of teachers' foreign language communicative competence		Control group	Experimental group	Fisher criterion	Null hypothesis
1	2	3	4	5	6
1) motivational criterion	1. Motivation towards professionally oriented teaching	67	78	2,28	<i>rejected</i>
		62,0%	76,5%		
	2. Professional interests in the sphere of foreign language education	61	72	2,13	
		56,5%	70,6%		
2) cognitive criterion	3. Linguistic knowledge in the sphere of foreign language education	45	75	4,76	<i>rejected</i>
		41,7%	73,5%		
	4. Professionally oriented pedagogical knowledge	33	48	2,47	
		30,6%	47,1%		

3) operational criterion	5. Ability to analyze situations of professional interaction	42	60	2,91	<i>rejected</i>
		38,9%	58,8%		
	6. Ability to solve professionally oriented problems in the sphere of foreign language education	27	45	2,94	
		25,0%	44,1%		

5. Conclusion

The research made it possible to define the essence of teachers' foreign language communicative competence in the conditions of the advanced training which is considered to be the competence determining their readiness for communication in the course of learning a foreign language in integration with professional cycle disciplines during educational, research and practical activities.

Teachers' foreign language communicative competence is a component of the professional competence directed at intercultural communication and is formed during learning a foreign language and special preparation disciplines. This competence being teachers' integrative personal characteristic and reflecting peculiarities of their professional work provides teachers' effective self-realization at solving professional problems and promotes successful realization of communication with colleagues, foreign partners by using professional knowledge, abilities, mastered ways of creative activity and experience with the help of system of linguistic, sociolinguistic, sociocultural, pragmatic, discourse and strategic means.

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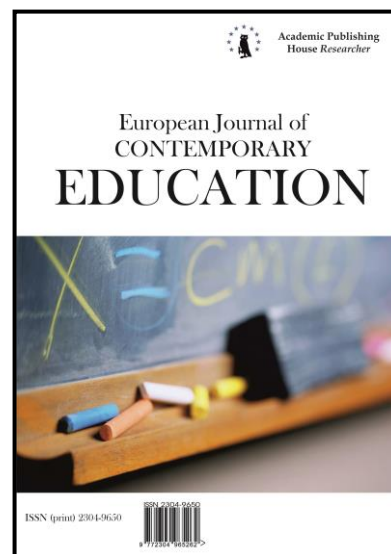
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Modern Medical Higher Education Institutions in Russia

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Abstract

Now the Russian healthcare system is rapidly changing. In this period training of future doctors is essential. In the modern conditions when highly qualified medical specialists mastering modern high-tech diagnosis and treatment methods are in demand, the improvement of the quality of training future doctors is one of the important goals of medical higher education institutions. However, the problems of medical higher education institutions are related to the organization of the educational process and limit the full achievement of this goal.

Analyzing the results of the sociological survey among practitioners and medical students revealed problems related to the professional and social adaptation of young specialists, as well as the medical personnel's unpreparedness to practice after the graduation.

Based on the conducted studies, the article has revealed the limitations that impede the development of the socially important profession – the doctor, analyzed the level of theoretical and practical training of students, and considered the organization and quality of the educational process for medical students.

The authors have formulated recommendations that contribute to improving the modern medical higher education in Russia.

Keywords: students, medical higher education institutions, higher education, system of training medical personnel, educational programs, medical residency, doctors, health care.

1. Introduction

The level of training medical personnel influences the current state of such important social sector as health care. Therefore, the improvement of the medical personnel's qualification, the system of their training, the introduction of new forms and methods of teaching are important issues. Within the "Concept of Developing Health Care up to 2020" the Russian Federation plans to improve skills of medical workers and to create a system of motivating them for high-quality work. Therefore, it is impossible not to talk about important problems related to training personnel. It is

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necessary to create a system of life-long medical education, with the level of training complying with the modern world realities. Unfortunately, the doctors' training programs are based on developing their skills to apply certain recommendations of the Ministry of Health, rather than to apply certain therapeutic algorithms that are so popular in Europe and the United States. Now the Russian system of training higher medical personnel suffers certain difficulties associated with the outdated material and technical base of higher education institutions. Even if they were modernized, there is still no free access to all equipment, and there are often difficulties related to maintaining the appropriate state of the technical base (lack of technicians). New requirements for equipping higher medical education institutions set new demands, and far from all of them can modernize the existing practical laboratories. Many of them use obsolete facilities. New competencies for the students mainly aim at forming certain skills of the personal development and improving the activity of students in the information, communication and legal areas. The content of educational and training programs does not always comply with the practical requirements set in relation to young specialists. The duration of the most important courses is shortened and reduced. In addition, it is rather difficult to integrate employees of clinical departments in medical education institutions into the treatment process. The issues on clinical bases of higher education institutions and the management of departments of clinical activity based on state and municipal medical entities have not been regulated yet.

In recent years, the system on training higher medical personnel has been considerably reformed, educational programs and teaching methods have been revised, and the time for theoretical training has been reduced. As a consequence, it is extremely important to take into account the opinion of practitioners involved in the educational process, as well as their positive and negative views about preparing and organizing the educational process for future specialists.

2. Discussion

Theoretical and methodological issues, as well as the conceptual apparatus on organizing and training personnel in the health care sector are considered in the works of such Russian authors as N.V. Boldina et al. (2015), L.V. Shubtsova, N.A. Makhnova (2014), I.M. Sheiman, V.I. Shevsky (2015), L.A. Savinkina, T.S. Shepelova (2014), V.O. Schepin (2013), E.Ya. Titova (2017), P.V. Solodukha, D.N. Baranov (2018). as well as foreign researchers (Ten Cate O. et al. (2010), Mitesh S. Patel et al. (2011), P.P. Groenewegen et al. (2013)). These studies present data on the size and supply of the population with doctors and paramedical personnel in Russia and abroad, and the problems of medical staff shortages. However, in the works of the authors, personnel processes in medical organizations are not considered, approaches to the organization of the educational process in a medical university, and the readiness of students to carry out medical activities after graduation have not been studied.

With a large number of scientific developments devoted to improving the quality of higher medical education (L.P. Peshev, N.A. Lyalichkina (2017), Yu.O. Komarov (2013), N.V. Bagrova (2017), E.R. Zinkevich (2013), N.B. Naigovzina et al. (2014), V.I. Starodubov et al. (2016), D.S. Andrega et al. (2015), O.A. Gavrilyuk et al. (2017), M.A. Joshi (2012), B.M. Wong (2012), M. Tariq, S.A. Ali (2014), Liviana Da Dalt et. al. (2010), J. Pearce et al. (2015), Carrera R.M. et al. (2015), Satterfield J.M., Carney P.A. (2015), Dr Helena Ferris, Dermot O'Flynn (2015) and others), issues that reveal the restrictions that impede mastering medicine by students have not yet been fully investigated. The opinion of experts (doctors) has been insufficiently studied in the context of preparing medical students to solve professional problems. There are extremely few empirical data that reflect, on the one hand, the needs of the Russian society in medical specialists, and, on the other hand, real capabilities and abilities of medical graduates to carry out medical activities.

That is why not only the results of a survey of consumers of medical services, as well as students of medical universities, but also practicing doctors who directly carry out medical activities are of interest.

3. Materials and Methods

The empirical base of the study included the results of a sociological survey carried out by the authors in June 2018 in the Tambov Regional State Health Care Institution Tambov Municipal Clinical Hospital No. 3 (TRSHCI TMCH No. 3). The sample included 28 experts (doctors involved in training of future medical staff). The purpose of this study was to assess the level and quality of

theoretical and practical training of future doctors, as well as to identify the factors that impede the development of a socially important profession – the doctor.

The results of the experts' survey show that in the modern conditions, in order to train highly qualified doctors, it is necessary to create study rooms in hospitals and clinics where students master practical skills; to provide students with the opportunity to use medical equipment during training; to assign mentor doctors who will share their experience of professional medical activity.

Besides, the authors carried out a sociological study in March-April 2018 at the Medical Institute of the Derzhavin Tambov State University. During this study 72 students (3-6 courses of study) were interviewed. This study was aimed at assessing the organization and quality of the educational process for students of the higher education institution.

The conducted research made it possible to identify a number of problems that impeded mastering medicine by students.

The results of the study were assessed by analyzing the relationship between the actual level of training of future doctors and their expectations (obtaining extensive practical knowledge, skills and experience, individual approach, teaching innovative treatment algorithms, providing relevant and timely educational references, demand on the labor market).

The authors used the counting method for Pearson's criterion χ^2 (Table 1, Table 2).

Table 1. The analysis of contingency tables using the Chi-square

Factorial sign	Effective sign			Sum
	satisfied	uncertain	dissatisfied	
Quality of education	28	10	34	72
Number of theoretical lessons	24	9	39	72
Number of practical classes	23	5	44	72
Practical significance of knowledge	35	0	37	72
Relevance of educational literature	30	0	42	72
The level of equipment of laboratories	20	0	52	72
Work in the specialty	40	25	7	72
Total	200	49	255	504

The number of degrees of freedom is 12. The value of χ^2 is 113.412. The critical value of χ^2 at the significance level $p=0.01$ is 26.217. The relationship between the factor and effective signs is statistically significant at the significance level $p<0.01$.

Table 2. The analysis of contingency tables using the Chi-square

Factorial sign	Effective sign		Sum
	Good	Bad	
Theoretical training	10	18	28
Clinical thinking	8	20	28
Interest in the profession	15	13	28
Provision of training equipment	5	23	28
Total	38	74	112

The number of degrees of freedom is 3. The value of χ^2 is 8.444. The critical value of χ^2 at the significance level $p=0.05$ is 7.815. The relationship between the factor and effective signs is statistically significant at the significance level $p<0.05$. The level of significance $p=0.038$.

4. Results

The analysis of the results of the sociological survey carried out among students showed that 39 % of the respondents were satisfied with the quality of education, while almost every second

respondent (47 %) was not satisfied with the knowledge obtained at the university, and 14 % rated the quality of education as satisfactory.

In order to improve the quality of education at a higher education institution, more than 50 % of the respondents (54 %) noted that it was necessary to increase the time for theoretical training. In turn, every third student (33 %) was satisfied with the existing schedule, and 13 % stood for reducing academic disciplines.

It is necessary to note that the overwhelming majority of students (61 %) considered it necessary to increase the time spent for practical classes, and every third respondent (32 %) stated the number of practical classes was enough, while 7 % found it difficult to answer.

Practical training of students is the most important part in training specialists because at this stage they improve and systemize the theoretical knowledge they have obtained.

The results of the study show that rather many students are not satisfied with the current education system and are interested in increasing the time for theoretical and practical training rather than in its reduction and self-training. In addition, there is a gap between the knowledge obtained during the theoretical and practical classes. The students noted that almost half of the knowledge they had obtained during theoretical training was not useful when doing practical assignments. 52 % of the respondents indicated this, while almost every second (48 %) respondent did not consider it to be a problem. It is interesting that more than half of the respondents (69 %) believe that they will not need the knowledge obtained in general education disciplines. These answers indicate that there is a need in the further revision of educational programs.

In addition, the students note that the educational process is insufficiently provided with relevant educational and methodological literature. This was indicated by 59 % of respondents. The overwhelming majority of future doctors, namely 78 %, indicated the need to increase the time for studying clinical disciplines, while 22 % would like to have the opportunity to study international practices.

One of the main reasons of low clinical training is the lack of proper conditions (rooms, modern medical equipment, etc.) for practical and laboratory classes. This problem was indicated by 72 % of the respondents.

In addition, the students were asked whether they wanted to be doctors in the future. Every third student (34 %) found it difficult to answer this question. Almost one in ten (10 %) plans to be engaged in another activity, and only 56 % are sure that they will work in their specialty.

An important criterion for assessing the education quality is the demand for specialists having graduated from higher education institutions (Kabanova, Vetrova, 2018), therefore, in addition to interviewing the students, the authors carried out a sociological survey at the Tambov Regional State Health Care Institution Municipal Clinical Hospital No. 3. This hospital is the clinical base for training students of the Medical Institute.

According to the survey results, it was revealed that the level of theoretical training of trainee students was quite low. This was indicated by 64 % of the doctors surveyed. Almost every third expert (36 %) noted a high level of theoretical readiness of students.

The experts note unwillingness of future doctors to study as one of the reasons why the level of students' training is low. This is the opinion of half of the doctors surveyed (52 %). At the same time, 28 % of the respondents note that the level of students' education is low because it is free (the state must pay for their studies). 16 % of the respondents associate this problem with an inefficient system of education in the pregraduate courses (4-6 courses). 4 % of the respondents related it to dishonesty teachers.

According to the study results, 73 % of doctors are dissatisfied with the clinical thinking of young specialists. At the same time, it is necessary to note that the role of clinical thinking is very high in the doctor's professional work. Clinical thinking starts with the first minutes of communicating with the patient and continues throughout the treatment process. The analysis of the data obtained during the examination, their comparison and interpretation allow defining a preliminary diagnosis at the beginning of the study, which is based on the disease features that have already been revealed. Clinical thinking along with constructive, integrative thinking and the ability to collect anamnesis and other information about the patient is an important element of medical practice (Deberdeev, 2015).

The study also revealed that most students practicing in the hospital did not show any interest in professional activities. Almost every second expert (47 %) pointed to this problem.

In addition, the doctors note the reluctance of young specialists to fill out medical records and reporting forms. They perform this kind of activity formally and carelessly.

The experts defined the inability to provide medical students with medical equipment for practice as one of the essential problems. The overwhelming majority of the doctors surveyed (82 %) note that they cannot provide the student with the opportunity to practice independently by using the existing medical equipment because it is used for work. It is necessary to note that the remaining 18 % of doctors do not provide equipment, but they allow the student to be present and observe. Undoubtedly, the current trend reduces the level and quality of the student's practice during the learning process.

Thus, it is possible to conclude that the existing education system requires adjustments. The overwhelming majority of students and experts note the insufficiency of academic hours for theoretical and practical studies. In addition, it is necessary to note that the classes should focus not on general educational disciplines, but on clinical ones and have a practical-oriented and professionally applied nature.

5. Discussion

New state education standards made it possible for a medical graduate to start an independent work in health care institutions without training in the internship. This change entered into force at the beginning of the 2017-2018 academic year. Nowadays, in order to work in a medical and preventive institution, it is enough to have a diploma of a general practitioner because students master their profession in the simulation training rooms. Recently this has been actively used in the educational process of medical higher education institutions of the Russian Federation. These changes in the education system were made to solve such acute problem as the shortage of medical personnel in the health care institutions.

However, many experts negatively regard these innovations because the previous system of training specialized medical specialists assumed the mastery of practical skills under the guidance of practitioners who had many years' experience and great opportunities in training the future doctor. At the moment, medical graduates almost completely eliminated the shortage of therapists and pediatricians, but their level of training is rather weak. The conducted analysis proves this. Many experts insist on reproviding the internship because it could train highly qualified specialists. Its abolition caused the reduction in academic hours to study microbiology, biochemistry, physiology, and other specialized disciplines.

According to the practitioners, it would be the most rational to choose a specialty after the 4th course, i.e. after the student has obtained the basic knowledge of basic subjects, and to start mastering the chosen specialty (primary specialization) at the 5th and 6th courses, and then continue it during 2 years by studying in clinical residency. In this case, clinical residency should become an obligatory stage of training each student. This way will allow prolonging the term of training on the chosen specialty and improving clinical training.

The practical part of the future specialist's education is carried out as the simulation training on simulators that enable students to practice their skills of examining a patient. However, even subject to sufficient availability of complex and high-quality simulators for all students, they do not replace direct communication and work with patients. This is not available, although there are clinical departments in medical institutes. They provide this process. It is necessary to remember that institutions of practical public health often become clinical departments of higher education institutions. Sometimes they do not have special rooms for studies, medical equipment for educational purposes, the possibility for students to access wards and operating rooms. These factors will define clinical training of future specialists. For this, a higher education institution concludes an agreement with practical organizations, mainly with medical and preventive institutions. Although the survey shows that the institution is not able to fully participate in the training of students.

It is possible to solve this problem by transferring a number of hospitals to medical higher education institutions, where heads of hospitals will be heads of clinical departments. These training complexes should be staffed by experienced clinical professors, associate professors, assistants, whose functions should include the organization of not only curative, but also the educational process.

6. Conclusion

The results of the study have shown that the majority of university graduates (70 %) do not have the required practical skills and abilities because the modern educational programs are not

enough to study the techniques that are necessary for the future doctor's individual practice. In the modern conditions, another important problem is a large number of students attending practical classes in training groups. Currently, on average there are 15 students in each group. It is merely impossible to teach everyone under such number of trainees. Each teacher can teach no more than 4 students who after the 4th-5th year of studying must be involved in the required practical or research work by medical institutions that are interested in this (Komarov, 2013).

Thus, the current system of medical higher education is not perfect. First of all, it is necessary to improve the curricula and steering documents taking into account the development of clinical thinking, to update teaching materials, to improve the work of practitioners to share experience and knowledge, to comprehensively provide medical schools with modern equipment, and to expand the list of practice bases. The goal of medical education institutions at all levels should be a system of core competencies on the issues related to their professional training based on unified approaches to medical education. It is necessary to form a clear readiness of future medical personnel to modeling highly professional competence and a desire to improve the nation's health, as a whole.

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Effects of a 8-Month Exercise Intervention Programme on Physical Activity and Physical Fitness for First Grade Students

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Abstract

Background. The World Health Organization recommends that children should participate in sufficient PA by engaging in moderate-to-vigorous physical activity for at least 60 min daily per week. Schools are important settings for the promotion of children's physical activity. Through commuting, break times, and physical education lessons they provide regular opportunities for children to be active

Methods. The experimental group included 26 girls and 24 boys aged 6–7 years old, and the control group included adolescent girls (n=25) and boys (n=23). The experimental group included 26 girls 24 boys aged 6-7 years old. Their mean weight and height were 24.3±0.9 kg and 1.25±0.11 m for the girls, and 29.3±0.6 kg and 1.33±0.09 m for the boys. The control group included 25 girls and 23 boys aged 6-7 years old, attending the same school. Their mean weight and height were 22.3±0.7 kg and 1.24±0.1 m for the girls, and 28.4±0.7 kg and 1.36±0.07 m for the boys. The methodology of innovative physical education classes was based on the DIDSFA model (dynamic exercise, intense motor skills repetition, differentiation, reduction of parking and seating, physical activity distribution in the classroom).

The testing of physical fitness. The flexibility test, the long jump test, 3 × 10 m speed shuttle run test, a medical (stuffed) 1 kg ball pushing from the chest test. *The evaluation of physical activity.* Children's Physical Activity Questionnaire (Corder et al., 2009) was used. It was also based on the Children's Leisure Activities Study Survey (CLASS) questionnaire,

Results. Experimental group (EG) (boys and girls) post-test results physical fitness (PF) tests, it turned out that the results of the long jump test ranged from 106.3 cm (girls) to 120.1 cm (boys), statistically significant differences were detected ($p < .05$). The girls (2.93 m) performed worse than the boys (3.64 m) ($p < .05$) in the medical (stuffed) 1 kg ball pushing from the chest test.

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The best score of the girls' 3 × 10 m speed shuttle run test was 8.55 s, for boys it was 8.8 s, the worst performance time for boys was 13.52 s, for girls 13.22 s ($p < .05$). Comparing the results of boys' and girls' flexibility, there were no statistically significant differences ($p > .05$): the girls' flexibility was about 0.06 cm, for boys -1.8 cm.

The post-test of the experimental group boys (1261.93 MET, min/week) was to analyze average physical activity in comparison with the girls of the experimental group (737.48 MET, min/week). Statistically significant difference was found during the analysis of average MET per boy (1390.45 MET, min/week) in comparison with the girls (880.27 MET, min/week, $p < 0.05$).

Conclusion. Established that the properly construed and purposefully applied complex of the 8-month exercise intervention programme for first grade students caused the statistically significant changes in the dependent variables: increased physical activity and physical fitness for experimental group.

Keywords: physical activity, physical fitness, innovative physical education classes, primary education.

1. Introduction

As physical activity (PA) is beneficial for children's health (Baranowski et al., 2006; Xu, Xue, 2016) the promotion of PA is a useful and logical way to improve children's health and prevent chronic diseases. The World Health Organization recommends that children should participate in sufficient PA by engaging in moderate-to-vigorous physical activity for at least 60 min daily per week (WHO..., 2010; Teychenne, York, 2013) PA with moderate intensity is defined as an activity that increases breathing, sweating, and heart rate, while PA with vigorous intensity refers to an activity that substantially increases breathing, sweating, and heart rate (Landry, Driscoll, 2012).

Public health interventions in schools are important, as a large number of children can be reached (Dobbins et al., 2013); and there are key windows of opportunity in a primary school setting to increase children's PA levels such as: break times (Powell et al., 2015), in class activity breaks (McMullen et al., 2014) and Physical Education classes (McKenzie, Lounsbery, 2014). Schools are important settings for the promotion of children's physical activity. Through commuting, break times, and physical education lessons they provide regular opportunities for children to be active (Ridgers et al., 2006). Past work has found that children can acquire up to 40 % of their daily moderate-to-vigorous physical activity (MVPA) during school break times (Ridgers et al., 2006), and between 25 % and 40 % during travel to and from school (van Sluijs et al., 2009). Previous work has highlighted how alterations and additions to the physical school environment can increase children's activity levels (Harrison, Jones, 2012), and that the supportiveness of primary school physical activity environments is positively related to children's school-time activity levels (Jones et al., 2010).

The purpose of this study was to establish the effects of a 8-month exercise intervention programme on physical activity and physical fitness for first grade students

2. Methods

Participants. According to the SVIS data base statistics (URL: <http://www.svis.smm.lt/>), the number of first grade students in year 2017/2018 was 30.126 in total (14.609 of girls). All in all, 384 first form students had to be tested. This study was only observational and therefore a smaller number of respondents were selected.

The school was randomly selected from primary schools in Lithuania. With the approval of the parents, the time and place of the examination were agreed with the school administration in advance. The study took place in 2017 from September to November in four Lithuanian general education schools that had primary education and primary education classes. The time and place of the study, with the consent of the parents, were agreed upon in advance with the school administration.

The experimental group included 26 girls and 24 boys aged 6–7 years old, and the control group included adolescent girls ($n=25$) and boys ($n=23$). The experimental group included 26 girls 24 boys aged 6-7 years old. Their mean weight and height were 24.3 ± 0.9 kg and 1.25 ± 0.11 m for the girls, and 29.3 ± 0.6 kg and 1.33 ± 0.09 m for the boys. The control group included 25 girls and 23 boys aged 6-7 years old, attending the same school. Their mean weight and height were 22.3 ± 0.7 kg and 1.24 ± 0.1 m for the girls, and 28.4 ± 0.7 kg and 1.36 ± 0.07 m for the boys.

In the present research, we used a pre-test/post-test experimental strategy. That was chosen to avoid any interference with educational activities due to the random selection of children into the groups. The experimental group was under test during eight months. We developed the methodology of innovative physical education classes and created the model of educational factors stimulating pupils' physical activity. We identified relationships between the pupils' physical activities at school and learning achievements. We also prepared the methodical material for innovative physical education classes (Figure 1). The methodology was based on the DIDSFA model (dynamic exercise, intense motor skills repetition, differentiation, reduction of parking and seating, physical activity distribution in the classroom) (Powell et al., 2016; Bulioliene et al., 2017).

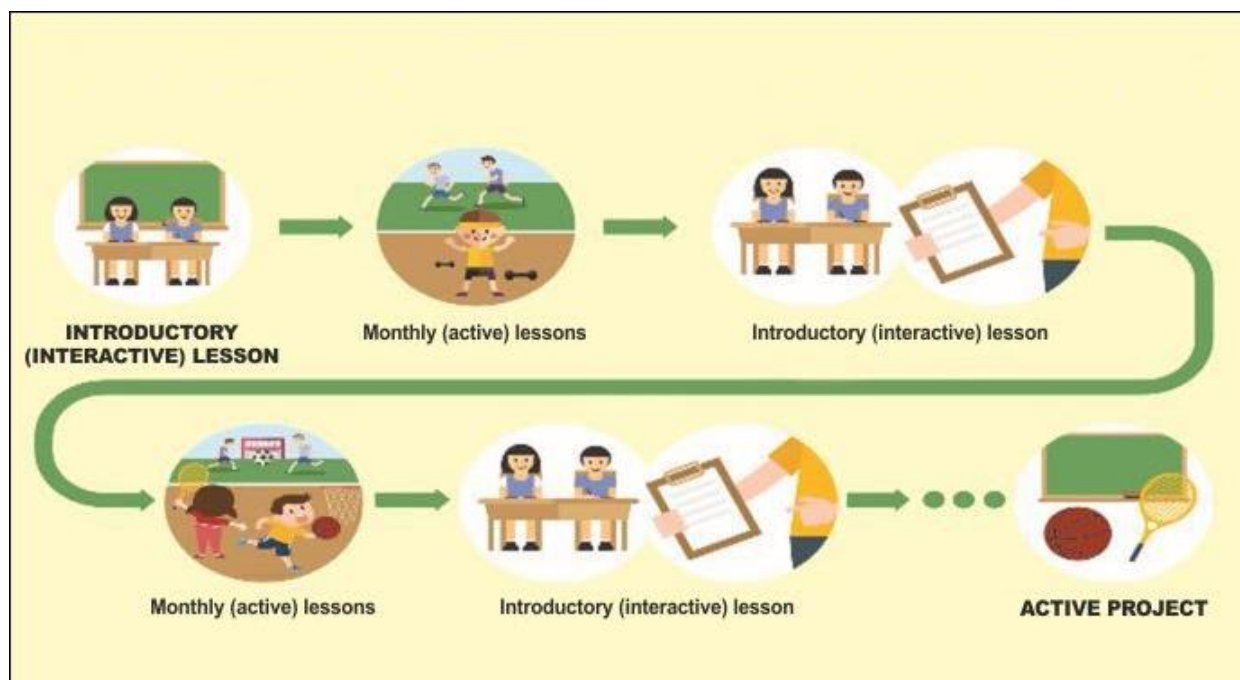


Fig. 1. Methodical material for innovative physical education classes

The girls and boys in the control group attended the same (non-modified) physical education lessons.

The testing of physical fitness. The students performed four physical fitness tests (PFT) during physical education lessons. They performed the European Physical Fitness Test Battery (Eurofit) in the following test order: the long jump test to test explosive power of children's leg muscles; flexibility (sit and reach test) (Venckunas et al., 2017); 3 × 10 m speed shuttle run test – agility (Ivanovas, Paškevičienė, 2003); medical (stuffed) 1 kg ball pushing from the chest test explosive power of the hands (Fjørtoft et al., 2011).

The evaluation of physical activity. Children's Physical Activity Questionnaire (Corder et al., 2009) was used. It was also based on the Children's Leisure Activities Study Survey (CLASS) questionnaire, which included activities specific to young children, such as "playing in a playhouse." The original intent of the proxy-reported CLASS questionnaire for 6–7-year-olds was to assess type, frequency, and intensity of physical activity over a usual week.

Mathematical statistics. The arithmetic mean (\bar{x}) and the average standard deviation (SD) were determined for comparison. Differences between different genders, age and physical fitness were estimated using one-factor dispersion analysis (ANOVA). The relationship between variables was calculated on the basis of the correlation coefficient of the Spearman correlation coefficient. Differences between different genders and physical activity were estimated using Mann-Whitney U test. The following reliability levels were used for statistical outputs: $p > .05$ – insignificant; $p < .05$ – significant. All calculations were performed using MS Excel and SPSS programs.

3. Results

Physical activity of 7-year-old children. On analyzing the pre-test results of physical activity of the 7-year-old students, it turned out that both the boys (98.30 MET, min/week) and girls (90.30 MET, min/week) in the experimental group were physically active during physical education classes ($p > 0.05$).

The analysis of physical activity types, such as cycling to school and walking to school showed that there were no differences in gender according to MET. In the context of average physical activity, a higher indicator (1086.21 MET, min/week) was detected in the boys of the experimental group in comparison with the girls (681.41 MET, min/week). Statistically significant differences were found in average MET per boy (1184.51 MET, min/week) in comparison with the girls (815.88 MET, min/week) ($p < 0.05$; Table 1).

The post-test of the experimental group boys (1261.93 MET, min/week) was to analyze average physical activity in comparison with the girls of the experimental group (737.48 MET, min/week). Statistically significant difference was found during the analysis of average MET per boy (1390.45 MET, min/week) in comparison with the girls (880.27 MET, min/week, $p < 0.05$; Table 1).

Table 1. The physical activity level using the MET method (the pre-test/post-test results of the experimental group)

Type of physical activity	MET	1 day/min	Days per week	MET, min/week
The experimental group pre-test				
Boys				
Physical Training lesson	3.5	31	1	98.30
Cycling to school	4	0	3	0.00
Walking to school	3.3	0	4	0.00
Sport groups (mean physical activity)	6	59	1	1086.21
On average for one boy				1184.51*
Girls				
Physical Training lesson	3.5	31	1	90.30
Cycling to school	4	0.48	3	18.35
Walking to school	3.3	0.97	4	25.82
Sport groups (mean physical activity)	6	59	1	681.41
On average for one girl				815.88*
Experimental group post-test				
Boys				
Physical Training lesson	3.5	31	1	128.52
Cycling to school	4	0	3	0.00
Walking to school	3.3	0	4	0.00
Sport groups (mean physical activity)	6	59	1	1261.93
On average for one boy				1390.45*

Girls				
Physical Training lesson	3.5	31	1	94.68
Cycling to school	4	0.48	3	18.50
Walking to school	3.3	0.97	4	29.61
Sport groups (mean physical activity)	6	59	1	737.48
On average for one girl				880.27*

*– p<0,05 (according to the Mann-Whitney U test)

Analyzing the results of the 7-year-old students' physical activity, it turned out that in the control group, both the boys (93.86 MET, min/week) and girls (90.68 MET, min/week) were physically active in physical education classes ($p > 0.05$) during the pre-test.

The analysis of physical activity types such as cycling to school and walking to school found no differences in gender according to MET. A higher number of the boys in the control group (954.36 MET, min/week) was determined during the analysis of average physical activity compared to the girls of the same group (568.52 MET, min/week). Statistically significant differences were found during the analysis of average MET per boy in the control group (1070.90 MET, min/week) compared to the girls (691.69 MET, min/week, $p < 0.05$; [Table 2](#)).

The post-test results of the boys of the control group (1012.08 MET, min/week) were determined by the analysis of average physical activity in comparison with the girls of the same group (598.03 MET, min/week). Statistically significant differences were found in average MET per boy (1130.23 MET, min/week) in comparison with the girls (723.17 MET, min/week, $p < 0.05$; [Table 2](#)).

Table 2. Physical activity level using the MET method (the pre-test/post-test results of the control group)

Type of physical activity	MET	1 day/min	Days per week	MET, min/week
Control group pre-test				
Boys				
Physical Training lesson	3.5	31	1	93.86
Cycling to school	4	0.70	3	22.68
Walking to school	3.3	0	4	0.00
Sport groups (mean physical activity)	6	59	1	954.36
On average for one boy				1070.90*
Girls				
Physical Training lesson	3.5	31	1	90.68
Cycling to school	4	0,51	3	12.28
Walking to school	3.3	0,57	4	20.21
Sport groups (mean physical activity)	6	59	1	568.52
On average for one girl				691.69*

Control group post-test				
Boys				
Physical Training lesson	3.5	31	1	94.02
Cycling to school	4	0.70	3	24.13
Walking to school	3.3	0	4	0.00
Sport groups (mean physical activity)	6	59	1	1012.08
On average for one boy				1130.23*
Girls				
Physical Training lesson	3.5	31	1	91.45
Cycling to school	4	0.51	3	13.41
Walking to school	3.3	0.57	4	20.28
Sport groups (man physical activity)	6	59	1	598.03
On average for one girl				723.17*

Note. * $p < .05$ (according to Mann-Whitney U test).

Physical fitness of 7-year-old children. While analysing the results of 7-year-old students' experimental group (EG) (boys and girls) pre-test results physical fitness (PF) tests, it turned out that the results of the long jump test ranged from 105.2 cm (girls) to 118.3 cm (boys), statistically significant differences were detected ($p < .05$) (Table 3). The girls (2.73 m) performed worse than the boys (3.35 m) ($p < .05$) in the medical (stuffed) 1 kg ball pushing from the chest test. The best score of the girls' 3 × 10 m speed shuttle run test was 9.55 s, for boys it was 9.2 s, the worst performance time for boys was 13.68 s, for girls 13.54 s ($p < .05$). Comparing the results of boys' and girls' flexibility, there were no statistically significant differences ($p > .05$): the girls' flexibility was about 0.05 cm, for boys -1.6 cm (Table 3).

Control group (CG) (boys and girls) pre-test results physical fitness (PF) tests, it turned out that the results of the long jump test ranged from 101.5 cm (girls) to 113.3 cm (boys), statistically significant differences were detected ($p < .05$) (Table 3). The girls (2.31 m) performed worse than the boys (3.05 m) ($p < .05$) in the medical (stuffed) 1 kg ball pushing from the chest test. The girls' 3 × 10 m speed shuttle run test was 12.73 s, for boys it was 10.09 s, ($p < .05$). Comparing the results of boys' and girls' flexibility, there were no statistically significant differences ($p > .05$): the girls' flexibility was about 0.04 cm, for boys -1.7 cm (Table 3).

Table 3. Comparison of 7- year-old boys' and girls' indicators of physical fitness (the pre-test/post-test results of the Experimental group)

Test	Girls	Boys	F criterion value; p level	Observed Power
Experimental group pre-test				
Long jump (cm)	105.2 (12.1)	118.3 (9.8)	28.017 .000	1.000
Medical (stuffed) 1 kg ball pushing from the chest (m)	2.73 (0.27)	3.35 (0.65)	73.460 .000	1.000
3 × 10 m speed shuttle run	11.61 (0.914)	10.99 (1.06)	21.082 .000	0.996
Sit and reach (cm)	0.05 (7.09)	-1.6 (6.25)	3.475 .064	0.459

Relationships between students' physical fitness				
	Long jump (cm)	3 × 10 m speed shuttle run	Medical (stuffed) 1 kg ball pushing from the chest (m)	Sit and reach (cm)
Long jump (cm)	1			
Medical (stuffed) 1 kg ball pushing from the chest (m)	-.939**	1		
3 × 10 m speed shuttle run	.945**	-.960**	1	
Sit and reach (cm)	.945**	-.949**	.942**	1
Experimental group post-test				
Long jump (cm)	106.3 (11.5)	120.1 (7.6)	28.524 .000	1.000
Medical (stuffed) 1 kg ball pushing from the chest (m)	2.93 (0.17)	3.64 (0.52)	74.324 .000	1.000
3 × 10 m speed shuttle run	10.59 (0.91)	10.05 (1.06)	21.025 .000	0.985
Sit and reach (cm)	0.06 (7.05)	-1.8 (6.05)	3.841 .064	0.478
Relationships between students' physical fitness				
	Long jump (cm)	3 × 10 m speed shuttle run	Medical (stuffed) 1 kg ball pushing from the chest (m)	Sit and reach (cm)
Long jump (cm)	1			
Medical (stuffed) 1 kg ball pushing from the chest (m)	-.912**	1		
3 × 10 m speed shuttle run	.895**	-.915**	1	
Sit and reach (cm)	.982**	-.892**	.953**	1

Note. ** $p < .01$.

Experimental group (EG) (boys and girls) post-test results physical fitness (PF) tests, it turned out that the results of the long jump test ranged from 106.3 cm (girls) to 120.1 cm (boys), statistically significant differences were detected ($p < .05$) (Table 4). The girls (2.93 m) performed worse than the boys (3.64 m) ($p < .05$) in the medical (stuffed) 1 kg ball pushing from the chest test. The best score of the girls' 3 × 10 m speed shuttle run test was 8.55 s, for boys it was 8.8 s, the worst performance time for boys was 13.52 s, for girls 13.22 s ($p < .05$). Comparing the results of boys' and girls' flexibility, there were no statistically significant differences ($p > .05$): the girls' flexibility was about 0.06 cm, for boys -1.8 cm (Table 4).

Control group (CG) (boys and girls) post-test results physical fitness (PF) tests, it turned out that the results of the long jump test ranged from 101.7 cm (girls) to 114.9 cm (boys), statistically significant differences were detected ($p < .05$) (Table 4). The girls (2.42 m) performed worse than the boys (3.59 m) ($p < .05$) in the medical (stuffed) 1 kg ball pushing from the chest test. The girls' 3 × 10 m speed shuttle run test was 12.23 s, for boys it was 12.09 s ($p < .05$). Comparing the results of boys' and girls' flexibility, there were no statistically significant differences ($p > .05$): the girls' flexibility was about 0.05 cm, for boys -1.9 cm (Table 4).

Table 4. Comparison of 7- year-old boys’ and girls’ indicators of physical fitness (the pre-test/post-test results of the Control group)

Test	Girls	Boys	F criterion value; p level	Observed Power
Control group pre-test				
Long jump (cm)	101.5 (9.3)	113.3 (9.2)	25.032 .045	0.825
Medical (stuffed) 1 kg ball pushing from the chest (m)	2.31 (0.52)	3.05 (0.31)	69.581 .023	0.932
3 × 10 m speed shuttle run	12.73 (0.54)	12.09 (0.86)	21.082 .000	0.901
Sit and reach (cm)	0.04 (2.86)	-1.7 (3.25)	3.475 .064	0.529
Relationships between students’ physical fitness				
	Long jump (cm)	3 × 10 m speed shuttle run	Medical (stuffed) 1 kg ball pushing from the chest (m)	Sit and reach (cm)
Long jump (cm)	1			
Medical (stuffed) 1 kg ball pushing from the chest (m)	-.856**	1		
3 × 10 m speed shuttle run	.923**	-.910**	1	
Sit and reach (cm)	.749**	-.891**	.899**	1
Control group post-test				
Long jump (cm)	101.7 (9.1)	114.9 (5.2)	25.059 .049	0.865
Medical (stuffed) 1 kg ball pushing from the chest (m)	2.42 (0.49)	3.59 (0.21)	69.641 .035	0.961
3 × 10 m speed shuttle run	12.23 (0.32)	12.09 (0.52)	21.023 .000	0.938
Sit and reach (cm)	0.05 (2.79)	-1.9 (1.48)	3.628 .034	0.648
Relationships between students’ physical fitness				
	Long jump (cm)	3 × 10 m speed shuttle run	Medical (stuffed) 1 kg ball pushing from the chest (m)	Sit and reach (cm)
Long jump (cm)	1			
Medical (stuffed) 1 kg ball pushing from the chest (m)	-.862**	1		
3 × 10 m speed shuttle run	.945**	-.911**	1	
Sit and reach (cm)	.863**	-.898**	.901**	1

Note. ** $p < .01$.

4. Discussion

It was established that the properly construed and purposefully applied complex of the 8-month exercise intervention programme for first grade students caused the statistically significant changes in the dependent variables: increased physical activity and physical fitness for experimental group.

Physical Activity. The main aim of this research was to evaluate a one-year teaching strategy intervention, which supported teachers in increasing children's active learning time during primary physical education classes (PEC). Our results indicated that the intervention programme was effective. Thus, teachers were provided with a new platform that raised awareness, provided a clear focus and re-directed their approach to teaching primary PEC. It was evident from the qualitative data that teachers began to think about primary PEC in a very different way, in short their approach to PE at baseline did not align with their new awareness of increasing active learning time at post intervention programme. Powell et al. (2016) found that proportion of time children were engaged in moderate to vigorous physical activity during PE lessons in the intervention school increased significantly between baseline ($M = 42.51\%$ $SD = 12.41\%$) and post-intervention ($M = 72.59\%$, $SD = 10.05\%$). As a result, it seems effectively increase children's active learning time in PE. Sallis et al. (1997) evaluated a health-related physical education program for fourth- and fifth-grade students designed to increase physical activity during physical education classes and outside of school. Scientists found, that students spent more minutes per week being physically active in specialist-led (40 min) and teacher-led (33 min) physical education classes than in control classes (18 min; $P < .001$). After 2 years, girls in the specialist-led condition were superior to girls in the control condition on abdominal strength and endurance ($P < .001$) and cardiorespiratory endurance ($P < .001$). There were no effects on physical activity outside of school (Sallis et al., 1997). Children's moderate and vigorous physical activity significantly increased in the intervention group (moderate: from 38 to 50 %, vigorous: from 10 to 11 %), while it decreased in the control group (moderate: from 44 to 39 %, vigorous: from 11 to 5 %). At morning recess, providing game equipment was effective in increasing children's moderate physical activity (from 41 to 45 %), while it decreased in the control group (from 41 to 34 %). Finding suggests that promoting physical activity through game equipment provision during recess periods can contribute to reach the daily activity levels recommended for good health (Stefanie et al., 2006). Kliziene et al. (2018) found that both boys and girls were physically active in physical education lessons ($p > 0.05$).

Physical Fitness. Poor scoring in physical fitness is an important risk factor for cardiovascular disease (Timpka et al., 2014), type 2 diabetes (Lee et al., 1999), hypertension (Faselis et al., 2012), stroke (Högström et al., 2015). Venckunas et al. (2017) carried out the study about Lithuanian children physical fitness The study has shown loss of flexibility, leg muscle power, upper body strength and cardiorespiratory fitness between 1992 and 2012, although there was an improvement in abdominal muscle strength in girls, agility in boys and balance in both genders during the same period. At large, negative trends in aspects of fitness seen between 1992 and 2002 have not slowed down between 2002 and 2012. Positive trends in agility and abdominal muscle strength seen before 2002 have regressed or were reversed between 2002 and 2012, while balance continued to improve at increased pace (Venckunas et al., 2017). Sallis et al. (1997) estimated, that applying a health-related physical education program for girls in the specialist-led condition improved substantially in mile-run time. On the sit-up test, girls in the specialist-led condition improved more than those in the control condition. Kliziene et al. (2018) found that long jump results ranged from 105.2 cm (girls) to 118.3 cm (boys), statistically significant differences were detected ($p < 0.05$) The best score of the girls' shuttle running 3×10 m was 9.55 s, for boys it was 9.2 s, the worst performance time for boys was 13.68 s, for girls – 13.54 s ($p < .05$).

5. Conclusion

Established that the properly construed and purposefully applied complex of the 8-month exercise intervention programme for first grade students caused the statistically significant changes in the dependent variables: increased physical activity and physical fitness for experimental group.

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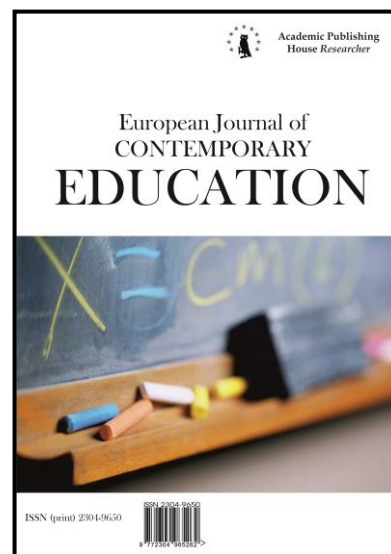
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Personality Factors and Foreign Language Pronunciation Anxiety: The Effect of Psycho-Social Training

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Abstract

This paper focuses on the link between 16 primary and 5 global personality factors and the Foreign Language Pronunciation Anxiety of 63 Slovak learners of English, who underwent a 24-week psycho-social training (in the experimental group) combined with English pronunciation training (both in the control and experimental group). Data was collected before and after the training interventions, using the Foreign Language Pronunciation Anxiety Scale and the Sixteen-Factor Personality Questionnaire 16 PF. Data analysis proved that the differences in the 16PF scores between the pre-test and post-test were significant for the factors Reasoning, Emotional Stability, Apprehension, Tension and Anxiety in both groups; and for Social Boldness, Vigilance and Self-Control in the experimental group only.

Keywords: personality, ESL, anxiety, intervention, teacher preparation.

1. Introduction

After researchers in the second half of the twentieth century began recognizing affective factors as equally relevant in learning as cognitive factors, one of the most examined affective variables in the field of foreign language (FL) learning was foreign language anxiety (FLA) (Horwitz, 2010). FLA is considered more of a psychological (identity-based) construct than a linguistic (competence-based) construct (Alrabai, 2015), stemming most likely from the learner's perception of "self" (Scovel, 1991), where self-perceptions, perceptions of others, perceptions of FL learning and performance play important roles (Gardner, MacIntyre, 1993; Horwitz et al., 1986; Kralova, Petrova, 2017).

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Foreign language learning itself is often considered a “profoundly unsettling psychological proposition” (Guiora, 1983: 8) because it threatens learners’ self-concepts as their self-expression is limited by their imperfect command of a FL. Especially speaking is often sensed as a “threat to peoples’ self-concept, self-identity, and ego, which they have formed in their first language as reasonable and intelligent individuals” (Horwitz et al., 1986; Hashemi, Abbasi, 2013: 645). As FL learning inevitably requires learners to experience constant change or reconstruction, learners with the capability to overcome such a “cognitive inconsistency” (Bennett, 1998) are considered successful FL learners. Risk-taking (Horwitz, 1996) and tolerance of ambiguity (Dewaele, Shan Ip, 2013) thus may well shape the success in mastering an FL.

Extraversion is another personality feature that has received attention in FL learning research over the past several decades (e.g., Dewaele, Furnham 2000; Dewaele, 2005; Ehrman et al., 2003). It is believed to be an advantage for FL speech production because extraverts tend to be outgoing, sociable, lively, impulsive, carefree and risk-taking; they like parties, changes, have many friends, seek novelty and change (Eysenck, Eysenck, 1964). Other personality traits studied in FL learning were emotional stability (Dewaele, Al-Saraj, 2015; MacIntyre, Charos, 1996), perfectionism (Gregersen, Horwitz, 2002), neuroticism (Dewaele, 2013), emotional intelligence (Dewaele et al., 2008), verbal intelligence (Fahim, Pishghadam, 2007), integrativeness (Gardner, MacIntyre, 1993), and empathy (Guiora et al., 1972a).

Relatively few researchers have tried to link FLA measures with personality traits. Creativity, cooperativeness, competitiveness, individualism, self-worth and coping self-efficacy were examined as potential predictors of FLA (Bailey et al., 2000; Onwuegbuzie et al., 1999). Gregersen and Horwitz (2002) concluded that more anxious participants tended to be more perfectionist. Dewaele et al. (2008) found out that higher levels of emotional intelligence corresponded to significantly lower FLA, and a significant relation was revealed between communicative competence and openness to experience (Verhoeven, Vermeer, 2002).

Most studies on FLA have concluded that speaking is the skill most affected by FLA (Horwitz, 2010), and one of its most immediate determinants is the concern over FL pronunciation (Baran-Łucarz, 2011), an essential factor in FL speaking. Pronunciation is seen as the most salient aspect of the language ego (Guiora et al., 1972b) and strongly related to human identity and the speaker’s level of self-confidence.

The relationship between FL pronunciation achievement and personality can thus be rather significant. Several scholars investigated the effect of personality on FL oral production, trying to determine predictors of FL pronunciation quality (e.g., Baran-Łucarz, 2012; Dewaele, Furnham, 2000; Flege et al., 1995; Hu et al., 2011; Hu et al., 2013; Piske et al., 2001).

Hu et al. (2011, 2013) aimed at clarifying the neuro-psychological origins of individual differences in FL pronunciation aptitude, finding empathy a significant predictor of FL pronunciation aptitude. Concerning level of FL pronunciation, Kralova (2012) detected a significant positive relationship between sensitivity and openness to change and a significant negative relationship between tough-mindedness and anxiety. On the other hand, Baran-Łucarz (2012) reported no systematic relationship between the level of ambiguity tolerance, the thickness of ego boundaries and attainments in FL pronunciation.

The trait theories of personality identify personality features as relatively stable, long-term and consistent (e.g., Eysenck, 1981; Kerry, 1990) and consider them to be biologically determined and inherited. However, many researchers believe that this traditional conception “does not do justice to the dynamic, fluid and continuously fluctuating nature of learner factors and neither does it account for the complex internal and external interactions that we can observe” (Dörnyei, 2010: 253).

Seemingly few studies have examined the relation of personality variables and FLA in a longitudinal design applying any kind of intervention. Tracy-Ventura et al. (2016) demonstrated significant changes in the emotional stability of participants after a year spent in a FL-country. The effect of affective strategy instruction (relaxation, music, visualization, humour, positive self-talk, risk-taking, and monitoring emotions) on FL oral tasks has also been examined (Rossiter, 2003). Ganesan and Kulkarni (2016) attempted to reduce English language anxiety through a combination of behaviour modification techniques in a one-month intervention. Both studies recognized the positive influence of the applied affective strategies on oral performance and anxiety levels, yet they did not examine the effect of any intervention on personality factors.

The links between FLA and personality traits have been under-researched (Dewaele, 2013), and there is continuing need for more intervention studies to determine the effects of affective strategies on FL learning. Moreover, applying affective intervention strategies in FL learning/teaching is in line with the current trends in linguistics and psychology. The post-communicative approach (Modern Language Association of America, 2007) in FL teaching and learning utilizes psychological methods and techniques to make it more effective and enjoyable, and the positive psychology (Oxford, 2015) aims to activate character strengths and self-regulated learning to enhance professional and personal well-being.

What is more, nearly all interventions attempting to reduce FLA are learner-oriented and rely on FL teachers to implement anxiety-relieving behaviours and practices in their classrooms (Skrinda, 2017). It is often forgotten that many FL teachers themselves are not native speakers and may face FLA (Horwitz, 1996). However, the research on teachers' and student teachers' FLA is still rather limited, and this despite the fact that it can have an undesirable influence on FL learning as the role of the teacher is undoubtedly crucial in making FL learning less stressful and more effective (Hashemi, Abbasi, 2013; Horwitz, 1996).

Therefore, a longitudinal study of training interventions specifically aimed at reducing pre-service teachers' FL pronunciation anxiety (FLPA) levels and how this reflects their personality characteristics can shed more light on the issue and complement the existing findings. In the current study, an affective intervention was applied to a group of pre-service EFL teachers in the form of psycho-social training combined with intensive English pronunciation training¹ in order to determine whether there is any effect of this intervention on their personality and English pronunciation anxiety.

In this context, two research questions were formulated:

1. What changes does the psycho-social training induce in foreign language pronunciation anxiety?
2. What changes does the psycho-social training induce in personality factors?

2. Materials and Methods

Objectives

The main objectives of this study were to determine the effect of psycho-social training on the analysed personality variables and FLPA. Many researchers (e.g., Hashemi, Abbasi, 2013; MacIntyre, 1995) have acknowledged the need of FLA coping training for FL learners as a supplement to skills training. Based on the literature review, it was assumed that some personality traits enhanced by psycho-social training might contribute to the reduction of FLPA, especially the primary factors positively related to the global factor Extraversion and those negatively related to the global factor Anxiety.

Participants

63 Slovak first-year EFL student-teachers served as participants in this study. After the pre-test, they were subdivided into two groups (the experimental group – 30 students and the control group – 33 students) by stratified random sampling to obtain the comparable level of FLPA in both groups. Further, the experimental group was divided into two sub-groups of 15 participants each, as psycho-social training is proven to be most effective in smaller groups from 5 to 12-15 people (Wilkinson, Canter, 1982). The two experimental sub-groups were given identical amounts and qualities of intervention and were treated as a whole in the analysis.

Instruments

The Sixteen-Factor Personality Questionnaire (16PF). Information concerning personality was elicited from the participants by the way of the Sixteen-Factor Personality Questionnaire, 5th edition (Cattell et al., 1997), which was administered and evaluated by a psychologist (one of the authors). The questionnaire assesses personality traits according to five global factors and sixteen contributing primary factors (Table 1) by means of self-reported answers to 185 multiple-choice questions. The personality features are evaluated on a 10-point scale with a higher score indicating a higher tendency towards the given personality trait.

Table 1. Global and contributing primary factors in the 16PF (Cattell et al., 1997)

Global Factor Definition	Contributing Primary Factors
<p>Extraversion (EX) Social orientation; the desire to be around others and be noticed by them; the energy invested in initiating and maintaining social relationships.</p>	A Warmth
	F Liveliness
	H Social Boldness
	N Privatness -
	Q2 Self-Reliance -
<p>Anxiety (AX) Emotional adjustment; the types of emotions experienced and the intensity of these.</p>	C Emotional Stability -
	L Vigilance
	O Apprehension
	Q4 Tension
<p>Tough-Mindedness (TM) The way a person processes information; the extent to which they will solve problems at an objective, cognitive level or by using subjective or personal considerations.</p>	A Warmth -
	I Sensitivity -
	M Abstractedness -
	Q1 Openness to Change -
<p>Independence (IN) The role a person assumes when interacting with others; the extent to which they are likely to influence or be influenced by the views of other people.</p>	E Dominance
	H Social Boldness
	L Vigilance
	Q1 Openness to Change
<p>Self-Control (SC) Response to environmental controls on behaviour; internal self-discipline.</p>	F Liveliness -
	G Rule-Consciousness
	M Abstractedness -
	Q3 Perfectionism

Foreign Language Pronunciation Anxiety Scale (FLPAS). The FLPAS (see Appendix)² has been used to examine the participants’ English pronunciation anxiety level before and after the intervention. Its design was inspired by the Foreign Language Classroom Anxiety Scale (Horwitz et al., 1986) and the Phonetics Learning Anxiety Scale (Baran-Lucarz, 2013), based on the authors’ teaching experiences in English phonetics courses and reflecting the students’ opinions on their English pronunciation weak points and worries.

The questionnaire included 20 declarative statements to gather participants’ perceptions of their English pronunciation and required them to indicate the extent to which they agree/disagree to the statements based on a 5-point Likert scale (1 – strongly disagree, 2 – disagree, 3 – undecided, 4 – agree, and 5 – strongly agree). The anxiety score ranged from 20 to 100, with higher scores reflecting greater anxiety. For some items, a reversed scoring was used.

Procedure

Pre-test: 16PF and FLPAS were conducted with all participants. After the pre-test, the participants were subdivided into the experimental group and the control group 33 students to obtain a comparable level of FLPA in both groups.

Intervention: Psycho-social training was provided to the experimental group over the course of 24 weeks (a total of 36 hours). Pronunciation training was provided to both groups over the course of 24 weeks (a total of 36 hours).

Post-test: 16PF and FLPAS were conducted with all participants after 24 weeks of intervention.

Intervention

Psycho-social training. Psycho-social training is a widely accepted and applied non-therapeutic intervention training program of active social learning in all levels of education in the United States and Western Europe (Coleman, Deutsche, 2000). Compared to more traditional forms of education, it induces deeper and longer-term positive changes in participants' social competences (Positive Youth Development, 2014).

It is a non-therapeutic intervention training program of active social learning that should help individuals cope with stressful situations by developing their social abilities (sensitivity, assertiveness, empathy, communication and cooperation). It helps participants understand their own and the other people's emotions and behavior and enhance their self-confidence, acquire adequate reactions, realize the reasons for diffidence, strengthen their will and active self-knowledge and cope with stage fright.

Psycho-social training was led by a psychologist (one of the authors) and implemented exclusively in the experimental group for 24 weeks (one 90 minute session per week). The primary rules of psycho-social training are smaller groups of attendants, sitting in a circle, uninterrupted sessions and psychologists as lecturers. The purpose of psycho-social training is to create a supportive environment and an atmosphere that generates psychological trust, to enhance self-expression and openness.

Each session introduced a different topic (Who am I?; What am I like?; We all are different; Myself; Team; Communication; Emotions; Conflict; How to solve conflicts?; Conflict and I; Conflict and you; Conclusion) and had a similar structure. The first session started with introducing the participants to each other and making them aware of the objectives of the training. The next sessions started with a 10-minute talk about each participant's opinions and problems and continued with the discussion of the topic of the session (10-15 minutes). The program of the training was semi-structured and included the participants' topical issues, if required (for more details see Skorvagova, 2016).

The sessions were experiential in nature and the methodology was participatory, i.e., learning through the sharing of ideas and through practice. Individual, pair or group work, role playing, discussions and brain storming were used in the sessions to encourage the participants to experience, understand and contribute towards individual as well as collective learning. The participants were encouraged to use various expressive techniques (e.g., puppet play, drawing, writing and physical activities) to acknowledge their feelings and problems.

Psychotherapeutic activities applying cognitive-behavioural, modelling, metaphor, systematic reinforcement and mindfulness techniques were the core of each session and took from 10 to 75 minutes. After each activity, a short discussion (debriefing) was initiated by the psychologist to reflect the participants' feelings. The session was concluded by a 5-minute summary of the session.

Pronunciation training. The phonetic training was led by a phonetician (one of the authors), which was equally implemented in both the experimental and control groups for 24 weeks (one 90-minute session per week). The phonetics classes were predominantly practical with complementary theoretical input on English phonetics and phonological issues (Roach, 2009). The pronunciation training focused on eliminating the native language interference in English. Both segmental and supra-segmental features of English were presented in a detailed manner, using mostly an inductive approach (students tried to observe the phonetic phenomena and come up with the rules).

The classes consisted of standard instruction for EFL phonetics courses and usually started with a theoretical explanation followed by oral practice. Different types of techniques were applied to practice pronunciation (listen, identify, repeat and produce) using audio- and video-recordings and the teacher as a model of articulation. The last part of the lesson was devoted to transcription practice using IPA symbols.

Data analysis

The 16PF score for each factor was computed using the DOS Psychosoft System Brno, which provides automatic scoring and interpretation. The FLPAS score for each subject was computed by summing up the scores of each questionnaire item (with respect to the reverse scoring). The data were collected and evaluated, and the individual scores of the respective parts were analysed using descriptive statistics and non-parametric tests to examine the changes of participants' 16 PF and FLPAS scores. A quantitative analysis of the data obtained by the instruments (16PF and FLPAS) applied in the pre-test and post-test was performed using the Wilcoxon Signed Rank Test and the Wilcoxon Rank Sum Test in the program STATISTICA because of the small sample without normal distribution.

3. Results

Foreign Language Pronunciation Anxiety Scale (FLPAS)

First, the means of the self-reported anxiety levels in the pre-test and post-test in both groups (Table 2) were calculated and compared. The Wilcoxon Rank Sum Test proved that the differences between the FLPA scores of the control group and the experimental group are statistically insignificant ($p > 0.05$) in the pre-test: $Z = 0.089496$, $p = 0.928688$, $\alpha = 0.05$ and statistically significant ($p < 0.05$) in the post-test: $Z = 2.51329$, $p = 0.011961$, $\alpha = 0.05$. A non-parametric one-side Wilcoxon Signed Rank Test proved that the differences in the FLPA scores between the pre-test and post-test were statistically significant ($p < 0.01$, $\alpha = 0.01$) both in the control group ($Z = 4.396575$, $p = 0.000011$) and the experimental group ($Z = 4.78214$, $p = 0.00000$).

Table 2. FLPA scores in the pre-test and in the post-test

pre-test	control group	post-test	control group
	72.97		68.36
	experimental group		experimental group
	72.70		61.97

16 Personality Factor Questionnaire (PF16)

The means of the 16 PF in the pre-test and post-test in both groups were calculated and compared (Table 3).

Table 3. Wilcoxon Signed Rank Test results of 16PF

factor	control group (n = 33)				experimental group (n = 30)			
	means		Z	p	means		Z	p
	pre-test	post-test			pre-test	post-test		
A	5.70	5.88	1.43	0.15	5.77	5.57	0.75	0.45
B	5.73	6.30	3.18	0.00*	5.70	6.73	3.43	0.00*
C	4.70	5.03	2.52	0.01*	4.47	5.50	3.02	0.00*
E	5.03	4.97	identical		4.93	4.83	0.34	0.73
F	6.18	6.06	1.83	0.07	6.13	6.20	0.18	0.86
G	4.67	4.82	1.83	0.07	4.57	4.80	0.58	0.56
H	6.09	6.18	1.01	0.31	6.07	7.53	3.72	0.00*

I	6.36	6.24	1.47	0.14	6.40	6.33	0.33	0.74
L	6.79	6.61	1.35	0.17	6.90	5.37	3.71	0.00*
M	6.03	6.00	identical		5.90	6.10	0.61	0.54
N	5.67	5.52	1.83	0.07	5.53	5.47	0.01	0.99
O	6.03	5.36	3.18	0.00*	5.93	4.33	3.70	0.00*
Q1	5.67	5.82	1.83	0.07	5.73	5.97	0.60	0.55
Q2	5.64	5.73	1.21	0.22	5.67	5.83	0.35	0.73
Q3	4.82	4.91	1.60	0.11	4.67	4.80	0.64	0.52
Q4	5.82	5.27	2.58	0.01*	5.87	4.37	4.13	0.00*
EX	5.79	5.76	0.37	0.72	5.77	5.77	0.09	0.93
AX	6.61	5.97	3.41	0.00*	6.67	4.53	4.69	0.00*
TM	4.76	4.70	0.80	0.42	4.87	4.63	0.65	0.51
IN	5.70	5.61	identical		5.57	5.53	0.28	0.78
SC	4.58	4.73	1.18	0.24	4.63	5.97	3.23	0.00*

The Wilcoxon Rank Sum Test (Table 4) proved that the differences between the 16PF scores of the control group and the experimental group are statistically insignificant ($p > 0.05$, $\alpha = 0.05$) in the pre-test on all factors and statistically significant ($p < 0.05$, $\alpha = 0.05$) in the post-test on the factors marked by * (H – Social Boldness, L – Vigilance, O – Apprehension, Q4 – Tension, AX – anxiety and SC – Self-Control).

Table 4. Wilcoxon Rank Sum Test results of 16PF

factor	pre-test		post-test	
	Z	p	Z	p
A	-0.13	0.89	0.66	0.51
B	0.059	0.95	-1.82	0.07
C	1.015	0.31	-1.45	0.15
E	0.29	0.77	0.29	0.77
F	0.14	0.89	-0.32	0.75
G	0.15	0.88	0.02	0.98
H	0.16	0.87	-2.80	0.01*
I	0.07	0.94	-0.36	0.72
L	-0.19	0.85	2.74	0.01*
M	0.40	0.69	-0.24	0.81
N	0.35	0.73	0.22	0.83
O	0.26	0.80	2.52	0.01*
Q1	-0.13	0.90	-0.44	0.66
Q2	-0.02	0.98	-0.32	0.75
Q3	0.06	0.95	0.06	0.96
Q4	0.04	0.97	2.45	0.01*
EX	0.07	0.94	-0.11	0.92
AX	-0.20	0.84	2.81	0.01*
TM	-0.30	0.76	0.17	0.86
IN	0.31	0.75	0.23	0.82
SC	0.01	0.99	-3.04	0.00*

A non-parametric one-side Wilcoxon Signed Rank Test (Table 3) proved that the differences in the 16PF scores between the pre-test and post-test were statistically significant ($p < 0.01$, $\alpha =$

0.01) only for the factors marked by *. In the control group: B – Reasoning, C – Emotional Stability, O – Apprehension, Q4 – Tension, AX – Anxiety; and in the experimental group: B – Reasoning, C – Emotional Stability, H – Social Boldness, L – Vigilance, O – Apprehension, Q4 – Tension, AX – Anxiety and SC – Self-Control.

4. Discussion

The purpose of this study was to investigate to what extent the aspects of EFL student teachers' personalities changed after the 24-week psycho-social training in the experimental group combined with English pronunciation training conducted in both groups. After the intervention, FLPA was reduced in both groups, probably due to the phonetic training conducted in both groups, which improved participants' English pronunciation quality and therefore confidence. However, the decrease of FLPA in the post-test was more significant in the experimental group, probably due to the psycho-social training provided.

The next research question investigated to what extent the examined personality factors changed after the intervention as measured by the 16PF questionnaire. The 16PF results were similar for both groups in the pre-test with rather high scores on L – Vigilance, I – Sensitivity, and the global factor AX – Anxiety. The lowest scores were on C – Emotional Stability, G – Rule-Consciousness), Q3 – Perfectionism and the global factor SC – Self-Control, without any significant differences between the control and experimental groups.

The participants were young (18-19 years of age), just starting their university studies, with many worries and expectations. Late adolescence is a period of identity formation, and some emotional instability and doubts about oneself are an integral part of it, which could partly explain such factor proportions.

After the intervention, the groups differed in six factors, with the experimental group scoring significantly higher in Social Boldness and Self-Control, and significantly lower in Vigilance, Apprehension and Tension contributing to the global factor Anxiety. However, Apprehension, Tension and Anxiety were significantly reduced also in the control group, which can be attributed to two semesters of targeted FL pronunciation training. The participants' self-perception of their FL pronunciation quality was better, which resulted (inter alia) in reduced Anxiety and related primary factors. Nevertheless, Social Boldness, Vigilance and Self-Control did not change in the control group.

When comparing the factor changes within each group, Reasoning and Emotional Stability increased in both groups as well. The emotional, social and cognitive development of the participants enhanced by the psycho-social training could result in increased relaxation, patience, adaptation, self-assurance, confidence, self-satisfaction and internal self-discipline, and in reduced suspicion and distrust.

A significant increase in Reasoning in both groups after two semesters of university study is undoubtedly a gratifying finding. However, the relation to the intervention applied seems to be blurred, as the psycho-social training does not primarily develop cognitive aspects. The considerable improvement in Reasoning in the experimental group might correspond to the phenomenon of divided attention between the task-related and emotion-related cognition among anxious individuals, making cognitive performance less efficient (Eysenck, 1981; MacIntyre, Gardner, 1991). The significantly-reduced anxiety in the experimental group might reflect the facilitative effect on the mental capacity of the participants.

Most of the factors that changed were the primary factors contributing to the global factor Anxiety, and their significant change can be attributed to the effect of both the pronunciation and psycho-social training. The combination of FLA coping intervention as a supplement to FL skills training is generally considered effective (e.g., Horwitz, 1996; Hashemi, Abbasi, 2013; MacIntyre, 1995). However, an overall maturation effect that occurs naturally over time and does not result from the intervention applied and the effect of environmental factors on personality profiles (Pervin, Cervone, 2010) have to be taken into account when interpreting the data.

Even so, the exact nature of the relationship between personality factors and FLPA may be influenced by various concomitant factors, which prevents generalized linear correlations from reaching overall significance. However, no other significant variables have been traced during the current experiment, so it can be summarized that both the psychological training combined with phonetic training had facilitative effects in reducing this specific type of FLA.

5. Conclusion

The aim of this study was to introduce psycho-social training as a novel approach to reducing FLPA. The psychologist conducting the psycho-social training observed that most participants achieved deeper self-knowledge and higher spontaneity in their interpersonal relations. The participants' feedback revealed that they appreciated mostly the activities supporting their self-reflection and the others' reflections on the issues, which stimulated them to interact in a group and be more open and spontaneous. The major benefit of the psycho-social training was that the participants who showed low self-esteem and increased self-consciousness previous to the training were given sensitive support and feedback. They had an opportunity to develop their social abilities and competencies, such as their ability to communicate, cooperate and accept others.

The psychology of personality in FL pronunciation learning and teaching seems to be the current tendency nowadays, since the nature of pronunciation is strongly related to a learners' ego. New trends in teaching pronunciation emphasize the affective aspect of learning to counterbalance the traditional cognitive learning. The results of the current study lend support to the view that psycho-social investment is a driving force in personality development (Roberts et al., 2005) and that psycho-social training is an example of an effective and easily-applicable strategy in FL education, transferable across diverse cultural and language contexts, with the potential to influence personality and thus reduce FLA.

It may be hypothesized that the lowered FLPA levels after pronunciation training resulted not only from the improvement of pronunciation but also from the participants' self-assessments and beliefs in their pronunciation skills being at a higher level after intensive pronunciation practice, which is an important contribution to the discussion of the idea that FLA may be the result as well as the source of an insufficient command in an FL (Sparks, Ganschow, 1991).

The present study is most likely unique for considering the relationship of FLPA with such a large scale of personality factors, thus contributing to a slightly clearer picture of FLA and its relationship with personality traits. However, it is important to show caution, as FLA may interact with a complex of other factors. It would be worthwhile to replicate this study, to add another perspective in considering to what extent the effect of intervention remains stable over time. Further exploration of this intriguing issue is needed, but it is hoped that another small step has been taken towards a greater understanding of the impact of personality on FL learning.

6. Limitations

The present study has a number of serious limitations, the first one being the choice of research instruments and the comparability of research results. The "Big Five" is more often used in related studies, however, 16PF was preferred here, as it evaluates personality on a scale among a range of aspects rather than condensing them into a small number of global factors scored high to low.

FLPAS might provide an impetus for further research. An analysis of the factorial structure of the FLPAS was outside the scope of the present study, and it was methodologically impossible due to the sample size limitation. Because the number of participants was rather small, it was impossible to use a Factor Analysis.

Space limitations prevented including the analysis of participants' pronunciation quality after the intervention as well as the interpretations of semi-structured interviews conducted with the participants after the intervention. As they will shed more light on the complex phenomenon that FLPA undoubtedly is, their results will be included in forthcoming studies.

7. Notes

* The FL pronunciation quality of the participants was evaluated by 5 native speakers of English, both before and after the intervention, in a 5-point Likert scale. The impact of psycho-social training on the participants' pronunciation and the correlation between pronunciation quality and pronunciation anxiety is the subject of a separate study. However, the current results as well as some previous research (Kralova et al., 2017) indicate the strong positive influence of psycho-social training on FL pronunciation and a significant negative relationship between pronunciation quality and pronunciation anxiety.

²The participants were given the English-specific pronunciation anxiety scale, referred to as the Foreign Language Pronunciation Anxiety Scale, supposing the findings relate to general FL pronunciation anxiety issues.

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Appendix

English Pronunciation Anxiety Scale

The following questionnaire was designed for the purpose of academic research. Your responses will not be shared with anyone but the researchers who are conducting this study and will be kept confidential. Thank you for your time and participation.

Personal background information.

Gender:

Age:

Learning English (since when/where/how):

Time spent in an English speaking country:

Communication with English native speakers (duration/frequency):

To what extent do you agree with the following statements?

Strongly disagree/Disagree/Undecided/Agree/Strongly agree

1. I do not feel nervous when speaking English. (reverse-scoring)
2. I do not like talking to more advanced English speakers.
3. I feel embarrassed talking to people with good English pronunciation.

4. I get nervous when I have to speak English in front of other people.
5. I am satisfied with my English pronunciation. (reverse-scoring)
6. I am bothered about making pronunciation mistakes.
7. I realize how many pronunciation mistakes I make.
8. I feel embarrassed when I realize that I pronounce some words incorrectly.
9. I am afraid people will think I am silly and incompetent because of my poor English pronunciation.
10. I consider imitating native-like English pronunciation ridiculous.
11. I am afraid my future students will have better English pronunciation than I do.
12. Other students do not have better English pronunciation than I do. (reverse-scoring)
13. I am worried about not being understood because of my improper pronunciation.
14. I do not feel ashamed when people correct my pronunciation mistakes. (reverse-scoring)
15. It seems to me that I cannot get rid of my Slovak accent in English.
16. I can never master good English pronunciation.
17. I do not think English pronunciation is difficult. (reverse-scoring)
18. I consider the rules of English pronunciation incomprehensible.
19. It is very difficult to pronounce like a native speaker.
20. I think that good English pronunciation is very important for an English teacher.



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Among the Mathematics Tasks, Math Courses and Math Exams: How's the Level of Student Anxiety Toward Maths in a Private High School in Mexico?

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Abstract

The purpose of the study is to determine a latent structure of variables that explain the level of anxiety towards mathematics of high school students based on the interaction that the student has with the tasks, courses and math exams. For this purpose, the RMARS mathematical anxiety scale was used, which has a Likert-type scaling. The instrument was applied to a sample of 183 enrolled students from a private institution of upper secondary education located in Veracruz, Mexico and to obtain results, a factorial analysis was applied. The most significant finding is the obtained tetra-dimensional model, which contrasts with other models such as those of Alexander and Martray (1989) and recently with the penta-dimensional model of (Author 1 2017). This result suggests that the original design of the three-factor scale of Richardson and Suinn (1972), modified by Alexander and Martray (1989), does not apply to students in Latin contexts, such as the case of Mexico.

Keywords: anxiety, mathematics, higher secondary education, Mexico.

1. Introduction

Mathematics has been part of the formation of the human being, since childhood, mathematics contribute to develop a logical order that trains the mind to solve multiple problems of everyday life. Camarena (2014) explains that mathematics develops social skills and argumentative communication, reflective, analytical and critical attitudes, as well as ethical values of respect, responsibility and care for the environment, unfortunately in some cases the perception of it is different, causing people to experience symptoms of anxiety or stress towards it.

Since 1957, Dreger and Aiken introduce mathematical anxiety as a new line of research in which they define "the presence of a syndrome of emotional reactions towards arithmetic and

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mathematics". Subsequently, his work was aimed not only to study these reactions of anxiety but to design instruments to measure it. In 1968, Dutton and Blum contributed to the study of attitude towards mathematics and how to measure it by designing a survey that included several variables, such as anxiety of state traits, confidence, enjoyment and misconceptions. Years later, Suinn, Edie, Nicoletti and Spinelli (1972) designed the most used measure of mathematical anxiety in detection and as a measure before and after to evaluate the impact of interventions: the Mathematical Anxiety Rating Scale (MARS) There have been numerous efforts to assess the anxiety that mathematics arouses in certain people, although it is a very subjective phenomenon (Wood, 1988).

Currently, Pérez-Tyteca, Monje and Castro (2013) describe mathematical anxiety as an affective state characterized by the absence of comfort that an individual can experience in situations related to mathematics, both in their daily and academic life, and which manifests itself through a system of responses that encompass a series of symptoms, such as: tension, nervousness, worry, restlessness, irritability, impatience, confusion, fear and mental block.

The results obtained in the PISA test (OECD, 2015) indicate that regarding performance in mathematics, Mexico is below the average marked by the OECD (of 490 points). The result obtained by Mexicans was 408 points, similar to that of countries like Albania and Georgia. The 15-year-olds made a difference around 80 points below Portugal and Spain and between 10 and 15 points below Chile and Uruguay.

About anxiety, students in Mexico presented levels of anxiety above the average related to school work. 50 % expressed a lot of tension when they study (the OECD average is 37 %), and 79 % expressed concern about getting bad grades in class, a percentage higher than the 66 % average of the OECD countries. Figure 1 shows the results obtained related to anxiety.

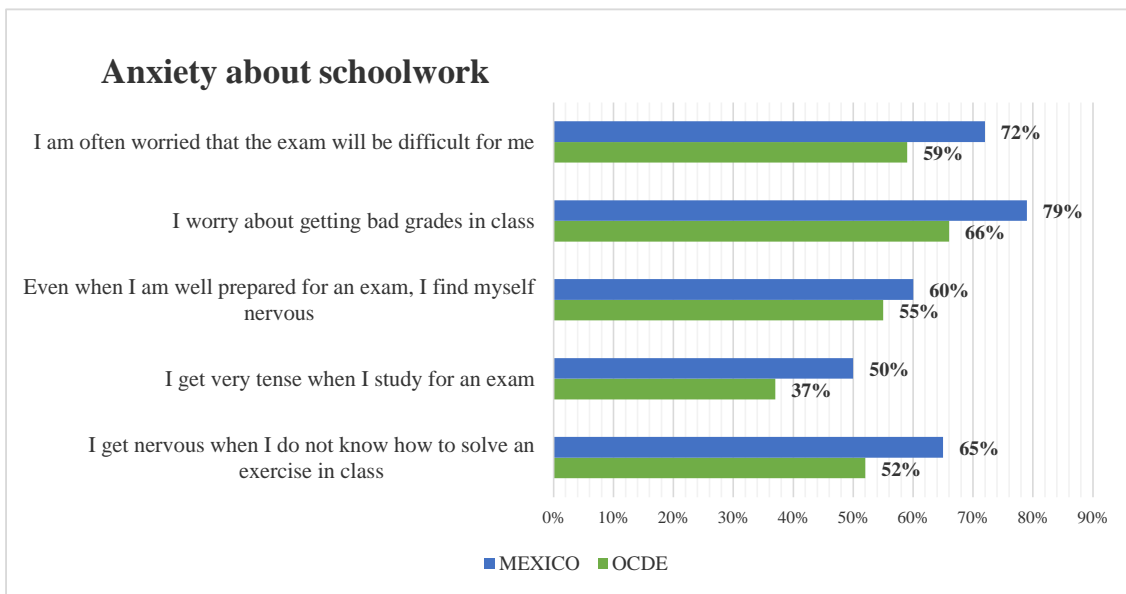


Fig. 1. Anxiety about schoolwork

Anxiety related to homework, courses or school exams is one of the main indicators of low satisfaction among students in Mexico. Anxiety is more frequent in schools where students study less than 50 hours per week, as revealed by OECD data in their Student Welfare report in 2015. Anxiety and low student satisfaction are a problem because in many cases they lead to students abandoning their studies to engage themselves in other activities, therefore, it is very important to identify certain anxiety-generating factors detected in students and work on them for the benefit of the new generations.

Taking as reference the construct of mathematical anxiety and considering the collateral effects that can affect school performance in high school students, the following questions are posed: What are the consequences of anxiety towards mathematics in student performance? Can this emotional problem be corrected? What alternatives or innovations can be implemented in study plans and methodologies to minimize anxiety in students?

Based on the arguments exposed previously, the following study question is raised: What is the latent structure of variables that explain the level of anxiety towards mathematics in high school students? Therefore, the main objective of the research will identify the structure of variables that explain anxiety toward mathematics

The hypotheses to be tested in this research are:

H1: There are latent structures of variables that explain the level of anxiety towards mathematics in high school students in a private school.

HO: There are not latent structures of variables that explain the level of anxiety towards mathematics in high school students in a private school.

For such effects, research is developed from the quantitative paradigm and its design and method are described in section 3.

2. Literature review

The literature related to anxiety towards mathematics has presented different approaches and perspectives over time. Lang (1968) quoted by Martínez, Inglés and García (2012) points out that anxiety manifests itself according to a triple system or three-dimensional factors which are cognitive, physiological and behavioral.

Hendel (1988) quoted by Agüero, Meza, Suárez and Schmidt (2017) specified that mathematical anxiety is related to general anxiety, anxiety towards exams and that produced by other academic subjects. Ashcraft (2002) defines mathematical anxiety as a "feeling of tension, apprehension or fear that interferes with mathematical performance". Ureña (2015) concludes that "mathematical anxiety is the manifestation of feelings such as tension, restlessness or terror that appear as a result of a bad relationship between mathematical knowledge and poor working memory to perform any numerical activity".

As a result of these studies, different measurement instruments have been created to identify the factors that generate anxiety in students when they are exposed to mathematical contents, as an example we have:

Fennema and Sherman (1976) designed a Likert-type scale to measure attitudes in the study of mathematics. The scale is made up of 108 items divided into nine factors that provide data related to: confidence in the learning of mathematics; success in learning mathematics; father's attitudes towards the study of mathematics; mother's attitudes towards the study of mathematics; teacher's attitudes towards the study of mathematics; mathematics as the domain of man; utility of mathematics and anxiety towards the study of mathematics; attitudes towards mathematics and motivation towards the study of mathematics.

The RMARS scale reviewed by Richardson and Suinn (1972) and modified by Alexander and Martray (1989) was designed to measure the mathematical anxiety presented by students. This measurement instrument is divided into 25 indicators, which are integrated into three dimensions, from item (1-15) the anxiety factor towards mathematics exams is analyzed, item (16-20) is aimed at determining the anxiety factor towards numerical tasks, and from item (21-25) the analysis of the anxiety factor of mathematics courses.

Muñoz and Mato (2007) developed an instrument to measure anxiety towards mathematics which showed a reliability coefficient of ($\alpha = .9504$) with a structure of 24 Likert-type items, of which five factors can be identified that are related to the anxiety towards the evaluation, towards temporality, towards the understanding of mathematical problems, numbers and mathematical operations and mathematical situations of real life.

Subsequently García-Santillán, Edel and Escalera-Chávez, (2010) designed an instrument called EAPH-MF which is structured with 31 items based on a Likert scale, which aims to measure attitudes and perception towards financial mathematics through the variables history of mathematics, simulation and simulators, computer platforms and virtual learning communities.

On the other hand Pérez-Tyteca (2012) constructed a model of structural equations that helps to determine the constructs anxiety, self-analysis and utility in mathematics and on the other hand establishes causal relationships between them. In the following year, Pérez-Tyteca, Monje and Castro (2013) created a comic-based instrument which turned out to be a facilitating element when extracting information. Finally Eccius-Wellman and Lara-Barragan (2016) developed a questionnaire on mathematical anxiety, through this instrument it is possible to analyze attitudes, emotions and beliefs, using 20 items in a Likert-type scaling.

Measuring instruments were used to test anxiety in terms of certain socio-demographic elements; in the PISA test (OECD, 2015), it was found that the average boy exceeded the girls by seven points. Around 59 % of the girls and 54 % of the boys did not reach the minimum level of competence (Level 2) in mathematics marked by the OECD. On the other hand, based on the results obtained by Martínez-Artero and Nortes (2013), women have more anxiety than men through the scale Fennema and Sherman (1976). On the other hand, Delgado, Espinoza and Fonseca (2017) in their study of mathematical anxiety according to gender, found that men presented less mathematical anxiety than women, which is evident in the average score of men that was lower than the one obtained for the whole of the sample; while that of women was higher.

3. Design and Method

Design

This empirical research it's a non-experimental design because the independent variables are not manipulated to modify its effects. The study type is descriptive and exploratory cross-sectional. Considering that the study variables focus on the anxiety generated by the interaction of students of upper secondary level with mathematics in private schools, a correlational-explanatory study is carried out in order to find the set of underlying variables that explain this phenomenon.

Population

For the purposes of obtaining the data, from the total of the surveyed population, a non-probabilistic sample is used for convenience, from a private school, which is incorporated into the National Educational System. The school authorities allowed the researcher to apply a survey to a total of 183 high school students, of which (89) belong to first semester, (27) to the third semester and (67) to the fifth semester. This population belongs to Veracruz, located in the central area of the state with the same name. The condition of the survey was confidentiality of the school as well as the students surveyed.

The inclusion criteria considered that students were enrolled at the high school level in the first, third and fifth semester and that they had agreed to answer the test without obligation.

The particular characteristics of the sample identify 72 male students and 111 female students. 144 students live with both parents, 35 live alone with one of them and 4 live with another family member. Our key informants were the students themselves who were supervised by the teacher in turn and by the interviewer.

Instrument

Considering the measurement instruments discussed in the literature, the present study used a RMARS mathematical anxiety score scale from Richardson and Suinn (1972) which was modified by Alexander and Martray (1989), which measures the mathematical anxiety in students. (See [Figure 2](#)).

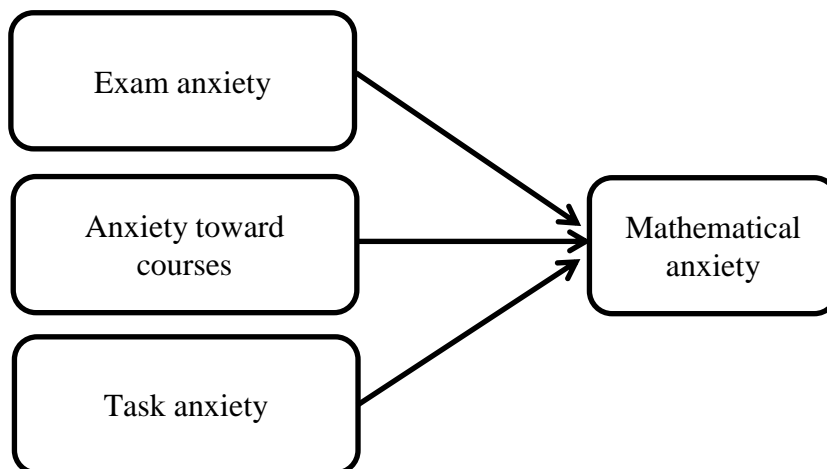


Fig. 2. Three-factor model of Richardson and Suinn (1972) take it of Navarro-Ibarra et al. (2017)

The RMARS scale is composed of two sections, the first section is aimed at identifying the socio-demographic profile of the interviewee and the second section is divided into 25 indicators that are integrated into three dimensions, which are described in [Table 1](#).

Table 1. Structure of the instrument

VARIABLE	DIMENSION	INDICATOR
MATHEMATICAL ANXIETY	Exam Anxiety (Mathtest)	Item 1to 15
	Task Anxiety (Mathtask)	Item from 16 to 20
	Anxiety towards courses (Mathcourses)	Item del 21 al 25

Source: Navarro-Ibarra *et al.* (2017).

4. Analysis Procedure

For the analysis of the data to answer the research question, the statistical procedure of the Exploratory Factor Analysis (AFE) with extraction of main components is used, with the Varimax rotation method. In the first phase of analysis, the internal consistency of the data obtained in the field is assessed using the Cronbach's Alpha index, which according to García-Santillán, Rojas-Kramer, Moreno-García and Ramos-Hernández (2017) is defined as "the representation of the square of the coefficient of the correlation with which measures the consistency of the items using the average of all the correlations between all the questions".

Table 2. Reliability index

Concept	Cases	%	A	
Valid	183	100		
Excluded	0	0	$\alpha = .939$	25 Items
Total	183	100		
Dimensions	MATHTEST			
	MATHTASK		$\alpha = .837$	3 dimensions
	MATHCOURSE			

Fuente: own

[Table 2](#) shows that the reliability of the Cronbach's Alpha data for all the items is $\alpha = .939$ and for the grouped ones within the four dimensions it had an $\alpha = .837$, taking Hair et al (1979) as reference for acceptable values of $\alpha > .80$ and George and Mallery (2003) for an excellent $\alpha > .90$ and for an acceptable $\alpha > .70$, the high variability and internal consistency of the data can be confirmed, which makes viable and reliable instruments.

Exploratory Factor Analysis (AFE)

In order to identify the factors that generate anxiety in students when they are subjected to activities related to mathematics, an exploratory factor analysis is applied to determine the underlying structure of the data to analyze, which in addition to correlating them, may be reduced to factors and with this the variance of the phenomenon of study will be extracted ([Bollen, 1989](#)). The correlation matrix between the referred variables is shown in table 3 and 4 for the 25 items.

Table 3. Variables correlation

Variables	X ₁	X ₂	X ₃	X ₄	X ₅	X ₆	X ₇	X ₈	X ₉	X ₁₀	X ₁₁	X ₁₂	X ₁₃
X1	1.00	.46	.43	.50	.33	.33	.49	.62	.48	.50	.31	.43	.32
X2		1.00	.52	.51	.31	.28	.26	.37	.33	.28	.23	.35	.27
X3			1.00	.45	.37	.39	.34	.27	.27	.22	.35	.40	.37
X4				1.00	.34	.42	.38	.46	.47	.34	.37	.47	.25
X5					1.00	.43	.35	.37	.29	.39	.52	.28	.45
X6						1.00	.42	.31	.39	.26	.45	.42	.46
X7							1.00	.65	.50	.53	.36	.44	.41
X8								1.00	.67	.53	.27	.42	.28
X9									1.00	.33	.37	.47	.33
X10										1.00	.43	.35	.41
X11											1.00	.36	.52
X12												1.00	.44
X13													1.00

Source: own

Table 4. Variables correlation (continuation)

Variables	X ₁₄	X ₁₅	X ₁₆	X ₁₇	X ₁₈	X ₁₉	X ₂₀	X ₂₁	X ₂₂	X ₂₃	X ₂₄	X ₂₅
X14	1.00	.60	.43	.32	.35	.35	.48	.26	.56	.42	.59	.57
X15		1.00	.44	.42	.36	.33	.32	.23	.54	.37	.58	.42
X16			1.00	.62	.60	.54	.46	.34	.40	.30	.48	.45
X17				1.00	.81	.76	.64	.37	.51	.35	.55	.42
X18					1.00	.77	.66	.43	.51	.36	.52	.46
X19						1.00	.80	.36	.46	.33	.44	.39
X20							1.00	.38	.49	.39	.40	.42
X21								1.00	.41	.41	.32	.35
X22									1.00	.46	.69	.59
X23										1.00	.46	.33
X24											1.00	.64
X25												1.00

Source: own

As can be seen in [Tables 3](#) and [4](#) that describe the correlation matrix, acceptable values are obtained among the 25 items that make up the instrument. The correlations show a positive behavior between them.

In addition, for this technique the test of the values of measurement of sample sufficiency per variable (MSA), the Bartlett test of Sphericity with Kaiser (KMO), whose result must be in a range of between (0 and 1) and finally, the value of the goodness-of-fit test χ^2 are used.

Table 5. KMO & Bartlett Test of Sphericity

Measure sampling adequacy of Kaiser-Meyer-Olkin KMO	.906		MSA	
Bartlett test of Sphericity	Chi-square aprox	2754.533	(Mathtest), (Mathtask) (Mathcourses)	Range between: .835 a .958
	gl	300		
	Sig.	.000		

Source: Own

The results obtained in table 5 show that the sample adequacy in this analysis presents a very good adaptation in the data, since the index (KMO) yields a result of .906 close to unity, with a Bartlett test of Sphericity of X^2 (2754.533) with 300 degrees of freedom.

The significance analysis (Sig.) is perfect since the value .000 is obtained, so they are sufficient and appropriate to perform a factorial analysis. In addition, the values of MSA are in a range between .835 and .958 considering them acceptable. These values correspond to the measure of sampling adequacy. In this regard García-Santillán et al. (2017) explain that the MSA values must be greater than .5, so according to the results of tables 5 you can be in a position to reject the null hypothesis which refers to the non-existence of the set of latent variables since it cannot be explained by at least one factor.

Number of Factors to be extracted

To carry out the factorial analysis by means of the technique of main components that allows identifying the factors that exceed the theoretical threshold (> 1), we will base on the Kaiser criterion of Hair et al. (1979), which specifies that all components with a value greater than 1 should be considered. Table 6 shows the components obtained and their variance.

Table 6. Total variance explained and sedimentation graphic

Component	Self-value	% of variance	% accumulate
1	10.297	41.187	41.187
2	2.418	9.673	50.859
3	1.470	5.88	56.739
4	1.211	4.846	61.585

Source: own

Based on the results obtained described in Table 6, it can be observed that the analysis of the extraction yields four factors that comply with the theoretical hypothesis indicated by Hair et al. (1979) on the Kaiser criterion, which can be evaluated visually in the sedimentation graph of [Figure 3](#).

X3				.752	.712
X2				.719	.585
X4				.666	.604
X12				.501	.489
Eigenvalue	10.927	2.418	1.470	1.211	
% Variance	41.187%	9.673%	5.880%	4.846%	
% Total of variance		61.586			

Source:own

As shown in Table 7, the variables are grouped in the matrix of components according to the four factors obtained in the extraction analysis (Table 6), which are integrated by their indicators, the eigenvalue and the proportion of the variance. Thus, in component 1, there are eight indicators that account for 41.187 % of the variance and an eigenvalue of 10.927; In the second component, seven indicators were grouped, explaining 9.673 % of the variance and an eigenvalue of 2.418; For the third and fourth component they integrate 6 and 4 indicators, which explain the 5.880 % and 4.846 % of the variance, with eigenvalue of 1.470 and 1.211 respectively.

In this way we obtain a total variance of 61.586 % that we can consider as acceptable to explain the study phenomenon, in the terms in which the objective was raised and which answers the research question.

5. Discussion

Based on the results derived from the analysis made of the data obtained from the surveyed population, which is within the sector of private higher education institutions in Veracruz, a resulting model was obtained in tetra-dimensional form, (see Figure 4), in contrast to the seminal studies of García-Santillán, Rojas-Kramer, Moreno-García, and Ramos-Hernández (2017) in which evidence was obtained of the existence of a penta-dimensional model in undergraduate students of the economic-administrative area at the Technological Institute of Veracruz by applying the RMARS scale of Alexander and Martray (1989).

The important finding is that the model of Alexander and Martray (1989), is a model of three factors, which contrasts with the model obtained in this study and with which it has been referenced previously penta-dimensional of (García-Santillán, 2017).

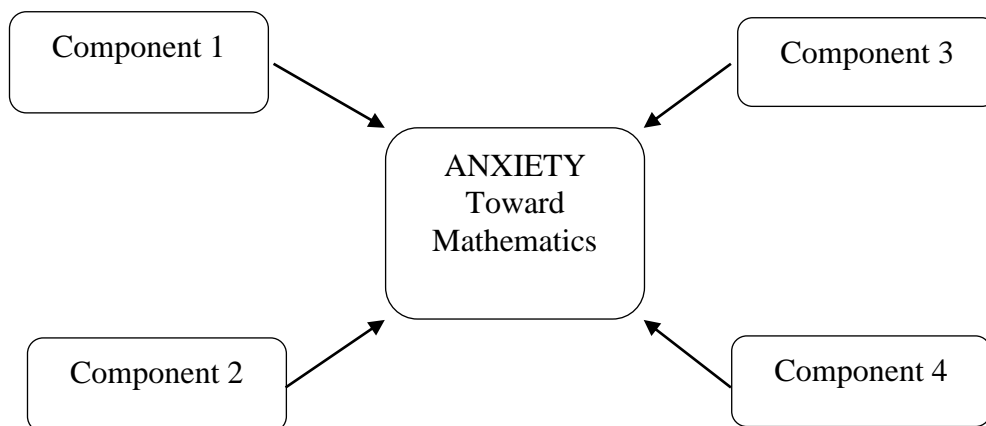


Fig. 4. Four-dimensional anxiety model

Table 8 shows each of these components, both the factorial weight they contribute to their self-value, and the textual definition of the meaning of each of them, the latter from the translation made to each item of Richardson and Suinn’s original scale (1972) and that was modified by Alexander and Martray (1989).

Table 8. Matrix of extracted components

Component 1 "Anxiety when preparing for a Mathematics test"	Component 2 "Anxiety when solving math problems"	Component 3 "Anxiety towards Mathematics Books"	Component 4 "Anxiety when presenting an exam in a Mathematics course"
X8.- Think about the next math exam a day before (.80)	X19.- Have a series of problems with multiplications to solve (.889)	X11.- Grab a math book to start a difficult task that implies the reading of mathematical theory (.747)	X3.- Presenting a quiz in a mathematics course (.752)
X9.- Think about the next math exam one hour before (.659)	X18.- Have a series of problems with subtractions dictated to solve (.855)	X13.- Open a math or physics book and see a page full of problems (.662)	X2.- Present the math section of an institutional exam (.719)
X7.- Think about the next math exam a week before (.645)	X17.- Have a series of numbers dictated to add on paper (.844)	X5.- Grab a math book to start a task (.647)	X4.- Present a final exam in a math course (.666)
X10.- Realize that you have to take math the 3 years of junior high school and high school (.615)	X20.- Have a series of problems dictated with divisions to solve (.763)	X6.- Have a task assigned with many difficult problems to be handed in next class (.588)	X12.- Receive the final math grade by mail (.501)
X25.- Enter the mathematics class (.611)	X16.- Do mental calculation (.619)	X21.- Buy a math textbook (.497)	
X15.- The moment they give you an exam in math class (.609)	X24.- Listen to another student explaining a mathematical formula to someone else (.428)	X23.- Enroll in a mathematics course (.411)	
X1.- Study for a math exam (.598)	X22.- Observe a teacher solving an algebraic equation on the board (.419)		
X14.- Study for the math exam (.564)			

Source: own

If we consider the model shown in figure 4, as each component indicator (Table 8) it is possible to introduce four-dimensional model obtained in this research (Figure 5).

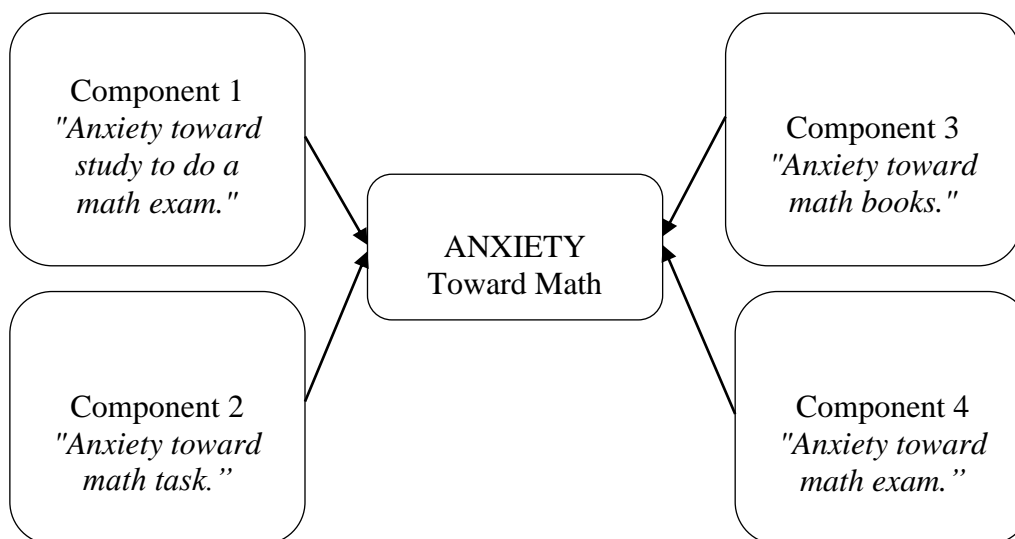


Fig. 5. Conceptual model of anxiety

It is important to highlight another finding obtained in this study, which is that items from the RMARS scale of Alexander & Martray (1989) were not excluded, although the order of them was modified and regrouped in different dimensions. This data is relevant if we consider that in other studies in Latin contexts, such as the one of García-Santillán et al. (2017) the indicators were excluded: Item 6, Item 7, Item 12, Item 13, Item 22, Item 23 and Item 25.

The results of this research contribute to design and implement new strategies in the teaching-learning processes that contribute to the reduction of anxiety levels in the students who were the object of this study.

While it is true, when scales are applied in different contexts that have been designed to measure this phenomenon, it is common that they present different behavior, probably derived from the translation of the original language to the context in which they will be applied.

The psychometric properties of the scales that measure the anxiety towards mathematics, have given significant evidence that has allowed to improve in this aspect, that is to say, the study plans have been modified and new teaching tools have been implemented that integrate new evaluation criteria for the learning process.

These finding remains on the table of discourse, considering that the methodology followed at all times the procedure that other recent studies have developed that have sought to explain the same anxiety phenomenon (García-Santillán et al., 2010, García-Santillán et al., 2017, Navarro-Ibarra, 2017).

Finally, it is worth noting that anxiety towards math exams, the resolution of mathematical problems, when resorting to the reading of a math book and to mathematics courses, may not be so surprising for the subject scholars, which may be interesting for future research as they have suggested in other studies, it is the monitoring that is given to these student populations, that is, how they have been evolving and what their behavior will be in the future, for example, when they enter professional education in different universities in the country.

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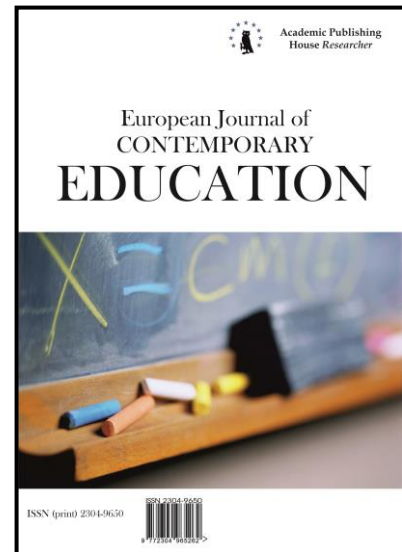
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Formation of Social Tolerance Among Future Teachers

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Abstract

The formation of tolerance among young people has recently become an important aspect in the research of scientists of the psychological and pedagogical direction. This is due to a number of aggressive manifestations that are unacceptable for modern society in students of schools and universities. In this regard, the purpose of the article is to develop a scheme for the formation of tolerance to asocial phenomena and experimentally prove its effectiveness in the process of professional pedagogical education. The research was conducted by 72 students – future teachers with the use of the author's scheme for the formation of social tolerance in the holistic educational process at the university. The peculiarity of the author's development was the use of interactive teaching methods and methods of the theory of solving inventive problems. For statistical evidence of the effectiveness of the implementation of the author's research, the Wilcoxon T-test was used. The practical implementation of the experiment showed the effectiveness of the author's development in forming students' tolerance for differences in society, culture, behavior that does not go beyond legal norms, and intolerance for violation of moral norms of behavior in society.

Keywords: tolerance, asocial phenomenon, formation of social tolerance, conflict, moral norms.

1. Introduction

The problem of tolerance is widespread in research scientists. This is due to a number of aggressive manifestations unacceptable for modern society, which are opposed to tolerance. An analysis of the sources on problems of tolerance/intolerance suggests that it is possible to influence intolerance by studying and reproducing tolerance.

There are various interpretations of the term “tolerance”, for example, G.L. Bardiyer (2007)

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interprets tolerance to characterize the situations of a dialogue of cultures, the rational search for ways of peaceful coexistence in diversity. Intolerance is used to describe situations of violence, discrimination, violation of personal capabilities, imbalance, the desire for unification. In this perspective, is the opposition of tolerance and intolerance. And at the same time, they are binary oppositions. Studying one, you should refer to another.

In the next study (Bondyrev, Kolesov, 2011) tolerance is characterized as “harmony in diversity”. At the same time, the formation of tolerance is the formation of an understanding of differences (Rostovtseva, 2016). Conflict-free existence is the path to tolerance. From a philosophical point of view, “tolerance” is overcoming non-acceptance, by virtue of the existing rules. An intolerant attitude is an aggressive-conflict action. In this context, this is an antisocial phenomenon.

The most important characteristic of tolerance is not that it is associated with friendship, respect, acceptance, but that excludes hatred (Leont'yev, 2009). Note that we mean hatred for the differences that surround the person in the modern world. There are different attitudes to the same phenomena of the cultural environment (for example, to social inequality). Tolerance in this case can act as a regulating force (Gray, 2018)

H. Pukington (2015) notes that her study did not reveal general intolerance among the population of Russia, however, among the youth there is a slight dynamic of ethnic intolerance. Analyzing other studies, we notice the presence of political, subcultural, and other forms of intolerance.

Personal intolerance is characterized by the following provisions. Tolerant personality accepts the variability of events. High regimen is characteristic of an intolerant person (Domracheva, 2015). Tolerance is inherent in a strong personality with a vital basis. Such a person does not feel threatened that the environment adheres to opposing beliefs. Weak personality differences scare and this fact can contribute to the manifestation of intolerance (Leont'yev, 2009)

J. Janmaat, A. Keating (2017) note that, in general, the level of tolerance is largely determined by the expansion of education. As a result, an educated person treats the differences with greater understanding. However, in another study (Chan, 2018), on the contrary, it is noted that improving access to education in college is not an effective institution's policy tool for dealing with hate attitudes and behaviors. In the latter case, education is considered within the framework of an educational institution, but we hold the opinion that a more educated person is more able to deal with differences in a balanced way.

The reason for the intolerance of personality traits, which shows a low level of intellectuality and morality. This leads to absolutism and inflexibility in thinking. Such a person will hardly accept the position of other people, and considers his own to be correct. Hence the manifestation of the behavior of violating generally accepted norms. These provisions can serve as the beginning of the formation of a tolerant person who is neutral or even positive about differences, despite differences in beliefs.

The analysis of primary sources shows that the problem of tolerance is acute in modern society. First of all, in practice, facts of intolerant attitudes towards people, events, rules are manifested. It is no coincidence that scientists and practitioners all over the world search for ways to level out this essentially deviant behavior. There are programs for the prevention of crime (Taheri, Welsh, 2015), which could take into account the ideas of social tolerance for deviant behavior. The perception of the uniqueness of diversity and intransigence towards negativity is the discourse of modern scientific developments. Therefore, we set a goal to create a scheme for the formation of social tolerance and test its effectiveness in the process of a pedagogical experiment.

Based on the relevance of social tolerance, the goal of the study, the analyzed sources, we designed a scheme that guided us in the practical training of future teachers. The training was based on the ideas of tolerance for attitudes, beliefs, behavior, which differ from the individual, and at the same time, negative attitude towards violations of social norms. The novelty of this work was that the emphasis was placed on such interactive training methods as the case method and methods created and applied within the framework of the theory of solving inventive problems.

In this regard, we put forward a hypothesis: if we develop a scheme for the formation of social tolerance with emphasis on the use of the case method, organizational and activity games, methods of the theory of solving inventive problems, then such personality characteristics will increase significantly when social tolerance is manifested as moral values, tolerance of differences

and intolerance to antisocial phenomena, competent behavior in conflicts. The scheme should include other conditions, forms and methods that are most appropriate for the formation of social tolerance, as well as criteria of social tolerance, which are an indicator of the effectiveness of the work being done. Thus, the purpose of the study is to develop a scheme for the formation of tolerance to asocial phenomena and experimentally prove its effectiveness in the process of professional pedagogical education.

2. Materials and methods

The research sample consisted of 72 students: in the experimental group – 36 and in the control group – 36. The experimental group included students of the profiles “Primary education and Mathematics”, “Pre-school education and Additional education”. The control group included students of the profiles “Primary education and the Russian language” and “Primary education and Biology”.

Statistical processing of research results was carried out using the statistical analysis software SPSS20. For a quantitative analysis of the data obtained in the course of research, the Wilcoxon T-test was used at ($p < 0.01$).

The experimental work was carried out during the first half of the year (academic semester) of 2018 and was meaningfully included in the disciplines of choice and, as a whole, in the implementation of professional training only for the experimental group. In the control group of the discipline of choice and, in general, the educational process was implemented without using the methods proposed above based on the curriculum approved by the specialized graduating department.

In turn, the experimental work included the organization of vocational training according to the following scheme of the formation of social tolerance among future teachers:

1. Social tolerance, as a process of benevolent respect for differences, attitude to social phenomena in terms of moral values. When ethical values are violated by opponents, the interaction is based on norms and rules of conduct.
2. The purpose of the formation of social tolerance: to form an understanding (tolerance) of the existing social differences among future teachers with an active negative attitude towards asocial behavior.
3. Formation of social tolerance: familiarity with the history, culture, social interaction of various subcultures. Formation of a general culture including a culture of behavior.
4. The use of interactive methods: master classes, the theory of solving inventive problems, clusters, dramatization, discussions, trainings, etc.
5. Guidance of the substitution mechanism: switching the energy of various groups and individuals into socially significant activities in which creativity is manifested.
6. Influence on the causes of asocial behavior of a person or group: propedeutics of aggressiveness, destruction of stereotypes, overcoming of language misunderstanding, egoism by psychological methods (Nagovitsyn et al., 2018), etc.
7. Criteria of manifestation of social tolerance: moral values, index of tolerance, conflict-related competence.

This scheme of formation of social tolerance is formed in the integral educational process at the university. Substantial material was included by fragments in various educational courses and disciplines of choice (Slastenin, 2008), as well as in the scientific work of students. Experimental work is carried out in practical classes in student groups and during teaching practice.

For the formation of social tolerance, we implemented workshops, social and psychological training, organizational and business games, a case method, Skype conferences, visualization lectures, problem lectures, a project method, an ethical experiment, and others. We used case studies to a greater extent. method, theory of solving inventive problems, organizational and activity games. They are, in our opinion, the most effective and relevant goals of the formation of social tolerance. With the help of these forms, conditions and problem situations are created in which future teachers need to show flexibility, tolerance, creativity, ability to resist negative phenomena, etc.

The case method is a solution to pedagogical situations that may arise when interacting with students. They need to state their position with conviction, be guided by social norms in the dialogue, be able to persuade, set prospects, etc. The discussion of the situation takes place in the

form of discussion and concludes the summary (Dhar, 2018).

From the theory of solving inventive problems, we have widely used such methods as brainstorming to develop problems related to the solution of asocial behavior, or develop projects by analogy in order to correctly describe common features and shift the emphasis on features. Morphological analysis allows you to add to the solution of the situation elements of solutions from other situations. In this case, a new solution may appear that is being tested in practice. For example, in the case of a student’s misdemeanor, it is important not only to apply incentive methods, but also to include the adolescent in creative activities, taking into account the specifics of the situation and its features. For this, it is important to analyze a variety of situations so that there is a choice of solution. The method of focal objects is that signs of others are added to the real object and a new, original object is obtained. As an example, we will cite the development of a holiday whose goal is to form a tolerant attitude towards others. For its development, you can take fragments from sports, patriotic, environmental trends, which, it would seem, do not directly relate to the formation of tolerance.

Organizational-activity games as a type of interactive methods we used to conduct educational councils, scientific conferences in the classroom. The content of these games was devoted to the problem of social tolerance. Among the students, the roles of researchers, opponents, reviewers, as well as teachers interested in finding solutions to the problem of social tolerance were distributed. In the course of organizational activity games, new conditions were introduced, for example, to write an essay, a mini-essay about the problem under discussion, so that there was a possibility of flexibility and creativity.

To identify the cumulative characteristics of manifestations of tolerance and intolerance, we conducted the Intol test (Pochebut, Beznosov, 2017). This diagnosis characterizes a person from two opposite sides due to the fact that in some cases a person manifests himself tolerantly to the unacceptable behavior of another, and in others – intolerant. The test consisted of 16 questions-statements. The assessment was made as follows: “I completely agree” – “+2”; “Agree” – “+1”; “Hard to say” – “0”; “I do not agree” – “-1”; “I completely disagree” – “-2”. We have identified three levels of the tolerance index: low (from “-30” to “-10” points); average (from “-10” to “+10” points); high (“+10” to “+30” points).

In turn, the criterion for the manifestation of tolerance to antisocial phenomena is moral behavior. Therefore, we carried out diagnostics of value orientations of M. Rokich. According to her, it was necessary to rank the presented values of the individual. We were interested in ethical (responsibility, independence, self-control, open-mindedness) and individualistic values (intolerance to shortcomings, courage in upholding positions, strong will) that determine behavior.

3. Findings

The results of the Intel test show that the average value of tolerance in the EG was 8.7 points, and in the CG – 8.5 points. These groups are homogeneous, include students of the same profile and one level of professional training. After the formative experiment, the results have changed. The index of tolerance in the EG was 11.7 points – increased by 34 %, and in the CG it was 8.9 points – increased by 5 % (Table 1).

Table 1. The dynamics of the coefficient of tolerance

Control group			Experimental group		
beginning of the experiment	end of the experiment	reliability	beginning of the experiment	end of the experiment	reliability
8,5	8,9	T=176, p<0,01	8,7	11,7	T=0, p<0,01

For the control group, T = 176; Tcr = 185 (p < 0.01); Tcr = 227 (p < 0.05). Since Temp < Tcr (0.01), we have statistically significant differences at the level of 0.01 in the control group throughout the experimental work. For the experimental group T = 0; Tcr = 185 (p < 0.01); Tcr = 227 (p < 0.05). Since Temp < Tcr (0.01), we have statistically significant differences at the level of 0.01 in the experimental group. Statistical verification of the results shows that the results are

reliable. Therefore, it makes sense to develop social tolerance among students, which manifests itself in tolerance for cultural, behavioral differences and intolerance to asocial phenomena. We show the percentage of students in terms of tolerance (Table 2):

Table 2. Tolerance levels of students in percent

Levels intol	Control group		Experimental group	
	beginning of the experiment	end of the experiment	beginning of the experiment	end of the experiment
Low	-	-	-	-
Average	82	79	80	47
Tall	18	21	20	53

Due to the fact that the “Intol” coefficient includes both a manifestation of tolerance and intolerance, moreover, the test is designed so that only individual answers can correspond to negative indicators, and most of the answers are positive, as a result we get a positive value of the coefficient and lack of holistic negative results.

The quantitative value of testing at the beginning of the experiment, both in the control and in the experimental group, corresponds to the boundary between medium and high levels. At the expiration of the time during which the experiment lasted in the CG, the average level remained almost unchanged, while in the EG the number of students at a high level increased by 165 %. This quantitative increase was due to the fact that some students moved from an average level of tolerance to a higher one. This fact indicates that the forming experiment influenced the tolerance of students.

In turn, the results of diagnostics of value orientations of respondents according to the method of M. Rokich are presented in Table 3.

Table 3. Ranks of ethical and individualistic values

№	Group Values	Control group			Experimental group		
		Ranks			Ranks		
	Ethical values	R1	R2	Δ R	R1	R2	Δ R
1	A responsibility	8	7	1	6	5	1
2	Independence	15	17	-2	14	15	-1
3	Self control	10	9	1	9	7	2
4	Latitude	9	8	1	7	6	1
	Individualistic values						
1	Rationalism	12	13	-1	13	12	1
2	Intransigence to disadvantages	11	10	1	10	8	2
3	Courage in upholding position	13	12	1	11	10	1
4	Strong will	14	15	-1	8	9	-1

They show that it is important for individuals to manifest social tolerance to be guided by ethical norms, to be accountable to others, to have their own views and to be able to defend them, in some cases to enter into combat with opponents, to be bold and decisive. In our opinion, the availability of these qualities serves as a basis for tolerance towards differences in society and intolerance towards negative phenomena. Studies have shown that, prior to the experimental work, ethical and individualistic values were generally average ranks. This suggests that future teachers

made a choice on these internal values, but gave priority to others. At the same time, they were not insignificant for the respondents. After conducting experimental work, the ranks of these values did not change much in the control group, while in the experimental group they became higher. This indicates that purposeful work influenced the choice of values of future teachers.

At the control experiment stage, we singled out and assessed on a 5-point scale those vital values that are of fundamental importance in prosocial tolerance: responsibility, intolerance to shortcomings, courage in upholding the position, independence, characteristics taken from the test of M.Rokic (Pochebut, Beznosov, 2017). Evaluation took place in the CG and the EG. We obtained statistically significant differences in the CG only for such evaluated qualities as responsibility, courage in upholding the position. This is due to the fact that due to external circumstances there was a slight change in these characteristics. It is several times smaller than in the EG.

In the EG, statistically significant differences were obtained in all measured characteristics: responsibility, intolerance to shortcomings, courage in upholding positions, independence. The greatest dynamics was obtained in such a quality as upholding one's position (almost by 1 point, which is approximately 20 %). This was greatly influenced by the case method in the course, which in the discussions had to defend its position. The dynamics of such a quality as independence were the least (just 0.5 points, which is 10 %). This neoplasm is quite complicated, therefore, its development is not so dynamic. In the control group, this characteristic has not changed at all (Table 4).

Table 4. Dynamics of life values, important in social tolerance

Qualities	Control group			Experimental group		
	beginning of the experiment	end of the experiment	reliability	beginning of the experiment	end of the experiment	reliability
A responsibility	3,7	3,8	T=168, p<0,01	3,6	4,3	T=105, p<0,01
Intolerance to disadvantages	3,5	3,6	T=102, p<0,01	3,7	4,5	T=120, p<0,01
Courage in upholding position	3,6	3,8	T=220, p<0,05	3,5	4,4	T=200, p<0,05
Independence	3,5	3,5	T=0, p<0,01	3,5	4	T=79, p<0,01

After checking the accuracy of the results obtained using the T Wilcoxon test, it can be noted that positive results were obtained in the dynamics of such qualities as responsibility (Temp = 168; Tcr = 185; Temp < Tcr), intolerance to shortcomings (Temp = 102; Tcr = 185; Temp < Tcr), independence (Temp = 0; Tcr = 185; Temp < Tcr). The confidence level reached 0.01.

Indicators of courage in upholding positions are at an uncertainty level of 0.05. This is evidenced by the Wilcoxon coefficient Temp = 220 at Tcr = 227, i.e. Temp < Tcr.

We can conclude that during the pedagogical experiment the participants began to progress precisely those life values that are important in social tolerance.

An intolerant reaction to asocial actions implies a conflict of parties. Because of this, we tested experimentally the conflict of personality. To this end, a test was conducted "Are you a conflict person?" (Rogov, 2014).

In this test, there are three levels of conflict. A greater number of points corresponds to the peace-loving and tactfulness (22-32 points). The manifestation of conflict in rare cases when the basic principles of the person are violated, corresponds to the average level (10-20 points). Frequent manifestation of conflicts, incontinence is determined by the lowest number of points (less than 10). The results of the experimental work are listed in the table (Table 5).

Table 5. The level of conflict of respondents

Control group			Experimental group		
beginning of the experiment	end of the experiment	reliability	beginning of the experiment	end of the experiment	reliability
18,9	19,5	T=160, p<0,01	20,3	13,9	T=1, p<0,01

We have checked the accuracy of measurements using the T-Wilcoxon test. The results of the conflict study are reliable at 0.01. For the control group Temp = 160 at Tcr = 185 and Temp < Tcr. For the experimental group, Temp = 1 at Tcr = 185 and Temp < Tcr.

In the course of experimental work, it was found that in the EG the average level of conflict increased by 6.4 points, which is 20 %. However, the values of conflict and 20.3 points and 13.9 correspond to the level when the conflict is manifested in extreme necessity, in violation of personal norms and beliefs. A more detailed qualitative analysis of the test shows that 1) the conflict has increased due to the attitude to violations of social norms, and not due to personal mood, living conditions; 2) no one from the respondents has reached a low level of conflict, which is critical in behavior; 3) simultaneously with this indicator, the level of moral and important individual qualities has increased. Therefore, an increase in conflict (to negative phenomena) in this context is a positive result. In the CG, the level of conflict practically did not change. This suggests that the formative experiment was effective.

4. Discussion

An analysis of research, including the author's, revealed a variety of forms of expression of intolerance, ranging from elementary insult and ending with religious persecution (Zimbuli, 1996). All of them have moral, religious, national, political origins. From here it is important to prevent or reduce the level of such negative interactions.

Of interest are behaviors that lead to intolerance (Pochebut, Beznosov, 2017). Note that they are close to the types of manifestations of intolerance (Zimbuli, 1996). Intolerance, as a response, acts to discriminate a person's capabilities, an information limit for making a decision, falsifying materials, manipulating a person's actions, aggressiveness, and harming the environment. In the case of such asocial intolerance, the person is both obliged and obliged to protect his rights and freedoms. At the same time, active self-defense should take place within the framework of moral rules and laws. In this case, a situation arises when one side acts as an aggressor and the other as a victim. In this case, the protection of personal and public rights and freedoms can act as social intolerance, which puts barriers to negative phenomena. The essential condition of such intolerance is the moral essence. In unison with this provision, the following ideas (Bardiyer, 2007): socio-psychological principles and norms of tolerance/intolerance are based on the internal moral-aesthetic and external legal and legal boundaries of a person formed in the process of socialization. Many experts hold the same position (Davis, 2018).

If we consider the problem of the limits of tolerance in a philosophical aspect, then tolerance is limited to: 1) the harm done to other members of society; 2) the moral maturity of man and society (Khomyakov, 2011).

An important position for us in his ideas is that if tolerance is a morally justified rejection of the use of force of influence on the existence of a morally unsuitable phenomenon, then such tolerance destroys society. In this connection, we are interested in moral values of life, which do not allow us to be indifferent to various social negativities. There are many diagnostics, including the diagnostics of the life values of M. Rokich, which allow to evaluate the moral characteristics of a person (Pochebut, Beznosov, 2017).

Describing the boundaries of tolerant/intolerant behavior A. Galeotti (2014) identifies such relations (in the field of politics) as rejection, neutral and tolerant. This study allows us to also identify at least three levels of manifestation of tolerance/intolerance.

Analyzing the problem of intolerance M.V. Rostovtseva (2016) highlights the causes of this phenomenon. Among them are public factors such as informatization and globalization. These phenomena should always be considered when considering and implementing the aggressiveness

propedeutics. Other reasons are socio-psychological in nature: lack of understanding of the language, egoism, stereotypes prevailing in different groups, societies, structures. The possibility of influencing this group is wider. The idea that to prevent negative actions should influence their causes is axiomatic. However, considering these factors of intolerance, we see that it is not always possible to successfully influence these causes.

Based on the analysis of the binary oppositions of tolerance and intolerance, it should be noted the ways of forming social tolerance. “Pedagogical tolerance is the ability to relate to the opinions, attitudes, habits of other people, to be tolerant without irritation and pronounced hostility. Problem situations require making optimal decisions without violating moral and ethical standards. Comprehension of the art of dialogue without edification and recipes, manifesting itself in concrete actions, acts as a powerful facilitative tool” (Ilyin, 2014). Based on his position, we believe that it is a tolerant attitude to different views (if they do not contradict norms, rules and laws) will lead to the fact that opponents will see patterns of correct behavior, be aware of arguments, facts and arguments supported by society. And all this is a prerequisite for their social behavior. Intolerant behavior causes an intolerant response. In connection with these, it is important for the teacher to possess such qualities that would have facilitative value.

In turn, the following study (Johansson et al., 2017) substantiates that the subculture influences culture by taking the example that bodybuilding from a widespread phenomenon has transformed into fitness – strength training (Nagovitsyn et al., 2015). The authors urge to study various subcultures in order to help representatives of various subcultures to find a way out of their creative energy. We recommend using the substitution of asocial activities for creative and socially significant (Nagovitsyn et al., 2017).

In addition to the subcultures of various social groups, one should also include the values of these groups. So notes the importance of informing about the history, culture of various groups, human races (King, 2008). Summarizing the following position (Simon et al., 2018), we note that a benevolent, respectful attitude in a group has a positive effect on attitudes towards other groups. The practical significance lies in the fact that it is important to form a favorable microclimate within the group so that its members are tolerant of others. The role of television in the formation of tolerance to various social groups is noted (Garretson, 2015). An increase in tolerance is recorded with an increase in the number of shows of these groups on television.

Analysis of studies in the field of tolerance/intolerance leads us to such characteristics of the teacher as moral behavior (Bardiyer, 2007; Khomyakov, 2011) assertiveness (Zimbali, 1996), harmony (Rostovtseva, 2016; Nagovitsyn et al., 2017), social responsibility, constructive social activity, pedagogical skills, communication and conflict characteristics (Ilyin, 2014).

Analyzing the federal state educational standards of higher education, it should be noted that they also emphasize the importance of student possession of competences, which in one way or another emphasize the tolerant attitude of the individual to social, personal differences. The lack of pedagogical conditions increases the risk of offenses among underage citizens (Li, 2018). Attitudes toward antisocial phenomena should be based on moral norms. Otherwise, intolerance may generate reciprocal intolerance.

Among the ethical characteristics, it is proposed to study such as independence, responsibility, breadth of views, self-control (according to the Rokich test), to study the general index of tolerance, it is proposed to study a modified questionnaire for determining the general index of tolerance (Pochebut, Beznosov, 2017) and a test to identify the general level of conflict. If the system of formation of pro-social tolerance is aimed at the formation of a tolerant position, the ability to behave correctly in a conflict situation and to be guided by moral norms in behavior, the diagnostic system allows to reveal the level of moral behavior, conflict and the level of tolerance.

Unfortunately, most experts do not pay enough attention to the formation of social tolerance through the use of interactive methods, such as solving inventive problems and trainings. In the scientific literature, we were able to find only fragmentary studies; however, these works were carried out using various approaches and methods, but without switching the energy of various groups and individuals into socially significant activities in which creativity is manifested.

5. Conclusion

As a result of the research work, students of the EG were updated with ethical life values, which significantly affect not only personal behavior, but also the reaction to the antisocial

behavior of other people. The positive dynamics of individualistic qualities such as responsibility, intolerance for shortcomings are revealed.

In the experimental work, the positive dynamics of the respondents' conflict was demonstrated within an acceptable level, when the behavior of others goes against personal convictions, but the conflict does not lead to insults and does not give pleasure. The degree of such conflict corresponds to the necessary intolerant reaction.

1. The study developed a pedagogical scheme for the formation of social tolerance in a holistic educational process at the university, a feature of which is the use of interactive teaching methods and methods for solving inventive problems. Its practical implementation has shown the effectiveness of development in a pedagogical experiment.

2. The case method was effective in shaping social tolerance. Preparation and solution of textual pedagogical situations, as well as situations of playing out, demonstrations of film fragments with subsequent analysis – all this allows us to include future teachers in solving real situations in which a manifestation of social tolerance is required.

3. Methods for solving inventive problems ensured the nomination of original solutions to situations in which it was necessary to actively resist various negativities. The search for a solution occurred by analogy with other areas of human activity, through the intensification of mental activity, the inclusion of all participants in solving important problems.

4. The use of organizational-activity games allowed to prepare individual and collective solutions to theoretical and practical studies of social tolerance.

Thus, the practical significance of the study is that the application of the author's work on the formation of social tolerance among future teachers will ensure tolerance for differences in society (culture, behavior that does not go beyond the legal norms) and intolerance for violation of moral norms of behavior in society. This is another practical contribution to the formation of individuals who are not indifferent to social negativity.

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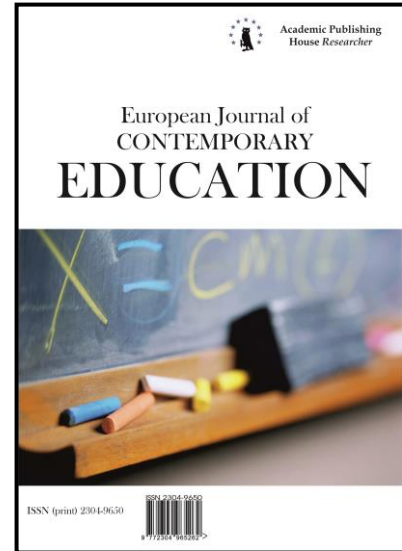
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Hydraulic Analogy Method for Phenomenological Description of the Learning Processes of Technical University Students

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Abstract

A physical process analogy of the learning process was studied using a hydraulic method. Detailed educational guidance describing applied pedagogical concepts for technical instructors of the civil, mechanical, chemical and materials engineering disciplines was formulated. A unified engineering-friendly formulation of learning processes using a direct analogy of civil, mechanical, chemical and materials engineering physical processes was developed. Generalized expressions were proposed for an approximate description of learning processes in the educational curriculum in the form of hydraulic processes in civil, mechanical, chemical and materials engineering practice. It was shown that it is possible to intensify students' attention to the studied technical material through a step-by-step building of a proposed analogy between hydraulic and learning processes, which is based on the similarity between corresponding mathematical models for both processes. Hard-working students have the prime educational problem of managing the growing overload and holding in their memory a cumbersome quantity of studied material in technical, social and human sciences. The author-proposed educational approach provides a better simultaneous understanding of both hydraulics and didactics by acquiring new inter-disciplinary practical knowledge, which helps learners plan an optimal scientific-based mode for effective study and self-study of educational material. This educational research helps students to remember that it is impossible to learn the studied material at the required level of understanding with a single one-time acquaintance without multiple reviews and repetitions.

Keywords: engineering education, memorization, forgetting, hydraulic analogy.

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1. Background

1.1. Concerning the Culture of Student Memory

Pedagogical research into students' memories is very important for the philosophy of education because the learner's memory combines past and future with the current life-point of now, which is the present biological time of human life (Heersmink, Carter, 2017; Heersmink, 2018). Human memory certainly ensures our sentient existence but it also determines the accuracy, efficiency and quality of the educational process in schools and universities. It was well shown in the famous Johnny Mnemonic (1995) cyberpunk movie (Donner, 2005) that problems of human memory and/or memory impairments result in serious disturbances in a person's conscious life. Neuroscience, neurophysiology, psychiatry, numerous movies, popular fiction novels, and computer games like Sanitarium (1998), provide detailed descriptions of several mental disorders associated with amnesia when a person partially or completely forgets everything that has happened in their previous life. However, everyone forgets a lot of educational and general information and it is not due to age-related issues or the current state of individual mental health. And the following question presents itself: Why does the human brain have a strong tendency to forget incoming information on a regular basis?

Neurophysiologists suppose that our memory has a special structure, which is tailored and configured to manage a large volume of information without memory overloading and irreversible memory damage. It was well shown in the famous Tarja's song "The archive of lost dreams" (CD-album "What lies beneath", 2010) that we spontaneously and completely forget everything that we experienced a year or a month ago without additional retention and fixation of previous information in memory. All European culture was initially created as a culture of memory. Culture of memory is a special technique to work with oblivion. It is important to note that the purpose of civilization, instead of barbarism, is focused on memory preservation.

Psychologists point out an important consideration in educational process, which answers a question as to the conditions under which students better remember learning material (Figs. 1–4). Psychologists conclude that students better remember learning material when they see the sense and importance of the studied material, educational facts and occurrences. Pedagogically, it is possible to create a culture of student memory by the assignment a practical value to the studied material for students. It is impossible for students to successfully remember the mandatory volume of learning material without the assignment of educational values, and the creation of value-related interconnections and synergetic associations. A student's memory cannot accept and transform unrelated parts of complex learning material, which remains valueless for a student, and which results in a permanent failure to remember compulsory design schemes, numerous formulae, rules, theorems, corollaries etc. in a timely manner. Assignment of learning value should be a conscious permanent work for educators and students which distinguishes cultural people from barbarians.

Educators should understand that a student's memory is a very vulnerable thing which requires regular enhancement through systematic use of advanced learning tools and psychological techniques. Among memory-stimulating techniques, the simplest and most effective are narratives because written or pronounced narration is the first approach to creation of a memory culture when a person prepares detailed retrospective, informed, and critical essays, notes, blogs, and stories as well as relevant individual audio and video recordings about recently studied textbooks, video lectures, movies, and lived out days (Figs. 1–4). It is funny to note that MacLachlan's character, agent Cooper in Lynch's Twin Peaks (1990-1992) movie (O'Connor, 2004), was one of the first famous audio-blogger characters in a popular culture of the early 90s who clearly showed that detailed narration of diaries, descriptive paragraph writing (Fig. 2), and reading speeches and monologues (Fig. 4) are an integral part of people's common communicational tradition. Each time when people give retrospective monologues, speeches (Fig. 4) or written notes (Fig. 2) about the same topics, they find some additional new ways for reassessment and rethinking of their previous life and experience. When students start to tell aloud the complex learning material, they trying to understand it, the required information enters their memory and their mind becomes susceptible to understanding the bulk volume of new data. Information disclosure by speaking it aloud (Fig. 4) enables a person to be more intelligent and meaningful as well as explore multiple "corridors" and "corners" of his/her mind. Neurophysiologists suppose that speaking information aloud provides a human with the generation of new neural connections, networks and pathways between brain neurons. The principal differences between the two brains are grounded on different quantities and

varying quality of existing neural networks. It is very important for students and teachers to work toward memory improvement by regularly speaking the studied material aloud (Fig. 4), by discussion of multiple high complexity textbooks, by constant generation of new narratives from physics, mathematics (1) – (63) and hydraulics (Figs. 5–6). This constant learning process (Figs. 1–4) has the two aspects. At the neurophysiologic level, students ensure complication and enhancement of existing neural connections as well as emergence and formation of novel neuronal networks and pathways within their brains. At the theoretical science-related level, students ensure intellectual complication and synergetic improvement of effectiveness of their rational life. A student usually iteratively memorizes and remembers the studied material (Fig. 5) by cyclic re-addressing of textbook information (Figs. 1–4). Sometimes the learning process reminds us of precision exercise of information cataloging, or pedantry with multiple repetitions of boring things (Fig. 5). However multiple repetitions and reiterations (Fig. 5) are mandatory procedures for concentrating a package of previously spoken material in the form of short concise phrases and laconic informative definitions within the learner’s memory (Figs. 1–4). In fact, every scientific school is grounded on such brief axiomatic statements and assumptions, which are considered as scholarly dogmas or tenets. Ancient Greek philosopher Plato believed that any new knowledge is only remembering or recollection (Plato, 1892). According to Plato, the purpose of any dialog between teacher and student is based on imposition of certain influence on student’s “spirit” to provide remembering or recollection of necessary knowledge (Plato, 1892). Plato supposed that it is principally impossible to teach a student any new knowledge “from the outside” and that any lecture must be a variation of his hypothesis of remembering or recollection (Plato, 1892). Quite often modern students attend lectures in an exploitative manner but Plato believed that it is impossible to behave as a mere user of a new knowledge. Plato noted that a lecture should provide motivating situations and stimulate different situations of understanding but only students can empower their mental and “spiritual” abilities and make their own internal decisions to teach themselves with new learning material. Plato assumed that a student can generate all knowledge based on internal principles of his/her spirit (Plato, 1892). Plato was assured that a memory, remembering and recollection are the roots of all available knowledge (Plato, 1892).

1.2. Concerning Memory Conceptions in Social Sciences

Information within human memory can be represented individually and simultaneously as semantic information and pattern (figural) information. Students should be able to use the benefits and possibilities of both data representations at every stage of the individual education process. The preferred way of person-centered data representation strongly depends on the student’s individual characteristics. The quick and efficient way for proper solution of a complex educational problem is through the combined use of both data representations when unobvious and problematic relations and entities from the first representation become simpler and more student-friendly with further disclosure and practical applications with the second data representation.

In the beginning, social scientists considered human memory as a certain imprint or specific footprint, which ensures inactive conservation of human-found information because of the reproductive process. Hence, material review and repetition was considered as the main educational technique for footprint-based memory model. Considerable importance was also attributed to the frequencies and time frames for material repetition. The fourfold material repetition after the lapse of adequate definite time intervals was considered as an optimal mode for proper memorization of material with repetitions. Success in memorization of educational material was grounded on the enhancement of individual motivation, use of different mnemonics, mnemotechnics and association methods, which were specially designed for reduction of memorization-related issues and elimination of inabilities to memorize the studied material after repetition.

Starting approximately in mid-20th century, human memory was considered not as simple information storage but as human’s activity, which was developed in human beings in the process of a social evolution. This novel memory interpretation was substantially enhanced and expanded by the inclusion of external means and tools for proper organization of learner’s memory. This generalization of the memory concept led to more comprehensive research into cognitive processes, internal psychology, and such educational techniques as formalization, schematization (planning), and conciseness (meaningfulness), which determine the effectiveness of memory performance. This improved memory theory enabled a more sophisticated approach to memory as a substantive

activity through the application of external tools. The main problem of memory activation during education has transformed into an administrative management problem, requiring reorganization of immersion educational activity. It was necessary to achieve a learning situation where the studied material has remained in the learner's memory since the learner is enthusiastic and engaged in the process of understanding the learning material. The process of retaining material in memory itself becomes a second-order problem and not a matter of principle in these learning situations. Practical realization of these theoretical results in education is a much more complex assignment than working with a footprint-based memory model. However, this approach is much more efficient than a simple mechanical memorization.

This second approach to a learner's memory shows us that the educational problem of memorization and forgetting has been overcome by the management problem of advanced organization of unified educational activity in each specific university.

Solution of the modern multidisciplinary problem of competitive development of an artificial intelligence has resulted in an actualization of the problem of human memory performance. It was found that several human memory-related issues remained unidentified and unresolved. The problems of memory system organization, accurate information retrieval, and information acquisition are some examples of these complex questions and issues, associated with the performance of multi-layered networks of artificial information-processing computer systems. Some examples of actual applied memory-related problems which have attracted research attention in the recent years include advanced human memory modeling for improvement of artificial intelligence memory capabilities, finding optimal strategies for education and considering the distinctive features of a person's individual experience and psychological preferences.

1.3. Concerning Memory Concepts in Didactic Transposition Theory

It is very important to address the concepts of a student's memory, which have been developed in modern constructivism philosophy (Piaget, 1950/1973; Vygotsky, 1986) and Chevallard's didactic transposition theory (Chevallard, 1985; Kang, Kilpatrick, 1992; Bosch, Gascón, 2006; Klisinska, 2009; Chevallard, Bosch, 2014), which arose from it. The change of educational paradigms in modern engineering didactics has shown that behaviorism philosophy should be replaced with constructivism philosophy. Today didactic transposition theory is often considered as an effective educational answer to contemporary anthropological challenges. The main purpose of Chevallard's didactic transposition theory (Chevallard, 1985; Kang, Kilpatrick, 1992; Bosch, Gascón, 2006; Klisinska, 2009; Chevallard, Bosch, 2014) is focused on accurate, effective and student-friendly transformation of highly theoretical scientific disciplines from modern engineering and physics research into the didactic sphere of educational and easily understandable STEM-disciplines. It is very complex and very important for didactic transposition theory to make a proper simplification of the studied material without undesirable distortion or misrepresentation of the original scientific concepts and facts. The educational idea of constructivism philosophy in applied didactics is grounded on the fact that it is impossible to transfer complete, comprehensive knowledge to a student. The only successful way for effective learning is to create favorable educational conditions, which will facilitate acquisition of new knowledge by students.

The basic ideas of constructivism philosophy in education are based on Piaget's (Piaget, 1950/1973) and Vygotsky's (Vygotsky, 1986) ideas in didactics. Piaget and Vygotsky have analyzed the emergence and formation of new knowledge in students, who are the subjects of the educational process (Piaget, 1950/1973; Vygotsky, 1986). Piaget and Vygotsky have noted that a student acquires some objective information from a lecture (Piaget, 1950/1973; Vygotsky, 1986). However, in most cases a student cannot acquire specific objective information from a lecture. The student develops a specific interpretation of the material presented in the lecture which is strongly dependent on the structure of the learner's mind and memory. As a result, in the student's recollection process he tends to reconstruct his interpretation of the lecture information as his own original knowledge with a peculiar synthesis of objective facts and his interpretations of these facts instead of simple mechanical mapping of objective facts. Piaget and Vygotsky have assumed that the generation of new knowledge within a student's mind is the result of successful resolution of the permanent contradiction between existing structure of the learning subject-learner and the reality of outward things (Piaget, 1950/1973; Vygotsky, 1986). Piaget and Vygotsky have assumed that it is impossible for a student to have a direct and comprehensive knowledge about the outside

world (Piaget, 1950/1973; Vygotsky, 1986). They have noted that it is possible to achieve a successful embodiment of a student's knowledge about the outer world only through intensive activation of the subject's individual experience (Piaget, 1950/1973; Vygotsky, 1986). Piaget and Vygotsky have assumed that first-hand personal experience determines the overall performance of individual learning dynamics including the formation of individual cognitive perception, memorization, and forgetting of certain specific information (Piaget, 1950/1973; Vygotsky, 1986). They have supposed that student's knowledge is the process of construction of reality rather than discovery of reality (Piaget, 1950/1973; Vygotsky, 1986). It has been shown in constructivism that a student's knowledge is a set of the conceptual linkages, causality interconnections, preferable operations and successful principles, which helps the student achieve a competitive advantage (Piaget, 1950/1973; Vygotsky, 1986). Constructivism assumes that the educational purpose of cognition is a successful formation of constructs and virtual mind-based assemblies of surrounding reality, which are quite adequate for the phenomena of real life. Didactic transposition is focused on issues and problems of an accurate and efficient adaptation of students to the growing requirements of the educational environment. Successful educational adaptation ensures the formation of student's abilities toward effective and creative operation with new knowledge as well as successful knowledge application to the solution of applied engineering problems.

Every attentive student has some level of individual experience, associated with personal cognitive perception of learning material. An attentive teacher also does his/her best to ensure the proper visualization and specialty-related adaptation of the introduction of the learning problem to simplify the student's efforts to search for a solution of the technical problem. The motivated and ambitious students usually demonstrate a favorable and approving reaction in response to the lecturer's didactic efforts. Quite often a successful and effective student's memorization is based on efficient didactic encoding of learning information and student-friendly schematization of educational data. Modern educational science assumes that the effectiveness of the process of memorization is determined by a student's learning activity and initiative as well as the subject student's intentions toward achievement of individual educational goals. It follows, from the activity approach, to consider the process of forgetting as an expedient phenomenon. The process of forgetting ensures that only the things and facts which are strongly included in the process of subject's activity and are important for a learner remain within student's mind. It was empirically found in educational sciences that the strongest and the most effective connections and linkages in memory are formed only in the case where the object of memorization is the scope of an educational activity. The level of an engagement of the object of memorization to the further activity of the student determines the further productivity and period of existence of the correspondent newly-emerged connections and linkages within learner's memory. A conclusion may be made that success in memorization is mainly determined by the level of engagement of the memorized object in the student's educational activity and, in lesser degree, by the characteristics of memorized object. All technical knowledge in engineering sciences is based on human applied activity. So, it is easier to remember applied technical knowledge by showing the transposition of engineering knowledge from the original technical spheres to the representation of technical knowledge in didactics of engineering education. Modern engineering education shows that it is possible to enhance the didactics of numerous engineering disciplines through the application of the methodology of transposition of mathematical knowledge, which was originally developed by Yves Chevallard (Chevallard, 1985; Chevallard, Bosch, 2014), to instructional problems of technical knowledge transposition. Practical applications of didactic transposition theory to teaching of engineering disciplines require additional research of institutional educational practices which provide generation and further applications of certain specific knowledge. For example, emergence, formation and distribution of many elements of technical knowledge quite often take place beyond the academic communities. Therefore, new technical knowledge passes several practical adaptations before it finds applied educational use for academic community.

Moreover, it is important to understand that memorization is not individual educational action. Memorization is the dynamic process, which is mandatorily included in the practice of the community. New levels and novel stages of memory development are mainly associated with educational implementations of new socio-cultural tools and techniques as well as with new approaches to student educational activity and, in lesser degree, to the mental state of student's psychic functions (Kostikov et al., 2017; Perig et al., 2017; Perig, 2017).



Fig. 1. A student who tries to quickly remember the learning material only by reading



Fig. 2. A student who tries to quickly remember the learning material only by writing down his notes

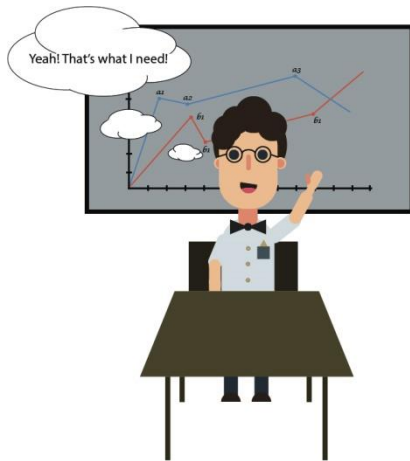


Fig. 3. A student who tries to quickly remember the learning material by making posters and wallpapers with the studied material

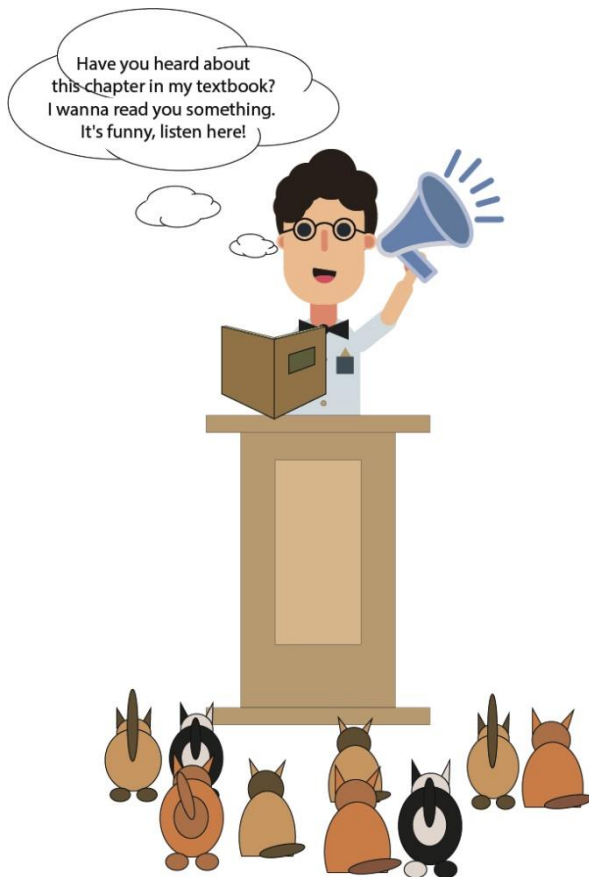


Fig. 4. A student who tries to quickly remember the learning material by reading aloud and by making a speech before available listeners

2. The State of the Art. Introduction and the Background

Pedagogical processes of learning and forgetting are complex internal and often implicit psychological processes, which attract a lot of research efforts of such researchers as Aberšek et al. (Aberšek et al., 2014), Barry et al. (Barry et al., 2017), Bosch et al. (Bosch, Gascón, 2006), Champagne et al. (Champagne et al., 1980), Chen (Chen, 2017), Chevallard et al. (Chevallard, 1985; Chevallard, Bosch, 2014), Coolen et al. (Coolen et al., 2005), Davidovitch et al. (Davidovitch et al., 2008), Doi et al. (Doi et al., 2010), Donner (Donner, 2005), Enelund et al. (Enelund et al., 2013),

Finch et al. (Finch et al., 2018), Foster et al. (Foster et al., 2018), Fox et al. (Fox et al., 2015), Gerstner et al. (Gerstner et al., 2014), Gibbons et al. (Gibbons, Langton, 2016), Heersmink et al. (Heersmink, Carter, 2017; Heersmink, 2018), Jaber et al. (Jaber, Bonney, 1996; Jaber, Bonney, 1997; Jaber et al., 2013), Kang et al. (Kang, Kilpatrick, 1992), Kangas et al. (Kangas et al., 2017), Klisinska (Klisinska, 2009), Kostikov et al. (Kostikov et al., 2017), Mallot (Mallot, 2013), Mayer (Mayer, 2014; Mayer, 2015; Mayer, 2016; Mayer, 2017), Murre et al. (Murre, Chessa, 2011), Nelson et al. (Nelson et al., 2015), Nomura et al. (Nomura, Asai, 2011), O'Connor (O'Connor, 2004), Omar (Omar, 2014), Perig et al. (Perig et al., 2017; Perig, 2017), Piaget (Piaget, 1950/1973), Plato (Plato, 1892), Rahmandad et al. (Rahmandad et al., 2009), Salameh et al. (Salameh et al., 1993), Sayre et al. (Sayre et al., 2012), Sun et al. (Sun et al., 2014), Vygotsky (Vygotsky, 1986), Wilson et al. (Wilson et al., 2012), and others.

Existing and emerging modern trends have comprehensively showed the actual necessity of the basic expansion of memory concepts and a change of horizons for rethinking memory. Modern scientific research into human memory-related problems has given a priority to memory technology.

Heersmink and Carter (2017) have studied metaphysical, epistemic, and ethical dimensions of memory technologies (Heersmink, Carter, 2017). Progress in metaphysical aspects of memory technologies require advanced research into the nature, information properties and functions of memory technologies, the means of classification and the ontological status of memory technologies (Heersmink, Carter, 2017). Research into the epistemological aspects of memory focuses attention on the integrity and reliability of external memory, on conditions when external memory is considered as knowledge, and on metacognitive monitoring of external memory processes (Heersmink, Carter, 2017). An ethical slice was focused on consideration of the desirability of the influence of different technologies on biological memory and on the estimation of technological influences on the human subject (Heersmink, Carter, 2017).

Heersmink (2018) has analyzed the different ways, routes and modes, which are available for interlacing artifacts with autobiographical memory systems (Heersmink, 2018). Heersmink (2018) has proposed the narrative approach to a human being (Heersmink, 2018). Heersmink (2018) has assumed that it is possible to consider people as unraveling stories of their lives (Heersmink, 2018). It was shown that unfolding the story of human life not only determines the current individual convictions and desires but also directs our further aims and actions in a future (Heersmink, 2018). Heersmink (2018) has supposed that human autobiographical memory is partially associated with his embodied interactions with such artifacts as photos, videos, diaries, souvenirs, artworks, jewellery etc, which initiate the activation of individual autobiographical memories (Heersmink, 2018). Heersmink (2018) has concluded that it is impossible to characterize the human being as brain-determined multiple psychological states or as organism-realized biological states (Heersmink, 2018). Heersmink (2018) has supposed that it is necessary to consider the human being as a relational and distributed assembly (Heersmink, 2018).

However, the further enhancement of modern educational process in technical universities requires additional research of learning and forgetting processes (Figs. 1–4) in context of existing analogies of educational (Figs. 1–4) and physical (Figs. 5–6) processes.

3. Aims and Scopes of the Article. Novelty

The subject of the research is the relationship between learning (Figs. 1–4) and physical processes (Figs. 5–6) in hydraulics.

The object of the research is the description of an analogy between educational (Figs. 1–4) and hydraulic (Figs. 5–6) processes.

The scope of the research is the formulation of detailed educational guidance in applied pedagogical concepts (Figs. 1–4) for technical instructors of civil, hydraulic, mechanical, chemical and materials engineering disciplines (Figs. 5–6).

The prime novelty of the research is a unified engineering-friendly formulation of learning processes (Figs. 1–4) through a direct analogy with physical processes in civil, hydraulic, mechanical, chemical and materials engineering (Figs. 5–6).

4. The Processes of Learning and Forgetting

The formation of sustainable knowledge (Figs. 1–4) requires a student to regularly overcome some forgetting processes as shown in Fig. 5. Curve AB corresponds to the learning process and curve BCD corresponds to the process of forgetting. Curve CE corresponds to the process of a faster than normal recovery of knowledge. A steeply sloping curve CE is associated with an increase in the amount of knowledge in random access memory due to the transition from long-term memory into random access memory, whenever the knowledge is needed again. Curve EF corresponds to reduced forgetting after recollection or repetition.

Forgotten material does not disappear from memory but is transferred from a student's random access memory to long-term memory. When this material is needed again, it is recalled from the student's long-term memory. The success and speed of the recall process is directly proportional to the number of times the studied material has been recalled (Figs. 1–4).

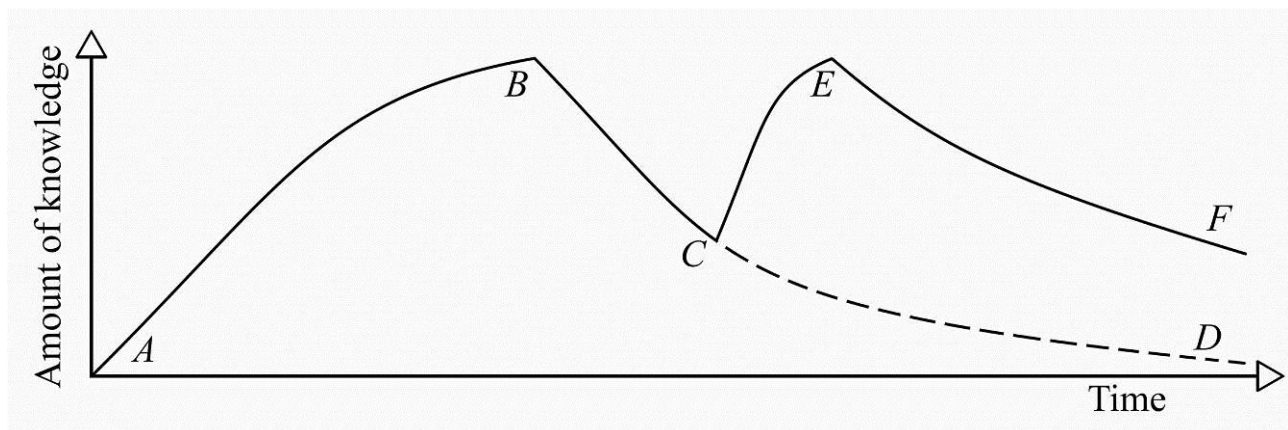


Fig. 5. Change in the level of knowledge in a student's random access memory

When a technical university trains teachers and instructors of technical disciplines, it is very important to explain these applied pedagogic ideas and concepts (Figs. 1–4) with a close connection to proper examples from applied technical disciplines (Figs. 5–6). Proper association of pedagogical concepts (Figs. 1–4) with a student's major (Figs. 5–6) is especially important when the lecturer explains the laws of knowledge accumulation in the process of education, the partial forgetting of knowledge, and knowledge recovery in memory. When the lecturer explains the pedagogic processes (Figs. 1–4) to students majoring in civil, hydraulic, mechanical, chemical and materials engineering and fluid mechanics, then it is more suitable to use the hydraulic model of the process of education (Figs. 5–6).

5. Hydraulic Technical Analogy for Description of Learning Processes

Comparison of human memory work with flowing fluid (Perig et al., 2010; Perig, Golodenko, 2014a; Perig, Golodenko, 2014b; Perig, Golodenko, 2015; Perig, Golodenko, 2016a; Perig, Golodenko, 2016b; Perig, Golodenko, 2017a; Perig, Golodenko, 2017b) is very popular in people language. The pedagogical ideas of Figs. 1–5 for civil, mechanical, chemical and materials engineering students majoring in fluid mechanics (Perig et al., 2010; Perig, Golodenko, 2014a; Perig, Golodenko, 2014b; Perig, Golodenko, 2015; Perig, Golodenko, 2016a; Perig, Golodenko, 2016b; Perig, Golodenko, 2017a; Perig, Golodenko, 2017b) can be described by using the design scheme of a hydraulic system, shown in Fig. 6.

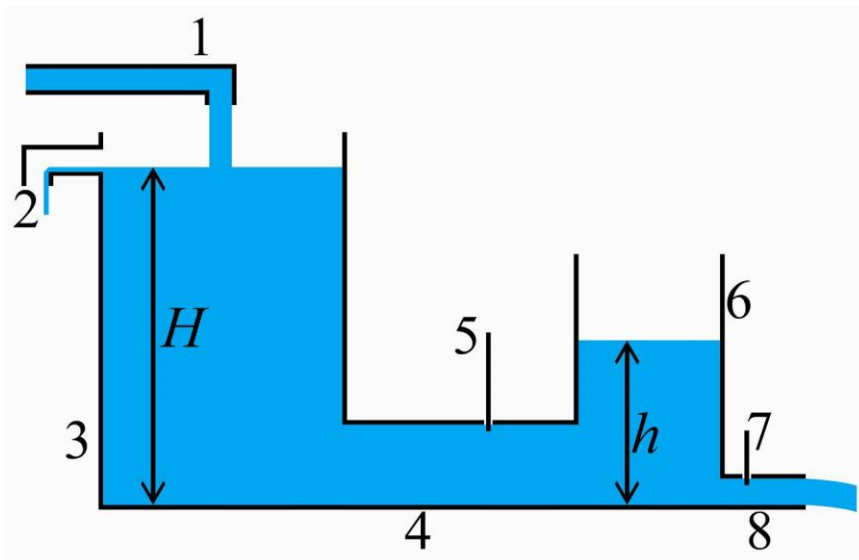


Fig. 6. Hydraulic model for description of the learning and forgetting processes

Digital numbers in Fig. 6 are used to denote the following machine parts and elements of the hydraulic system:

- 1 – fluid supply conduit into the head tank;
- 2 – discharge tube to maintain a constant level of fluid H in the head tank;
- 3 – head tank;
- 4 – fluid supply conduit from the head tank into the receiving tank, (i.e. the inlet of knowledge flow and memory reconstruction of previously studied material);
- 5 – gate valve, which regulates inflow into the receiving tank, (i.e. information flow into random access memory);
- 6 – receiving tank, where the fluid level h simulates the amount of knowledge of a certain specific discipline within the random access (working) memory;
- 7 – gate valve, which regulates outflow from the receiving tank representing the flow of forgotten information, (i.e. the flow of information which is transferred from the student’s random access memory into the long-term memory);
- 8 – discharge tube, providing fluid outflow from the receiving tank, representing the flow of forgotten information, which is transferred to a student’s long-term memory.

6. Analytical Approach to Laminar Hydraulic Modeling of Learning Processes

In the beginning, it is useful for a lecturer to address the first case of a slow laminar fluid flow through a hydraulic system in Fig. 6. It is possible to derive an analytical estimation for the laminar flow problem in Fig. 6 by neglecting the local hydraulic resistances.

6.1. Laminar-Flow based Analytical Solution of a Hydraulic Analogy for the expansion or learning phase

It is necessary to note that according to the Bernoulli equation for forced flow of fluid within conduit 4 in the process of filling (tanking up) the receiving tank 6 we have

$$H - h = h_{12}, \tag{1}$$

where H ([m], [mm]) and h ([m], [mm]) are the marks of free liquid surfaces or the fluid level marks in the head and receiving tanks (Fig. 6).

Loss of pressure head (height loss) can be estimated with the Darcy-Weisbach equation as

$$h_{12} = \left(\frac{1}{2 \cdot g} \right) \cdot \lambda \cdot \left(\frac{L_1}{D_1} \right) \cdot (V_1^2), \tag{2}$$

where λ is the flow friction coefficient, L_1 ([m], [mm]) and D_1 ([m], [mm]) are the length and diameter of conduit 4, $V_1 = V$ ([m/s], [mm/s]) is the fluid velocity in this tube 4, and g ([m/s²], [mm/s²]) is gravity acceleration.

The Poiseuille formula yields the following expression for the laminar flow friction coefficient

$$\lambda = \frac{64}{\mathbf{R}} = \left(\frac{(64 \cdot \nu)}{(V_1 \cdot D_1)} \right), \quad (3)$$

where \mathbf{R} is Reynolds number and ν ([m²/s], [mm²/s]) is the kinematic viscosity coefficient.

Substitution of the Poiseuille formula (3) into the Darcy-Weisbach equation (2) and (2) into (1) results in expression

$$H - h = \left(\frac{1}{(2 \cdot g)} \right) \cdot \left(\frac{(64 \cdot \nu)}{(V_1 \cdot D_1)} \right) \cdot \left(\frac{L_1}{D_1} \right) \cdot (V_1^2) = \frac{(32 \cdot \nu \cdot V_1 \cdot L_1)}{(g \cdot D_1^2)} = \frac{V_1}{\left(\frac{(g \cdot D_1^2)}{(32 \cdot \nu \cdot L_1)} \right)} = \frac{V_1}{A_1}, \quad (4)$$

where

$$A_1 = \left(\frac{(g \cdot D_1^2)}{(32 \cdot \nu \cdot L_1)} \right). \quad (5)$$

It is obvious from the previous expression (4) that

$$V_1 = V = A_1 \cdot (H - h). \quad (6)$$

According to the continuity equation

$$V_1 \cdot \omega_1 = V_t \cdot \omega_t, \quad (7)$$

we can estimate the rise rate (the rate of lifting) of the fluid level mark in the receiving tank 6 as

$$V_t = \frac{V_1 \cdot \omega_1}{\omega_t} \quad (8)$$

or

$$V_t = A_1 \cdot (H - h) \cdot \left(\frac{\omega_1}{\omega_t} \right) \quad (9)$$

where ω_1 ([m²], [mm²]) is the cross-sectional area of conduit 4, and ω_t ([m²], [mm²]) is the cross-sectional area of the receiving tank 6.

The increment of the fluid level mark in the receiving tank 6, which simulates the amount of student's knowledge within working memory, can be estimated as

$$dh = V_t \cdot dt \quad (10)$$

or

$$dh = A_1 \cdot (H - h) \cdot \left(\frac{\omega_1}{\omega_t} \right) \cdot dt. \quad (11)$$

Separation of variables in the last differential equation (11) results in the expression

$$\frac{dh}{(H - h)} = \left(A_1 \cdot \left(\frac{\omega_1}{\omega_t} \right) \right) dt. \quad (12)$$

This equation (12) can be integrated by considering that

$$d(H - h) = -dh \quad (13)$$

and

$$\frac{d(H - h)}{(H - h)} = - \left(A_1 \cdot \left(\frac{\omega_1}{\omega_t} \right) \right) dt. \quad (14)$$

The first integral of this expression (14) yields

$$\ln(H - h) = - \left(A_1 \cdot \left(\frac{\omega_1}{\omega_t} \right) \right) \cdot t + \ln(H) \quad (15)$$

because

$$(H - h)|_{t=0} = H. \tag{16}$$

Exponentiation of this integral (15) results in

$$\frac{(H - h)}{H} = e^{-\beta_1 t}, \tag{17}$$

where

$$\beta_1 = \left(A_1 \cdot \left(\frac{\omega_1}{\omega_t} \right) \right) \tag{18}$$

is the time constant [1/s] for the process of filling (tanking up) the receiving tank 6.

The solution of the last expression yields that the fluid level mark in the receiving tank in the process of filling is $h = H \cdot [1 - \exp(-\beta_1 \cdot t)]$ ([m], [mm]) or $h = H \cdot (1 - e^{-\ln 2 \cdot t / \tau})$ ([m], [mm]), where $\tau = \ln 2 / \beta_1$ [s] is the time interval for which the fluid level mark in the receiving tank in the process of filling the tank reaches a value of $h = (1 - e^{-\ln 2}) \cdot H = H/2$ ([m], [mm]).

The solution of the last expression (17) yields that the fluid level mark in the receiving tank in the process of filling is

$$h = H \cdot (1 - e^{-\beta_1 t}) \tag{19}$$

or

$$h = H \cdot \left(1 - \exp \left(-(\ln 2) \cdot \left(\frac{t}{\tau} \right) \right) \right), \tag{20}$$

where

$$\beta_1 = \frac{\ln 2}{\tau} \tag{21}$$

and

$$\tau = \frac{\ln 2}{\beta_1} \tag{22}$$

is the time interval [s] for which the fluid level mark in the receiving tank in the process of filling (tanking up) the receiving tank reaches a value of

$$h^* = H \cdot (1 - e^{-(\ln 2)}) = \frac{H}{2}. \tag{23}$$

Pedagogically, these derived formulae (19) – (20) for h ([m], [mm]) simulate the increase in the amount of knowledge in the student’s random access memory in the process of education, where time τ [s] (22) is the time interval for which the student’s random access memory receives half of all information to be memorized.

Therefore, the level of fluid in the receiving tank in Fig. 6 simulates the amount of knowledge of a specific discipline within the student’s random access memory. It is possible to derive curves AB and BD in Fig. 5 with the concepts of Fig. 6. If gate valve 5 is open and gate valve 7 is closed, then the fluid level mark in the receiving tank is determined as

$$h = H \cdot \left(1 - e^{\left(-(\ln 2) \cdot \left(\frac{t}{\tau} \right) \right)} \right), \tag{24}$$

which corresponds to the curve AB in Fig. 5, where h ([m], [mm]) is the fluid level mark in the receiving tank at time t [s]; H ([m], [mm]) is the fluid level mark in the head tank at time t [s]; and τ [s] is the time for which the fluid level mark in the receiving tank achieves the value of $H/2$ ([m], [mm]).

6.2. Laminar-Flow based Analytical Solution of a Hydraulic Analogy for the recession or forgetting phase

It is noted that according to the Bernoulli equation for forced flow of fluid within conduit 8 in the discharge process of receiving tank 6 we have

$$h = h_{12}, \tag{25}$$

where h ([m], [mm]) is the level mark of the free liquid surface in the receiving tank (Fig. 6). Loss of pressure head (height loss) can be estimated with the Darcy-Weisbach equation as

$$h_{12} = \left(\frac{1}{2 \cdot g} \right) \cdot \lambda \cdot \left(\frac{L_2}{D_2} \right) \cdot (V_2^2), \tag{26}$$

where λ is flow friction coefficient, L_2 ([m], [mm]) and D_2 ([m], [mm]) are length and diameter of conduit 8, $V_2 = V$ ([m/s], [mm/s]) is the fluid velocity in this tube 8, and g ([m/s²], [mm/s²]) is gravity acceleration.

The Poiseuille formula yields the following expression for laminar flow friction coefficient

$$\lambda = \frac{64}{\mathbf{R}} = \left(\frac{64 \cdot \nu}{V_2 \cdot D_2} \right), \tag{27}$$

where \mathbf{R} is Reynolds number and ν ([m²/s], [mm²/s]) is the kinematic viscosity coefficient.

Substitution of the Poiseuille formula (27) into the Darcy-Weisbach equation (26) and (26) into (25) results in the expression

$$h = \left(\frac{1}{2 \cdot g} \right) \cdot \left(\frac{64 \cdot \nu}{V_2 \cdot D_2} \right) \cdot \left(\frac{L_2}{D_2} \right) \cdot (V_2^2) = \frac{(32 \cdot \nu \cdot V_2 \cdot L_2)}{(g \cdot D_2^2)} = \frac{V_2}{\left(\frac{(g \cdot D_2^2)}{(32 \cdot \nu \cdot L_2)} \right)} = \frac{V_2}{A_2}, \tag{28}$$

where

$$A_2 = \left(\frac{(g \cdot D_2^2)}{(32 \cdot \nu \cdot L_2)} \right). \tag{29}$$

It is obvious from the previous expression that

$$V_2 = V = A_2 \cdot h. \tag{30}$$

According to the continuity equation

$$V_2 \cdot \omega_2 = V_t \cdot \omega_t \tag{31}$$

we can estimate the rate of lowering of the fluid level mark in the receiving tank as

$$V_t = \frac{V_2 \cdot \omega_2}{\omega_t} \tag{32}$$

or

$$V_t = A_2 \cdot h \cdot \left(\frac{\omega_2}{\omega_t} \right), \tag{33}$$

where ω_2 ([m²], [mm²]) is the cross-sectional area of conduit 8, and ω_t ([m²], [mm²]) is the cross-sectional area of the receiving tank 6.

We estimate the negative increment of fluid level mark in the discharging of receiving tank as

$$dh = -V_t \cdot dt \tag{34}$$

or

$$dh = -A_2 \cdot h \cdot \left(\frac{\omega_2}{\omega_t} \right) \cdot dt. \tag{35}$$

Separation of variables in the last differential equation (35) results in the expression

$$\frac{dh}{h} = -A_2 \cdot \left(\frac{\omega_2}{\omega_t} \right) \cdot dt. \tag{36}$$

The first integral of this expression (36) yields

$$\ln(h) = - \left(A_2 \cdot \left(\frac{\omega_2}{\omega_t} \right) \right) \cdot t + \ln(h_0) \tag{37}$$

because

$$(h)|_{t=0} = h_0. \tag{38}$$

Exponentiation of this integral (37) results in

$$\frac{h}{h_0} = e^{-\beta_2 t}, \tag{39}$$

where

$$\beta_2 = \left(A_2 \cdot \left(\frac{\omega_2}{\omega_1} \right) \right) \tag{40}$$

is the receiving tank 6 discharging process time constant [1/s].

The solution of the last expression yields that the fluid level mark in the receiving tank in the process of discharging is

$$h = h_0 \cdot e^{-\beta_2 t} \tag{41}$$

or

$$h = h_0 \cdot \left(\exp \left(-(\ln 2) \cdot \left(\frac{t}{T} \right) \right) \right), \tag{42}$$

where

$$\beta_2 = \frac{\ln 2}{T} \tag{43}$$

and

$$T = \frac{\ln 2}{\beta_2} \tag{44}$$

is the time interval [s] for which the fluid level mark in the discharging receiving tank reaches the value of

$$h^{**} = h_0 \cdot \left(e^{-(\ln 2)} \right) = \frac{h_0}{2}. \tag{45}$$

Pedagogically, these derived formulae (41) – (42) for h ([m], [mm]) simulate decrease in the knowledge in the student’s random access memory in the process of education, where time T [s] is the time interval for which student’s random access memory still contains half of the information memorized earlier.

Pedagogically, gate valve 5 can regulate the memory rate (the memory rate is higher in every successive process of recall than during initial training), and gate valve 7 can regulate the forgetting rate (the forgetting rate is slower in every successive process of recall).

Therefore, if gate valve 5 is closed and gate valve 7 is open, then the fluid level mark in the receiving tank is

$$h = h_0 \cdot \left(e^{\left(-(\ln 2) \cdot \left(\frac{t}{T} \right) \right)} \right), \tag{46}$$

which corresponds to the curve BD in Fig. 5, where h_0 ([m], [mm]) is the fluid level mark in the receiving tank at the time of opening of gate valve 5; T [s] is time for which the fluid level mark in the receiving tank is reduced to the value of $h_0/2$ ([m], [mm]).

However, this first “laminar case” (1) – (46) with available analytical solution (Figs. 5–6) is quite “slow” and requires a long running time as a computational or physical classroom demonstration experiment for engineering students.

7. Numerical Approach to Turbulent Hydraulic Modeling of Learning Processes

In further explanation, it is important for a lecturer to address the second case of a fast, turbulent fluid flow through a hydraulic system in Fig. 6. It is possible to derive a numerical estimation for the turbulent flow problem in Fig. 6 for the “turbulent case” accounting for the local

hydraulic resistances. This second “turbulent case” with the absence of an analytical solution is relatively fast and has an acceptable running time to be considered as suitable for a computational or physical classroom demonstration experiment for engineering students.

The lecturer notes that previous formulae (2) and (26) for the Darcy-Weisbach equation are also valid for turbulent modes of fluid flow in the second “turbulent case” but the friction coefficient λ for turbulent flow should be determined with formula (47) instead of the previous “laminar λ -expressions” (3) and (27).

Flow friction coefficient λ (Darcy’s constant (3), (27)) in formulae (2) and (26) for hydraulically rough pipes in a square resistance law zone (with Reynolds numbers $\mathbf{R} > ((500 \cdot D)/\Delta_{eq})$) can be estimated with the Shifrinson formula as

$$\lambda = 0.11 \cdot \left(\frac{\Delta_{eq}}{D} \right)^{0.25}, \tag{47}$$

where Δ_{eq} [mm] is an equivalent pipe roughness and D [mm] is an internal pipe diameter.

It is necessary to consider that the head (height) loss of a local resistance can be estimated with Weisbach formula as

$$h_{loc} = \zeta \cdot \left(\frac{V^2}{2 \cdot g} \right), \tag{48}$$

where ζ is the drag coefficient of a local resistance.

For the inlet into the conduit from the tank we have a value of a local resistance $\zeta_{entry} = 0.5$.

For the outlet from the conduit into the tank we have a value of a local resistance $\zeta_{exit} = 1.0$.

It is possible to estimate the rate of opening of gate valve (or valve opening position) by the following expression:

$$n = \frac{\omega_0}{\omega}, \tag{49}$$

where ω ([m²], [mm²]) is the cross-sectional area of the conduit, and ω_0 ([m²], [mm²]) is the area of the open cross-section of gate valve. It is possible to list the values of coefficient of a local resistance of gate valve ζ_{latch} in the following [Table 1](#):

Table 1. The numerical values of coefficient of a local resistance of a gate valve ζ_{latch}

n	ζ_{latch}
1.00	0.15
0.75	0.20
0.50	2.00
0.25	20.0

7.1. Turbulent-Flow based Numerical Solution of a Hydraulic Analogy for the expansion or learning phase

In the beginning of the “turbulent modeling” we will analyze the filling stage of the receiving tank 6 in [Fig. 6](#). This turbulent mode of the hydraulic stage ([Fig. 6](#)) simulates the learning stages for memorization and repetition of the studied material ([Figs. 1–5](#)). It is also possible to neglect the velocities of displacements of fluid levels in tanks 3 and 6. We write the following Bernoulli equation for this turbulent hydraulic stage ([Fig. 6](#)), which generalizes the previous idealized expression (1):

$$H - h = \left(\lambda_1 \cdot \left(\frac{L_1}{D_1} \right) + \zeta_1 \right) \cdot \left(\frac{V_1^2}{2 \cdot g} \right), \tag{50}$$

where H ([m], [mm]) and h ([m], [mm]) are the level marks of the free liquid surfaces or the fluid level marks in the head 3 and receiving 6 tanks ([Fig. 6](#)). Index one “1” in (50) corresponds to

fluid supply conduit 4, which connects tanks 3 and 6. The total (resultant) drag coefficient of a local resistance ζ_1 in (50) is as follows:

$$\zeta_1 = \zeta_{entry} + \zeta_{exit} + \zeta_{latch}. \tag{51}$$

We will assume the value of the coefficient of local resistance of the gate valve 5 in (51) is equal to $\zeta_{latch} = 20$ for the rate of opening of the gate valve $n = 0.25$ (Table 1) in further turbulent modeling (Fig. 6) of the educational stage of memorization of the studied material (Figs. 1–5).

We will also assume the value of local resistance coefficient of gate valve 5 in (51) equal to $\zeta_{latch} = 0.15$ for the rate of gate valve opening $n = 1.00$ (Table 1). This allows further hydraulic-based turbulent modeling (Fig. 6) of the educational stage of repetition and review of the studied material (Figs. 1–5) with a quicker completion (restocking) of the student’s working memory.

Equation (50) yields the following expression for the average fluid velocity through the section of the conduit 4:

$$V_1 = \sqrt{\frac{(2 \cdot g) \cdot (H - h)}{\left(\lambda_1 \cdot \left(\frac{L_1}{D_1}\right) + \zeta_1\right)}}. \tag{52}$$

Use of the previous expressions (7) and (8) yields the following generalized formula for the velocity of displacement of the fluid level mark in receiving tank 6 as

$$V_t = \left(\frac{\omega_1}{\omega_t}\right) \cdot \sqrt{\frac{(2 \cdot g) \cdot (H - h)}{\left(\lambda_1 \cdot \left(\frac{L_1}{D_1}\right) + \zeta_1\right)}}, \tag{53}$$

where ω_1 ([m²], [mm²]) is the cross-sectional area of conduit 4, and ω_t ([m²], [mm²]) is the cross-sectional area of the receiving tank 6.

The increment of the turbulent fluid level mark in receiving tank 6, which simulates the amount of student’s knowledge within working memory, can be estimated by the following generalization of the previous expression (10) as

$$dh = \left(\frac{\omega_1}{\omega_t}\right) \cdot \sqrt{\frac{(2 \cdot g) \cdot (H - h)}{\left(\lambda_1 \cdot \left(\frac{L_1}{D_1}\right) + \zeta_1\right)}} \cdot dt. \tag{54}$$

The total fluid level mark in the receiving tank 6 we will estimate as

$$h_i = h_{i-1} + dh \tag{55}$$

or

$$h_i = h_{i-1} + \left(\left(\frac{\omega_1}{\omega_t}\right) \cdot \sqrt{\frac{(2 \cdot g) \cdot (H - h)}{\left(\lambda_1 \cdot \left(\frac{L_1}{D_1}\right) + \zeta_1\right)}} \cdot dt \right). \tag{56}$$

7.2. Turbulent-Flow based Numerical Solution of a Hydraulic Analogy for the recession or forgetting phase

At the second stage of the “turbulent modeling” we will analyze the stage of discharge of the receiving tank 6 in Fig. 6. This turbulent mode of hydraulic stage (Fig. 6) simulates the educational stages for forgetting and recession of the studied material (Figs. 1–5). The displacement velocities of fluid levels in the tanks 3 and 6 may be neglected. It is possible to write the following Bernoulli equation for this turbulent hydraulic stage (Fig. 6), which generalizes the previous idealized expression (25):

$$h = \left(\lambda_2 \cdot \left(\frac{L_2}{D_2} \right) + \zeta_2 \right) \cdot \left(\frac{V_2^2}{(2 \cdot g)} \right), \tag{57}$$

where h ([m], [mm]) is the level mark of the free liquid surface or the fluid level mark in the receiving tank 6 (Fig. 6). Index two "2" in (57) corresponds to fluid discharge conduit 8, which provides fluid outflow from the receiving tank 6. The total (resultant) drag coefficient of a local resistance ζ_2 in (57) is as follows:

$$\zeta_2 = \zeta_{entry} + \zeta_{latch}. \tag{58}$$

We will assume the value of local resistance coefficient of gate valve 7 in (58) equal to $\zeta_{latch} = 0.15$ for the rate of gate valve opening $n = 1.00$ (Table 1) in further hydraulic-based turbulent modeling (Fig. 6) for educational stage of forgetting of the previously studied material (Figs. 1–5). We will also assume the value of coefficient of a local resistance of gate valve 7 in (58) equal to $\zeta_{latch} = 20.0$ for the rate of gate valve opening $n = 0.25$ (Table 1) in further hydraulic-based turbulent modeling (Fig. 6) of the educational stage of reduced forgetting after recollection or repetition (review) of the studied material (Figs. 1–5) with much slower discharge (recession) of the student’s working memory.

Equation (57) yields the following expression for the average fluid velocity through the section of the discharge conduit 8:

$$V_2 = \sqrt{\frac{(2 \cdot g \cdot h)}{\left(\lambda_2 \cdot \left(\frac{L_2}{D_2} \right) + \zeta_2 \right)}}. \tag{59}$$

Use of the previous expressions (31) and (32) yields the following generalized formula for the displacement velocity of the fluid level mark in the receiving tank 6 as

$$V_t = \left(\frac{\omega_2}{\omega_t} \right) \cdot \sqrt{\frac{(2 \cdot g \cdot h)}{\left(\lambda_2 \cdot \left(\frac{L_2}{D_2} \right) + \zeta_2 \right)}}, \tag{60}$$

where ω_2 ([m²], [mm²]) is the cross-sectional area of conduit 8, and ω_t ([m²], [mm²]) is the cross-sectional area of the receiving tank 6.

The negative increment of the turbulent fluid level mark in the receiving tank 6, which simulates the amount of student’s knowledge within working memory, can be estimated by the following generalization of the previous expression (34) as

$$dh = \left(\frac{\omega_2}{\omega_t} \right) \cdot \sqrt{\frac{(2 \cdot g \cdot h)}{\left(\lambda_2 \cdot \left(\frac{L_2}{D_2} \right) + \zeta_2 \right)}} \cdot dt. \tag{61}$$

The total fluid level mark in the receiving tank 6 we will estimate as

$$h_i = h_{i-1} - dh \tag{62}$$

or

$$h_i = h_{i-1} - \left(\left(\frac{\omega_2}{\omega_1} \right) \cdot \sqrt{\frac{(2 \cdot g \cdot h)}{\left(\lambda_2 \cdot \left(\frac{L_2}{D_2} \right) + \zeta_2 \right)}} \right) \cdot dt \tag{63}$$

7.3. Graphical Results of a Numerical Solution for Turbulent-Flow based Hydraulic Model of a Student’s Learning Process

A computer implementation of a turbulent hydraulic model (47) – (63) resulted in the development of an author-proposed educational computer code (Figs. 7–8), designed for numerical simulation of operating modes of a hydraulic design scheme in Fig. 6 and graphical hydraulic-based visualization of learning processes in Fig. 5.

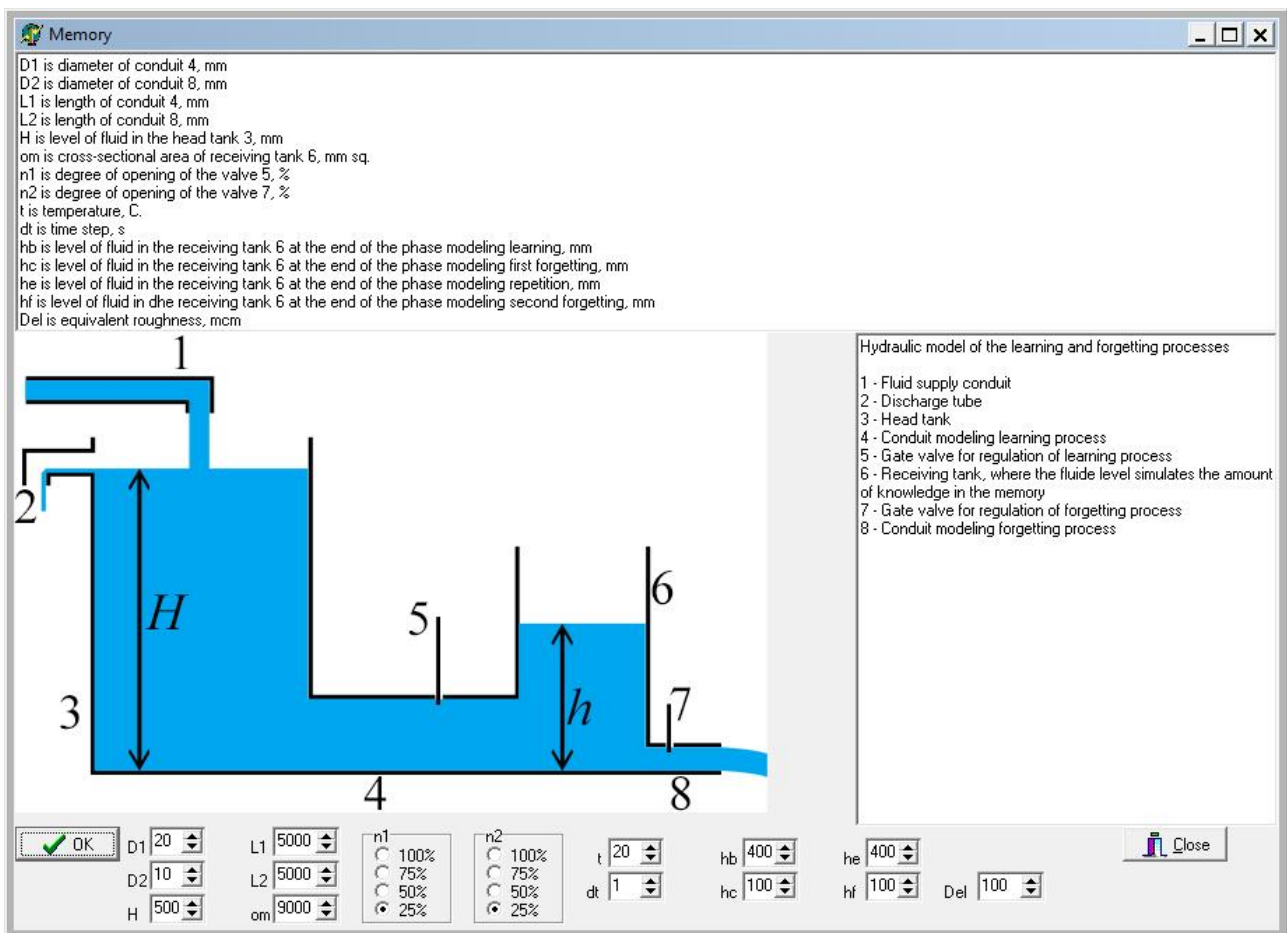


Fig. 7. Interface of author-developed computer code for numerical modeling of the learning and forgetting processes through implementation of turbulent hydraulic model (47) – (63)

Computer-derived results of numerical simulation of turbulent flows of fluid (47) – (63) in Figs. 7–8 essentially broaden and supplement previous analytical results (1) – (46) for laminar fluid flows.

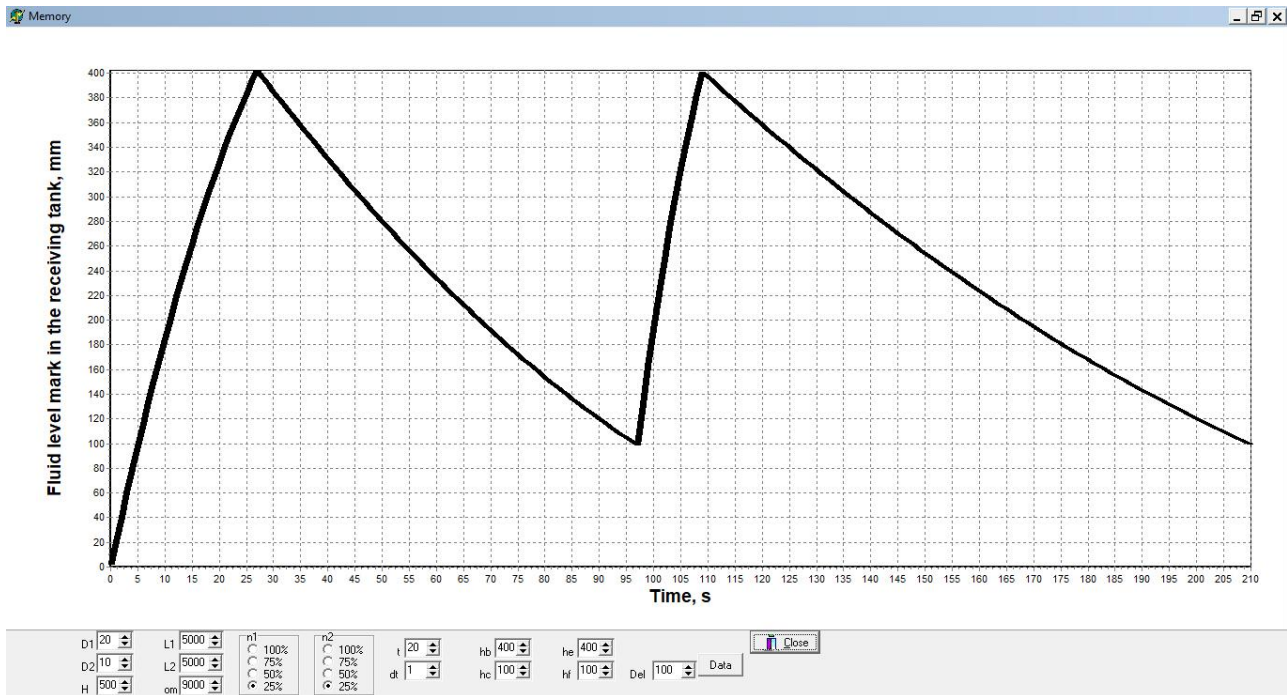


Fig. 8. Graphical visualization of author-developed results for numerical modeling of the learning and forgetting processes through implementation of a turbulent hydraulic model (47) – (63)

8. Discussion

Knowledge of educational psychology (Figs. 1–4) with an emphasis on the mechanisms of memorization and forgetting (Fig. 5) is especially important for instructors of technical disciplines (Figs. 5–8). Moreover, an instructor must share this knowledge with his students to help them properly organize their individual work with the material covered during the semester (Figs. 1–4). The student needs to know that strong knowledge retention (Figs. 1–4) requires several cycles of recollection or repetition (Figs. 5, 8). This means that students are strongly encouraged to prepare themselves for examinations not on the night before the examination but throughout the entire semester (Figs. 1–4). It is preferable not to study and recollect all the bulk volume of required course material (Fig. 1), but in small doses (Figs. 2–4) because the efficiency of the learning process decreases to the end of the phase of study or recollection (Figs. 5, 8).

A lecturer must explain the elements of educational psychology and technical pedagogy (Figs. 1–4) for instructors of technical disciplines using relevant examples, originating from the corresponding engineering disciplines (Figs. 5–8) to make the pedagogical truth more attractive and understandable for technical university students (Figs. 5–8). For this approach to stimulate students' interest, the proposed practical examples must be natural and easy to follow for technical university students, resulting in the studied educational material remaining in the students' memories. It is useful to address technical analogies (Figs. 5–8) and provide examples of periodicity in dynamic processes in nature and technology, which correspond to the technical instructors' major, when the lecturer speaks about periodicity in the educational processes of learning-forgetting-recollection (Figs. 5, 8). It is very important to provide graphical image-bearing ideas (Figs. 1–5) about cross-disciplinary analogies of these periodical processes (Figs. 5, 8) in real complex systems (Figs. 6–7).

The acquaintance of technical university students (Figs. 1–4) with different periodical processes in technology, nature, society, economics, education, and humanities (Figs. 5, 8) provides a broadening of students' ideas and enables the humanization of the technical university educational curriculum (Figs. 1–4). Development and use of simple mathematical models (Figs. 6–7) of periodical processes (Figs. 5, 8) enables the introduction of information technologies to teaching educational psychology and technical pedagogy (Figs. 1–4). When a hydraulics specialist or a fluid power engineer sees communicating vessels before him (Figs. 6–7), they will unwittingly

recall the psychological law that memorization accelerates with every new recollection and forgetting decreases with every new repetition (Figs. 1–8).

It is possible to make an analogy with the highest wave (the tenth wave or wreck (decuman) billow) in a stormy sea and the mechanism of student's memory (Figs. 1–8). It is well known that the tenth sea wave, which is very long, appears because of interference of shorter sea waves. A learner's memory mechanism (Figs. 1–8) also involves a peculiar kind of interference of information obtained via human sensory organs, and information which is stored in the student's long-term memory. This communication of information flows may result in the constructive interference of information with the appearance of a flash of dawned inspiration in a student with a deeper understanding of the studied material. Sometimes this superposition of the flows of information results in destructive interference when a student's random access memory erases and is cleared of upsetting unpleasant memories to protect human's mind.

It is very important to "fix" previously studied material in a student's memory through regular organization of refresher control works (Fig. 2), repetitive competitions (Fig. 4), reiterative thematic Olympiads, and display posters repetitively with basic formulae and regularly update these posters (Fig. 3) because with time students may lose awareness of old poster inscriptions (Figs. 2–3). It is also useful to make regular supporting conspectuses and workbooks for memory stimulation (Figs. 2–3).

Humanizing the educational process (Figs. 1–4) while learning mathematical and technical disciplines (Figs. 5–8) attracts students' attention, generates a keen interest, and leads to synergetic cross-disciplinary student understanding. A lecturer describes to students that ideas, models and techniques of hydraulics and continuum mechanics (Figs. 6–7) have the widest applications in technology, natural sciences, medicine, and economics. Why not apply these concepts to learning theory, educational psychology and time management (Figs. 1–4)?

The proposed educational approach for teaching students about learning theory (Figs. 1–4) using technical analogies (Figs. 5–8) is effective because it implicitly uses ideas of didactic transposition theory (Chevallard, 1985; Kang, Kilpatrick, 1992; Bosch, Gascón, 2006; Klisinska, 2009; Chevallard, Bosch, 2014). The authors have provided a student-friendly didactic transposition-based (Chevallard, 1985; Kang, Kilpatrick, 1992; Bosch, Gascón, 2006; Klisinska, 2009; Chevallard, Bosch, 2014) translation of hydraulics laws of laminar fluid flows (1) – (46) for describing knowledge flow in learning theory (Figs. 1–4). Students admitted that our approach helped them to see the "bridges" between hydraulics and human behavior (Figs. 1–4). Curious students sometimes rhetorically argued that our laminar flow-based model (1) – (46) can't describe the quick acquisition of new knowledge by movie superheroes and often refer to the Neo-superhero in the Matrix movie trilogy who managed to "load" new skills and knowledge into his brain in a few minutes. A lecturer encourages the most ambitious and curious students to learn the elements of turbulent flows (47) – (63), which helps them get some engineering ideas about the dynamics of high-velocity fluid flows, and which should help them better understand processes like quick knowledge flow during movie superhero cognition.

The proposed analogy (Figs. 5–8) was regularly described to undergraduate students majoring in civil, mechanical, industrial and control engineering in hydraulics-related disciplines taught by the authors for the last four years. An applied engineering problem of fluid outflow from one water tank to another (Figs. 6–7) is a sound hydraulic-based student-friendly model of the psychological laws of learning and forgetting (Figs. 1–5). Teaching the proposed analogy provides a reduction in student learning time, which was required for student self-study of the fundamentals of hydraulics theory and hydro-mechanics (Figs. 6–7). It was found with targeted students that the study of technical analogies (Figs. 5–8) with learning processes (Figs. 1–5) essentially improves the student's knowledge about laminar ((1) – (46)) and turbulent ((47) – (63)) fluid flow and provides better student understanding of the Darcy-Welsbach equation, the Poiseuille formula, the continuity equation, the Bernoulli equation, and techniques for the solution of differential equations. Examination results showed better student understanding of the above-mentioned topics (1) – (63). Running an accurate, rigorous pedagogical experiment concerning the quantitative measurement of the effectiveness of learning theory teaching using hydraulic analogies (Figs. 5–8) is rather complex now because our hydraulics courses are very limited in classroom hours. We work with small student groups for getting statistically-valid data, while, now, authors have no teaching hours for engineering pedagogy and psychology. Running a pedagogical

experiment for estimation of analogy effectiveness will be a matter of further research studies in industrial pedagogy for civil, mechanical, chemical and materials engineering students (Figs. 1–4).

9. Conclusion

The authors have taught two voluntary engineering undergraduate classes in Biofluid mechanics (Rubenstein et al., 2016) using the basic ideas of the present didactic research through wide discussion of Figs. 1–8 and detailed explanation of formulae (1) – (63). These classes involved 4 students in the spring of 2017 and 3 students in the spring of 2018. In addition, the authors taught two other classes using these ideas using Figs. 1 – 6 and practical implementation of an author-proposed numerical computer code in Figs. 7 – 8. One of these was a voluntary undergraduate engineering course in “Information Processing Systems” (Coolen et al., 2005) involving 5 students in the spring of 2018 and the other was “Mathematical Modeling in Biomedical Engineering” (Gerstner et al., 2014; Coolen et al., 2005; Doi et al., 2010; Mallot, 2013; Nomura, Asai, 2011) with 6 students in the spring of 2018.

The authors have also outlined the fundamentals of this approach in Figs. 1–8 in a formulae-free explanation in a voluntary humanitarian-focused graduate course “Subject in philosophical-clinical discourse” with 5 students in the spring of 2018.

It is obvious that the number of students involved in these courses was insufficient for a statistically-valid and statistically-significant educational experiment.

All engineering students who were experienced with differential equations could easily follow through all the hydraulics formulae (1) – (63). Both mathematically-weak technical students and mathematically-free humanitarian students were encouraged to use the author-proposed computer code, which implicitly utilizes hydraulic “turbulent” formulae (47) – (63). The main message, which students should remember, is the simple fact that a student’s “learning/forgetting cycle” is a naturally-oscillating educational process which can be easily described with a simple two-vessel hydraulic analogy through analytical “laminar” equations (1) – (46) or numerical “turbulent” expressions (47) – (63).

The explanation of learning dynamics in the present didactic article is not complicated for anyone who has ever looked through modern computational textbooks on learning dynamics (Gerstner et al., 2014; Coolen et al., 2005; Doi et al., 2010; Mallot, 2013; Nomura, Asai, 2011) of biologically-inspired artificial neuronal- and perception-based information-processing systems. Authors of the present educational research strongly believe that students who understand our didactic approach, will be more successful and consistent in the study of extra-complex and mathematically-saturated modern guides (Gerstner et al., 2014; Coolen et al., 2005; Doi et al., 2010; Mallot, 2013; Nomura, Asai, 2011), where they will see the same oscillations in learning systems as we studied in our Figs. 6, 8 but the level of their correspondent mathematical efforts will increase by several times due to the complex nature of Hodgkin–Huxley-like models (Gerstner et al., 2014; Coolen et al., 2005; Doi et al., 2010; Mallot, 2013; Nomura, Asai, 2011) of Bonhoeffer–van der Pol and FitzHugh–Nagumo.

People usually have the greatest practical interest in issues regarding their persons. This simple fact is the basic idea for humanization of the educational process. It is possible to intensify students’ attention to the studied technical material through a step-by-step building of a proposed analogy between hydraulic and learning processes, which is based on the similarity between corresponding mathematical models for both processes. Hard-working students have the prime educational problem of managing the growing overload and holding in their memory a cumbersome quantity of studied material in technical, social and human sciences. The author-proposed educational approach provides a better simultaneous understanding of both hydraulics and didactics by acquiring new inter-disciplinary practical knowledge, which helps learners plan an optimal scientific-based mode for effective study and self-study of educational material. This educational research helps students to remember that it is impossible to learn the studied material at the required level of understanding with a single one-time acquaintance without multiple reviews and repetitions.

Analysis of such quasi-periodical processes in education, society, economics, nature, and engineering as learning and forgetting, exemplified in physical systems by such as a hydraulic tank system, economic systems in an overproduction crisis, Kondratiev waves in economic systems,

predator-prey ecological systems, respiratory cycles in animals, solar cycles in astronomy, etc. has shown that there are objective analogies between oscillations in these complex systems.

All the above-mentioned processes, like many other complex oscillating systems in nature and society, allow simple approximate descriptions by functions $N = N_0 \cdot (1 - \exp(-\beta \cdot t))$ in the expansion or learning phase and $N = N_0 \cdot \exp(-\beta \cdot t)$ in the recession or forgetting phase.

Detailed educational guidance and a unified engineering-friendly formulation of applied pedagogical concepts and learning processes with a direct analogy with physical processes in civil, mechanical, chemical and materials engineering were proposed and developed for technical university students.

Notation

The following symbols are used in this paper:

A_1 = first time constant for the process of tanking up of the receiving tank 6 [1/s];

A_2 = first time constant for the process of discharging of the receiving tank 6 [1/s];

D_1 = diameter of conduit (tube) 4 ([m], [mm]);

D_2 = diameter of conduit (tube) 8 ([m], [mm]);

$e = \exp = 2.718281828$;

g = gravity acceleration ([m/s²], [mm/s²]);

H = level of fluid in the head tank ([m], [mm]);

h = level of fluid in the receiving tank ([m], [mm]);

h_{12} = loss of pressure head (height loss) ([m], [mm]);

L_1 = length of conduit (tube) 4 ([m], [mm]);

L_2 = length of conduit (tube) 8 ([m], [mm]);

R = Reynolds number;

T = time interval for which the fluid level mark in the receiving tank in the process of discharging of the receiving tank reaches the value of ($h^{**} = h_0/2$) [s];

V_1 = fluid velocity in conduit (tube) 4 ([m/s], [mm/s]);

V_2 = fluid velocity in conduit (tube) 8 ([m/s], [mm/s]);

β_1 = second time constant for the process of tanking up of the receiving tank 6 [1/s];

β_2 = second time constant for the process of discharging of the receiving tank 6 [1/s];

λ = flow friction coefficient;

ν = kinematic viscosity coefficient ([m²/s], [mm²/s]);

τ = time interval for which the fluid level mark in the receiving tank in the process of tanking up of the receiving tank reaches the value of ($h^* = H/2$) [s];

ω_1 = cross-sectional area of conduit (tube) 4 ([m²], [mm²]);

ω_2 = cross-sectional area of conduit (tube) 8 ([m²], [mm²]);

ω_t = cross-sectional area of the receiving tank 6 ([m²], [mm²]).

Disclosure

The submission of the authors' paper implies that it has not been previously published, that it is not under consideration for publication elsewhere, and that it will not be published elsewhere in the same form without the written permission of the editors.

Conflict of Interests

The authors Alexander V. Perig, Nikolai N. Golodenko, Violetta M. Skyrtyach, and Alexander G. Kaikatsishvili declare that there is no conflict of interests regarding the publication of this paper.

Authors' contributions

All authors participated in the design of this work and performed equally. All authors read and approved the final manuscript.

Compliance with ethical guidelines

Competing interests. The authors declare that they have no competing interests.

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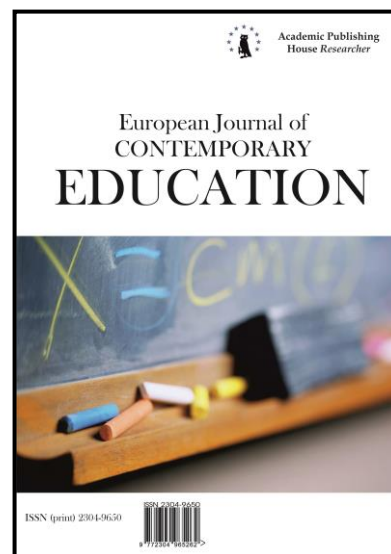
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Regional University Teacher: Evolution of Teaching Staff and Priority Activities

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Abstract

The article is prepared on the materials of the monitoring activities of the Russian University teachers. It is dedicated to the problem of teaching staff training for higher educational institutions.

The formation of professionally competent and pedagogically trained teaching staff is the most important task of universities, which solution ensures the quality of training of specialists with higher education.

The aim of this article is to identify priority activities of the University teachers and to determine the ways of development of their professional competences.

The achievement of the aim bases on the consideration of the evolution of University teaching staff, revealing the motives of their choice of teaching activities, development of forming the ways of pedagogical skills, as well as an assessment of opportunities of universities, faculties and departments in the development of professional competences of teaching staff.

The results of monitoring teachers' activities allow creating a statistical portrait of the University lecturer, estimating the motives of choice of scientific and pedagogical activities and the attractiveness of work at the University, identifying priority activities of the modern University teachers.

The article describes the difficulties of teachers' professionalization and possible ways of forming their professional qualities and competences.

Keywords: university teacher, higher educational institution, research activities, priority activities.

1. Introduction

As the main subject of an educational process the number of publications in scientific literature and periodicals is devoted to the University teacher that confirms the relevance of the chosen research. Today one of the main requirements to higher educational institutions – to do

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scientific work which would give the chance of their applied use and allow to get an economic profit. Unfortunately, among assessment indicators of efficiency of higher educational institutions there are no such ones which would reflect the quality of teachers' pedagogical work. And it is in spite of the fact that higher educational institution is educational institution first of all.

The modern higher educational institutions of Russia are characterized by a lot of new peculiarities: the growth of value and requirements to scientific works and higher educational institution in general; the intensive development of information technologies; the integration of Russian education into the world educational process, etc.

New conditions demand new priorities in activities of teaching staff.

In the existing system no technologies of training educators for their work in higher educational institutions of not pedagogical profile are developed.

The developed system of training the university teachers is rather directed to studying subject contents and assimilation of ready methods, but doesn't provide forming professionally significant qualities necessary in the solution of complex practical challenges in activities of the University lecturer of modern higher educational institution.

The lecturer's identity, his methodical, pedagogical and psychological readiness in many respects defines quality of teaching. He possesses a strategic role in the development of the student's identity during his professional training. Today an expert, a graduate from a higher educational institution, has to possess not only fundamental knowledge, but also high culture, to be ready to different activities, capable to put and solve a wide range of tasks independently in adjacent areas. In this regard the activities of the modern lecturer of higher educational institution has to be aimed at forming the generalized concepts about the mechanisms of application of the gained knowledge, ways of activities in various situations. Competence based approach in education can be realized only in case the University teacher possesses necessary competences that staticizes a question of professional training of pedagogical staff for higher school. The qualities demanded to the University teacher are considered by many authors studying the problems of higher education: D. Alekseeva ([Alekseeva, 2003](#)), E. Bondarevskaya ([Bondarevskaya, 2004](#)), A. Borovskikh ([Borovskikh, 2010](#)), G. Gaponova ([Gaponova, 2012](#)), L. Gurye ([Gurye, 2010](#)), V. Zhurakovsky ([Zhurakovsky et al., 2000](#)), V. Prikhodko, L. Krasinskaya ([Krasinskaya, 2009](#)), Yu. Maly ([Maly, 2009](#)), A. Ovsyannikova ([Ovsyannikova, 2010](#)), N. Rozov ([Rozov, 2014](#)), F. Sharipov ([Sharipov, 2010](#)), etc.

In recent years the prestige of pedagogical work at schools, colleges and higher educational institutions decreases, pedagogical staff of higher educational institutions grows old, an average age of the University lecturers comes nearer to pension that, undoubtedly, complicates modernization of the system of higher education. Adrianna Kezar and Sean Gehrke ([Kezar, 2016](#)) write about forming teaching staff of educational institution, the role of values in this process and organizational changes.

Penza state university of architecture and construction within the bounds of realization of the project "The System and Mechanisms of Formation and Development of Professional Competences of University teacher of Modern Higher Educational Institution " has carried out a complex research of the lecturer's activity of modern Russian higher educational institution. The objectives of our research were studying teaching staff of higher educational institution, priorities of their activities, the development of technologies of their professional and pedagogical competence on this basis.

Within this work:

- teaching staff of higher school, including its sex, age, basic education, academic degree is analysed,
- motives of the choice of scientific and pedagogical activity and some features of the University teacher's activity of higher educational institution in modern conditions are studied,
- real mechanisms of development of professional competences of educators of higher educational institutions are offered.

Over 400 teachers of state universities of the Penza region have taken part in monitoring that makes 20 % of the total number of teachers of higher educational institutions of the region.

Besides, based on monitoring an expert survey has been conducted. 22 highly qualified specialists in the field of pedagogics of higher school representing 11 universities of various regions

of Russia are involved as the experts to research the problems of professional formation of the University teacher of higher educational institution.

In the conducted sociological research, as an indicator reflecting the degree of confidence in the truth of the data obtained, a coefficient p-value equal to 0.05 was adopted. The degree of deviation of the statistics from the hypothesis tested for consistency with the received sample data (null hypothesis) is 5 %.

2. Results

The statistical "portrait" of the University teacher of Russian higher educational institution

The carried out monitoring has revealed a number of tendencies in changes of teaching staff of higher educational institutions of Russia. In general the number of professorial staff of higher educational institutions in Russia has been significantly decreasing since 2011: if in 2010 there were 356,8 thousand persons, then by the beginning of 2014-2015 academic years – 299,7 thousand persons ([Russia in Figures, 2015](#)).

The ratio of men and women in the total number of teaching staff of higher educational institutions has also changed: in 2010 among educators there were 55 % of women and 45 % of men ([Women and men of Russia, 2010](#)), in 2014 male teachers became even less – 37 %, and women in the total number of professorial staff make 63 % ([Women and men of Russia, 2014](#)). Decrease in salary level in higher educational institution forces men to leave work at higher school and to look for more lucrative positions.

Speaking about decrease in the total number of professorial staff of higher educational institutions, we will note that the share of lecturers having an academic degree in 2014 has grown in comparison with 2010: if in 2010 there were 12,3 % of the University teachers with an academic degree of doctor of science and 52,1 % ones with candidate of science degree, then in 2014 – 14,1 % and 54,7 % respectively ([Russian Statistical Yearbook, 2014](#)). It can demonstrate desire and sufficient opportunities at modern higher school to prepare and present a dissertation research.

In the Penza region as well as in general across Russia the number of lecturers has decreased from 3016 thousand people in 2010 to 2437 thousand people in 2014. The analysis of qualified teaching staff of the Penza region allows to speak about the reflection of all-Russian tendencies of growth of the share of doctors and candidates of science in the total number of teaching staff in 2014 in relation to 2010. We will note at the same time that the share of doctors of science in the total number of lecturers of higher educational institutions of the Penza region is below the all-Russian indicator: 10,3 % in 2010 and 13,1 % in 2014 while across Russia this indicator is 12,3 % and 14,1 % respectively. But the share of candidates of science in the total number of educators of the Penza region is higher, than in general across Russia: 2010 – 55,5 % in higher educational institutions of the Penza region and 52,1 % in higher educational institutions of Russia, 2014 – 58,8 % and 54,7 % respectively.

In general number of the interrogated University teachers there were 29,5 % of men, and 70,5 % of women. The similar ratio of the number of teachers of higher educational institutions according to the data of the state statistics ([Women and men of Russia, 2014](#)) is observed in general across Russia: men – 284,2 thousand people (37 %), women – 480,4 thousand people (63 %). Perhaps, such ratio is connected with the fact that often for men teaching work is not a primary activity: some have their own business, the others combine teaching with the work at manufacturing enterprises.

The considerable share of the respondents is made by educators aged from 26 to 40 years (43,8 %) and more than 50 years (31,9 %). There were only 17 % among the respondents aged from 40 to 50 years that reflects the age structure of teaching staff of higher educational institutions of the Penza region. The end of the 1990s-the beginning of the 2000s – the time when university graduates reluctantly remained to teach at departments and their interest in science decreased in many respects because of outdated laboratory base and decrease in financing. An average age of the interrogated educators was 42,7 years.

Young specialists (with experience to 3 years) in the total number of the respondents – 3,6 %. In our opinion it is connected with unwillingness of many young people after post-graduation to teach in higher educational institutions. The average value of experience in scientific and

pedagogical activity of teachers is 18 years. These indicators are confirmed by statistical data on aging of departments staff and the reduced inflow of young employees.

The long experience of lecturers can speak not only about a considerable experience of pedagogical activity, but also about conservatism in the choice of methods and tutorials, unavailability to the development and the deployment of innovations in educational process.

In the analysis of teaching staff by the criterion "held position" the following results are received: the main part of educators (56,3 %) hold the associate professor's position, 16,6 % of teachers work as professors, 17,4 % – senior teachers, 9,7 % – assistants.

A third of the interrogated University teachers are engineers according to their basic education, a third more – economists and managers, educators of pedagogical specialties among the respondents – 16 %. The obtained data demonstrate that educators of higher educational institutions generally have no pedagogical preparation, they can master the subject maintenance very well, but have no knowledge about the organization of educational process, don't know teaching techniques, they are forced to gain these skills by their own experience.

Lack of special pedagogical preparation of the University lecturers – a subject of consideration of a large number of publications. N.H Rozov emphasizes that excellent mastering the subject maintenance and their own achievements in creative researches don't guarantee the success in pedagogical activity, it is necessary to master the most difficult technological complex of methods of transferring of knowledge and the organization of an educational process (Rozov, 2014).

A.A. Verbitsky's statement that "the pedagogical consciousness of lecturers of not pedagogical higher educational institutions has developed on purely empirical basis, "on imitation" as they have no professional pedagogical education" is fair. At the same time he notes that lack of special preparation of the teacher has become a peculiar norm, unlike all other spheres of professional activity (Verbitsky, 2014).

Who and why becomes the university teacher

A considerable part of teaching staff of higher educational institutions – graduates of postgraduate study. They, being engaged in the scientific research in the course of preparation and writing their thesis, after all are far from pedagogics.

As a rule, the former graduates (and for a number of reasons not always the best) who have shown abilities to scientific activities and come to postgraduate study become the teachers of higher educational institutions today. Whether they had special abilities to pedagogical activities, nobody ever estimated.

Many of the young people graduating from higher educational institutions and coming to postgraduate study, have rather high level of professional knowledge and skills on the speciality, show serious interest in teaching and with enthusiasm would be ready to be engaged in it.

As a result of the research it is revealed that a half of acting lecturers didn't plan during their training at the University that they would be engaged in pedagogical activities.

At the same time we will note that those lecturers whose experience in scientific and pedagogical activities had been over 20 years didn't think of teaching work when they were students. Younger generation of today's teachers – with an experience of 6-10 years, still being students, connected the future professional activities with the University (Table 1).

Table 1. Training of students for future pedagogical activities

Training of students for future pedagogical activities	Scientific and pedagogical experience, %								Total
	to 3 years	3-5 years	6-10 years	11-15 years	16-20 years	21-25 years	26-30 years	31 years and more	
yes, prepared	66,7	89,3	92,1	84,8	61,3	3,6	2,7	7,0	47,8
no, didn't prepare	33,3	7,1	7,9	12,1	35,5	96,4	97,3	58,1	44,9
Have found it difficult to	0,0	3,6	0,0	3,0	3,2	0,0	0,0	34,9	7,3

answer									
Total	100	100	100	100	100	100	100	100	100

Practically all the teachers (91 %) having been got their basic engineering education remained in higher educational institutions after graduating, among the economists it is slightly more than a half (54 %) of such ones, the lawyers (89 %) became teachers after the experience in business and in production.

Only for 58,3 % of today's teachers the higher educational institution became the first place of work: and here there is the same tendency – those who have been aimed at future pedagogical activity even during their training in higher educational institution remained to teach after their graduation. The teachers with an experience, as a rule, of more than 20 years those who began as the production worker (Table 2).

Table 2. The previous place of work before entering higher educational institution for teaching work

The previous place of work before entering higher educational institution for teaching work	Scientific and pedagogical experience,								Total
	to 3-x years	3-5 years	6-10 years	11-15 years	16-20 years	21-25 years	26-30 years	31 years and more	
This is the first place of work	86,7	87,2	92,3	84,2	94,2	14,6	3,2	8,1	53,8
Industrial enterprise	0,0	7,1	7,7	5,3	0,0	77,1	54,8	4,0	20,2
SRC, SSEI, school	0,0	0,0	0,0	1,8	0,0	8,3	19,4	62,2	15
Alternative versions	13,3	7,1	0,0	8,7	5,8	0,0	22,6	25,7	11
Total	100	100	100	100	100	100	100	100	100

Of course, the experience of practical work in teaching is not superfluous, knowledge of real production enriches the content of training, but this is one task to solve production problems by himself, and absolutely another one – to teach students. And for this purpose knowledge and skills of other order – psychology, pedagogics, teaching techniques are required. They didn't study psychology and pedagogical bases of teaching in their higher educational institution, experts have reached methodical skill by means of practical experience for many years of working in higher educational institution. And even for those former graduates or post-graduate students who, still being students, connected their professional activity with teaching, it is not an easy task to act in that professional role for which they hadn't been specially trained.

The significant role in the development of professional skills of the teacher is played by motives of the choice of scientific and pedagogical activity by him. The motivation of the choice of professional pedagogical activity and the purpose of this activity at the beginning of teaching work in many respects define the results of pedagogical work. These problems are typical not only of Russian higher school, but also of foreign. So, the authors of the article "Teaching goes also early career university teachers in Germany", three groups of teachers with different goal profiles were identified: instruction-oriented, student-oriented, and ego-oriented early career university teachers (Wosnitza et al., 2014).

According to the received results of monitoring the choice of future teaching activity was influenced in many respects by an opportunity to teach and desire to be engaged in scientific activities. To a less extent such factors as aspiration to impart the professional knowledge to future generations, calling, possibility of creative work were shown. One can note that a part of teachers connect the choice of this activity only with entrance postgraduate study and requirements to post

graduate students to conduct an academic activity. But there are among the interrogated teachers those who were in the profession incidentally (Table 3) (Reznik, 2015).

Table 3. Motives of the choice of scientific and pedagogical activity

Motives of the choice of scientific and pedagogical activity	Respondents, (%)
Opportunity to teach	39,7
Desire to be engaged in a scientific research	34,4
Aspiration to impart professional knowledge to others	14,6
Alternative versions (psychological compatibility with the profession, calling, I consider this work useful for society, etc.)	17,4
Entrance postgraduate study	9,2
I became University teacher incidentally	5,8

90 % of men have chosen as the main scientific and pedagogical activity because of their desire to be engaged in a scientific work, this motive became the basic only for 11 % of women. Women become teachers because of their desire to teach more often – 54,3 %.

The desire to be engaged in the scientific work as the main motive of the choice of teaching work in higher educational institutions distinguishes 91 % of engineers according to the basic education. An opportunity to teach has involved 97 % of lawyers, 70 % of managers and 88 % of economists. Those who got basic pedagogical education remained to teach in higher educational institutions caring for education of future generations (46 %).

If the desire to be engaged in the scientific work is supported with training in this kind of activity in postgraduate study, then an opportunity to teach, as a rule, isn't supported with special pedagogical preparation. In the formation and the development of pedagogical skills of each teacher his personal plan of pedagogical career can play a significant role.

At the same time the analysis of the results of questionnaire has revealed a negative tendency: only 41,7 % of teachers are guided by the personal development plan for the scientific and pedagogical career, the others don't see advantages of work according to the drawn-up plan (Table 4). It demonstrates that the teachers don't plan not only their vertical advance – from an assistant to a professor, but also horizontal development – acquisition of new skills, development of professional skills.

Table 4. The available personal plans of scientific and pedagogical career of the University teacher

The available personal plans of scientific and pedagogical career	Respondents, (%)
Have such a plan	41.7
Unless it is possible to have such a plan, the life is so changeable	37.2
Alternative versions (they have a plan, but it is impossible to realize it; they have a plan – there are no resources; according to requirements of higher educational institution; there is no aspiration to promote in higher educational institution; an approximate plan; they have no any plans; etc..)	21.1
Total	100

Only 41,7 % of teachers had plans of scientific and pedagogical career, 37 % consider that such plans are not possible to have as the life is changeable. 22 % of the respondents have noted that if there is such a plan, then there are no opportunities to realize it or no desires to do career in higher educational institution. At the same time it is traced the following tendencies:

–young teachers with an experience to 15 years have accurate plans of pedagogical career, those who have worked in higher educational institution 16-30 years don't see any sense in planning of scientific and pedagogical career;

–98,3 % of the respondents having basic engineering education are engaged in planning scientific and pedagogical career while only 48 % among basic education teachers make plans of pedagogical career;

–90,4 % of men develop and follow the plan of scientific and pedagogical career while 50 % of women have no such plans because of constantly changing surroundings.

Investigating the career of women teachers in the Universities of the USA, Kerryann O'Meara represents an experiment of California University on women promotion at work. These four perspectives contributed toward agentic actions, as well as women's satisfaction and well-being. The strengths and the limitations of supporting agentic perspectives as a way to advance gender equity and organizational change are presented. (O'Meara, 2015)

The choice of professional teaching activity is influenced also by those moments that do this work interesting. Especially attractive in the work the University teachers consider great opportunities for creative self-realization (45 %) and high intellectual potential of collective (28,7 %). At the same time men at more extent (90 %) are interested in opportunities for creative self-realization, women are attracted by high intellectual potential of collective (34 %), both conditions and the schedule in the educational institution (44 %).

Thus, preparation for pedagogical activity really begins after a potential teacher has finished a higher educational institution and the person who has been formed as an expert not of a pedagogical profile masters teaching activity.

Priority activities of the modern University teacher

What are priority activities of the teacher today when the requirement to be effective (concerning higher education institution and each teacher) increases more and more?

Traditional conditions of the activity of higher educational institutions in the USSR relied on the centralized distribution of graduates, on a priority role of an educational process, the high motivation level of teachers' work. New conditions demand new priority activities of the University teacher who has to be guided by innovative approaches to educating students, pedagogical skills and professionalism now, to raise constantly the indicators of scientific activity, to correlate the educational process to employers' interests, requirements of labor market. But whether the teacher is ready to it?

Teaching activity is an implementation of a number of the functions which are closely connected with the specifics of the taught disciplines, the level of preparation of students' group, its structure, the peculiarities of concrete pedagogical situations, and also with scientific interests of the teacher.

The requirements to psychological and pedagogical competence of the University teacher constantly become complicated that is caused by a variety of reasons. First, the social order for training of the top skills, capable to develop the innovative economy and to provide competitiveness of the state, demands comprehensive improvement of an educational process in higher educational institution, the substantial increase of its quality. Secondly, transition to the competence based approach of educating and reforming the system of higher education is connected with it respectively imposes increased requirements to the competence of high school teachers. Thirdly, because of broad informatization, introduction of technologies of distance learning the nature of communicative interaction of the teacher with students, and consequently, his position and role in the didactic process of higher educational institution changes.

The activity of the modern University teacher is many-sided, it includes such spheres as:

- conducting educational process;
- methodical work and increase of personal qualification;
- educational work among students;
- scientific work;
- participation in management of a department, a higher educational institution and other organizing activities;
- personal activity of the teacher.

Educating students assumes not only classroom lessons (conducting lectures, seminars, laboratory lessons, practical training, consultations), but also managing course and degree projects, educational and work practice, reviewing examinations, examining, credit-tests, testing

knowledge of students. One of the components of the teacher's activities which demands considerable efforts, time and talent is training students for participation in educational competitions.

Communicating with students during usual studies, advising their course and degree projects, examining, involving in the research work, teacher shouldn't forget about need of continuous educational impact on culture and morality of young people, on formation of their life values.

The efficiency of academic work of teaching staff is in direct dependence on the level of pedagogical and methodical skills of the teachers therefore an integral part of educational process is methodical work.

It is hard to overestimate the importance of methodical work of the teacher. The classroom lesson lasts 80-90 minutes, but preparation for it takes even the skilled teacher much more time. Drawing up and updating of the curriculum programs, making manuals, methodical developments, making notes of lectures, practical works, editing educational and methodical materials, development of educational and methodical complexes, development of new technologies, methods, methods of training, participation in the work of scientific and methodical faculty councils of the faculty, higher educational institution and their board – the main forms of methodical work of the University teacher. The teacher can improve his skills not only within specially organized courses, but also participating in the work of educational and scientific and methodical conferences, seminars.

Educational work is an integral part of work with students in a classroom, during out-of-class occupations, within informal meetings, students' excursions, meetings with production workers, exhibitions. This field of activity of the teacher includes a coaching of students' group, and also work with a student's asset, work with parents (participation in meetings).

The sphere of scientific work of the teacher is made by preparation and presentation of a thesis, participation in competitions of programs and grants, preparation and implementation of applications for grants, carrying out research works, preparation of monographs, scientific articles, reports at scientific conferences and seminars, preparation and registration of applications for patents, reviewing and opposition of theses, abstracts, consultations and contractual works on production orders, managing post-graduate students, participation in the work of scientific and technical and dissertation councils and their boards.

Organizing activity of the teacher, his participation in the management of the department, higher educational institution is defined by the performance of the department instructions, the work at faculty meetings, the work on career guidance of the youth (at schools, colleges), establishing contacts with employers, participation and organization of sports, cultural events, establishment and maintenance of cooperation with the domestic and foreign higher educational institutions, research organizations, enterprises and institutions.

Ranging of spheres of activity of the university teacher according to the degree of their importance proceeding from the results of the research looks as follows (Table 5).

For a pairwise comparison of ranks, we use the criterion of signs – Wilcoxon signed rank test (also called the Wilcoxon signed rank sum test). The Wilcoxon signed-rank test is a non-parametric statistical hypothesis test used to compare two related samples, matched samples, or repeated measurements on a single sample to assess whether their population mean ranks differ (i.e. it is a paired difference test).

The conditions of application of Wilcoxon signed rank test correspond to our research: The number investigated when using T-criterion of Wilcoxon has to be not less than 5 and no more than 50; the studied sign can be measured both in quantitative continuous, and in a serial scale; it is used only in case of comparison of two rows of measurements.

Table 5. Ranging of spheres of activity of the University teacher

Spheres of activity	Ranks according to the teachers	Ranks according to the experts	Difference of indicators (d)	Rank of deviations
Conducting educational process	1	1	0	2,5
Methodical work and increase of personal qualification	2	2	0	2,5

Scientific work	3	3	0	2,5
Educational work	4	4	0	2,5
Organization of personal activity of a teacher	5	6	1	5,5
Participation in management of a department, higher educational institution and other organizing activities	6	5	1	5,5

As we see, typical shift of an indicator is the lack of changes noted in 4 cases from 6. In two cases (Organization of personal activity of a teacher and Participation in management of a department, higher educational institution and other organizing activities) the atypical shift was noted. The ranks corresponding to atypical shift are equal to 5,5 and 5,5. When the difference between the groups is zero, the observations are discarded.

We calculate the Wilcoxon T-test, which is equal to the sum of the ranks corresponding to the atypical shift of the indicator: $T = \Sigma R_r = 5.5 + 5.5 = 11$.

We compare T_{emp} and T_{kr} , which at significance value of $p=0.05$ and $n=6$ is equal to 2. Therefore, $T_{emp} > T_{kr}$. Thus, the null hypothesis of lack of the statistical importance of changes of an indicator is accepted.

According to the experts, the priority activities of the teachers should be (on decrease of ranks) – training and methodical work (1,2), scientific work (3), educational work (4), participation in management of a department, higher educational institution and other organizing activities (5), organization of personal activity of the teacher (6). Such ranging of the main spheres of activities partly coincides with choosing priorities by the teachers, however the experts consider the participation in management of the department and higher educational institution more significant in comparison with the organization of personal activity of the teacher.

In determination of the importance of concrete kinds of activity there are practically no distinctions in the teachers with different experience: all (both skilled, and unexperienced) consider as primary activity of the teacher conducting educational process (Table 6). For young teachers the organizing work, participation in management of the department is more significant than personal activity.

Table 6. Ranging of spheres of activity of the University teacher depending on experience in scientific and pedagogical work

Spheres of activity of the University teacher	Rank (average value)	Scientific and pedagogical experience							
		to 3 years	3-5 years	6-10 years	11-15 years	16-20 years	21-25 years	26-30 years	31 years and more
Conducting educational process	1	1,33	1,32	1,28	1,36	1,23	1,32	1,1	1,63
Methodical work and increase of personal qualification	2	2,67	2,25	2,45	2,12	2,29	2,18	2,3	2,42
Scientific work	3	3,22	2,82	3,34	3,21	2,94	3,25	3,13	3,02
Educational work	4	3,67	4,57	3,63	3,49	4,13	3,89	4,51	4,02
Organization of personal activity of a teacher	5	5	4,32	5,42	5	4,96	5	4,81	4,33
Participation in management of a department, higher educational institution and other organizing activities	6	4,44	5,28	4,76	5,7	5,58	5,75	5,54	5,56

Defining the priority activities, doctors of science, unlike candidates of science and teachers without an academic degree, almost on one level put methodical and scientific work (Table 7), explaining it with the fact that most often the conducted scientific researches come to an end not only by the publication of their results in articles, monographs, materials of conferences, but also by writing textbooks and manuals.

Table 7. Ranging of spheres of activity of the University teachers depending on availability of an academic degree

Spheres of activity of the University teacher	Total	Academic degree		
	Rank (average value)	No degree	Candidate of science	Doctor of science
Conducting educational process	1	1 (1,24)	1 (1,27)	1 (1,65)
Methodical work and increase of personal qualification	2	2 (2,1)	2 (2,31)	2 (2,53)
Scientific work	3	3 (2,89)	3 (3,26)	3 (2,68)
Educational work	4	4 (4,46)	4 (4,06)	4 (3,37)
Organization of personal activity of a teacher	5	5 (5)	5 (4,85)	5 (4,71)
Participation in management of a department, higher educational institution and other organizing activities	6	6 (5,1)	6 (5,44)	6 (5,37)

The problems of assessment of the activity of the University teachers – a subject of domestic and foreign publications. The results of the researches presented in them allow to gain an impression about practical professional activity of the teachers of higher educational institutions. The results of the carried out monitoring confirm the conclusions drawn by A.G. Efendiyev and K.V. Reshetnikova (Efendiyev, 2008) that the educational and methodical works dominate in real professional activity of the teachers. At the same time the authors note disproportions between research and pedagogical and methodical vectors of professional activity of employees of higher school. For 98 % of high school teachers the main fields of activity according to their spent time is preparation for lectures, addition to them, seminars with new materials. While the work on the monograph, scientific articles has captured 41,8 % of respondents, by systematic work on contracts, grants, orders (that is an evidence of systematic involvement of the teacher of higher educational institution in research work demanded by society-customer) only 26,2 % of respondents.

To the problems of modeling of competences of high school teachers the article “Competences and Competence Model of University Teachers” of Martina Blašková, Rudolf Blaško, Alžbeta Kucharčíková is devoted to (Blašková et al., 2014). The authors emphasize "the competences of university teachers are of exceptional importance, mainly because teachers constitute the basis for the creation of new knowledge and new values beneficial to the university as well as to students, and subsequently also to enterprises in the role of employers, who should be able to use reasonably and develop systematically the mature competences of their employees".

According to the results of monitoring of the teachers of the Russian higher educational institutions we have developed the structure of their professional competence. It includes six groups of competences – profound knowledge of subjects; pedagogical skills; broad scientific outlook; thirst for innovations and scientific creativity; availability of an academic degree, mastering the methods of scientific search; innovative mobility (Table 8).

Table 8. Ranging of the groups of professional and pedagogical competences of the University teachers depending on availability of an academic degree

Group of competences	In general	An academic degree		
	Ranks	No degree	Candidate of science	Doctor of science
Profound knowledge of a subject	1	1 (1,76)	1 (1,61)	3 (2,47)
Pedagogical skills	2	2 (1,95)	2 (2,16)	2 (2,26)
Broad scientific outlook	3	3 (2,84)	3 (2,84)	1 (1,95)
Thirst for innovations and scientific creativity	4	4 (3,62)	4 (3,98)	4 (3,92)
Mastering methods of scientific search	5	5 (4,62)	5 (4,98)	5 (4,71)
Innovative mobility	6	6 (5,65)	6 (5,67)	6 (5,13)

In spite of the fact that as a result of the poll of Penza higher educational institutions teachers the ranks have been appropriated to the main groups of professional and pedagogical competences, we will note that the opinion of doctors of science differs a little: they consider a broad scientific outlook the most important, then pedagogical skills and only after that profound knowledge of the taught subject.

In our opinion, the professional competence of the university teachers is a complete set of competences necessary for realization of the main directions of his activity: educational, methodical, scientific, educational, participations in management of a department, faculty, higher educational institution. Being a difficult, multiple-factor phenomenon, the professional competence of the teacher of technical University is a united complete structure which can't exist without each of the components included in it, and the productivity of the teacher's activity is provided with their interaction.

The activity of modern University teacher is many-sided and multidimensional, educational and methodical work of the teacher is the most important, of the second importance it is the scientific work. Proceeding from studying features of activity of the modern University teachers, at all versatility of the activity of teachers it is possible to speak about the following necessary priorities:

- mastering pedagogical skills;
- orientation to innovative approaches to students' training;
- active participation and increase of results of scientific activity;
- correlation of an educational process with the interests of employers, the requirements of labor market.

How to form and develop professional competences of the University teachers

Some researchers of the problem of the University teachers' professionalism see the link between the level of their professionalism and the resource opportunities not only of different higher educational institutions, but also of different faculties of one higher educational institution. Kelly Ochs Rosinger, Barrett J. Taylor, Lindsay Coco, Sheila Slaughter, according to the results of their research, draw conclusions that deprofessionalization has happened differently for teaching staff in high – and low-resource educational units. They confirm that faculty in high-resource units, like Brint's (1994) "expert" professionals, depend on external research resources and shape their careers accordingly, whereas faculty in low-resource units rely upon teaching revenues distributed by campus administrators (Rosinger et al., 2016).

In the publications on the problem of competence of the University teacher it is offered to use various ways and mechanisms of the development of professional competences, even neurolinguistic programming. "The more of these methods and techniques of self-education and self-development are used by the teacher, and the more he/she focuses on him/herself as a teacher, more probable will be the actual increase in his/her teaching competence. This say result in the fact the teacher continuously "matures" not only in his/her educational work – in relation to the students and development of his/her competences, but also in the scientific research, publications, organisational and other work" (Blašková et al., 2015).

Professional development of the teacher can be carried out in two ways. The first assumes the progress in skill heights that it is connected with the expressed aspiration to creativity and achievement of professional maturity. The second way is characterized by the development of activity at the level of standard instructions, habitual algorithms, traditional pedagogical technologies. Unfortunately, the analysis of practice allows to draw a conclusion that a considerable part of the teachers has no fair idea what are such professional and pedagogical skills and what are the ways of its achievement. To the solution of many questions of educational activity most of the teachers, and not only beginners, are poorly prepared. Many of them give preference to sample, monotonous methods of training influences, are often limited by very poor set of practical skills allowing to conduct lessons and are sure that it is quite enough for teaching work.

The continuous improvement of professional competence and pedagogical skills of the teachers – the most important problem of management of higher educational institution, dean's office, department (and the teacher himself). The choice of forms of work for this purpose is represented rather vast: participation of teachers in the work of scientific and methodical conferences and seminars; visit of open lessons with their subsequent discussion; studying, generalization and introduction of the best pedagogical practices; organization of lectures and seminars for psychology and pedagogics of higher school; training of the teachers in the leading higher educational institutions of our country and abroad; study of young teachers on courses and faculties of increase of their scientific and pedagogical qualification.

However, steps taken by the leaders of higher educational institutions, faculties, departments to the formation and development of professional competences of the teachers are often spontaneous and inconsistent, the optimality of methods of selection and training of teachers isn't confirmed with researches and experiments.

At the university, for example, we have forced the requirements to the heads of departments and deans, one of the key functions of whom is preparation of teaching reserve, we conduct seminars-trainings with the teachers and the selected reserve on promotion, the study of graduate students has been significantly added with training in pedagogical technologies.

The efficiency of teaching of a young teacher depends on the level of his methodical skills therefore the methodical work is an integral part of educational process. The young teachers and graduate students take part in the methodical seminars of the department aimed at increase of pedagogical skills of teachers, development of new effective methods of organization and conducting educational process, generalization and distribution of the best practices of training and education of students, covering the results of control and mutual visits of lessons, exchange of teachers' experience, development of ways of improvement of quality of students' training and education (Reznik, 2012).

For formation of motivation and development of interest in scientific and pedagogical activity at our Institute of Economics and Management of Penza State University of Architecture and Construction the project "School of the Young Scientist" is realized. The main objectives of which are the formation of professional competence of student as the scientific figure and the University teacher, providing basic data on pedagogical activity of the scientist, assistance in the choice of the direction of scientific interests.

In training the young teachers for pedagogical activity it is necessary to conduct seminars in parallel in two directions: the discussion of educational and methodical developments of the teachers and carrying out open lessons in the most difficult for the most difficult for understanding subjects by students.

The main mechanism of management of formation and development of professional competences of the lecturer is the different level scientific and methodical work assuming the inclusion of the teacher in various forms and methods of pedagogical, research activity on the basis of taking into account of his scientific interests, valuable and moral installations. For this purpose at our university we have practice of mentoring of the skilled teachers, visiting the classroom lessons on the discipline conducted by the professor or the associate professor, monthly methodical seminars of the department, participation in preparation of educational and methodical complexes of disciplines and processes, participation of teachers in the work of scientific and methodical conferences and seminars, visiting of open lessons with their subsequent discussion, studying, generalization and introduction of the best pedagogical practices.

3. Conclusion

Monitoring the activity of the University teachers of Russia has allowed to reveal some features of their changes: since 2010 the number of teachers of Russian higher educational institutions has been steadily decreasing, the number of graduates wishing to remain at teaching work in higher educational institutions every year becomes less, therefore, an average age of teachers also grows. Women make the main part of the teachers (2/3), one third – men; 85 % of the teachers have an academic degree of doctor or candidate of science; as a rule, the educators have basic engineering, economic, law education, but have no special preparation for the pedagogical work.

The main motives of the choice of teaching activity are the desire to teach (39,7 %) and to be engaged in scientific work (34,4 %). The tenth part of the respondents became the teachers because of entering postgraduate study, about 6 % became the teachers incidentally. The development of pedagogical activity happens at the main part of the teachers after their getting to work at higher educational institutions: 54,2 % of respondents remained the teachers at the departments after graduating from the University, but at the same time only 47,8 % of the teachers planned during their training in higher educational institution in advance that they would be engaged in pedagogical activity.

The results of the research have allowed revealing the problem of teachers' training for their pedagogical activity: lack of special psychological and pedagogical preparation of considerable part of teaching staff; lack of opportunities of the teachers, and sometimes their desires to follow the requirements of time – the fast updating of educational system of higher educational institutions, constant correcting of curriculum programs, technologies of training according to frequent changes of federal state educational standards; insufficient readiness of teachers for introduction in their practice of educational innovations; aspiration of teachers to work as before, intellectual and psychological unpreparedness of the University teachers for the activity in new conditions, despite the need to solve complex, non-standard problems.

The experts involved to the research consider that for the formation and development of professional and pedagogical competences of the University teachers the control of quality of teaching work of managers of departments is obligatory, the courses of pedagogical skills for the beginning teachers, their training at the enterprises of the region and in the leading higher educational institutions are necessary; exchange of experience with colleagues from other universities, the invitation of authoritative domestic and foreign experts for conducting educational seminars for the teachers, the use of special textbooks on teaching skills.

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Modern School Role in Human Potential Development

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Abstract

The article attempts to analyze critically the role of the modern school in the development of human potential. Based on the conducted research procedures (the focus group study of the parent community, the questionnaire survey N = 90), they determined the domination of parental position, according to which there is the lack of equal opportunity provision by the state for quality education. The commercialization of the educational industry, the increase of the informal sector of the economy at the market of educational services ensure the reproduction of social inequality, limit the access to quality education for students, primarily from low-resourced families. The results of the study illustrate the growing dissatisfaction of parents with the ability of the school to develop a sufficient cultural level of students, to build the system of spiritual needs, values and interests of young people. The system of school education develops the contradiction between the expectations of parents to intelligence, social and communicative skills, the moral qualities of students and actual learning outcomes. Professional burnout, the deformation of modern teacher social role significantly reduces the effectiveness of the educational impact on the younger generation. The modern school is not fully capable of sustainable human development provision due to the following dysfunctions: an insufficient legitimacy of disciplinary impact on student behavior, high pedagogical workload, conflict risks, the distortion of teacher traditional role. The promising trend for the development of human potential in modern Russian conditions is to increase the prestige of teacher profession, overcome the key deformations of its position, form creative spaces in the school environment, expand the diversity of educational programs, and focus on “gifted” children support.

Keywords: school education, modernization, socio-economic development, human potential.

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1. Introduction

School education as the central element of the educational system, acting as the foundation for the accumulation of modern youth knowledge, becomes the factor in the socio-economic development of any state (Feinberg, 2012; Rogach et al., 2017). The strengthening of educational policy effectiveness provides the possibility of our time challenge overcoming, such as the heterogeneity of the social, economic and intellectual potential of different regions (Nikulina, 2015); the cultivation of centrifugal processes capable of nation weakening (Skorodumova, 2017), the creation of a competitive knowledge economy and the achievement of a balanced spatial development (Frolova, Rogach, 2017).

“In modern market economy, education is rightfully viewed as the investment in human capital” (Zhelezov et al., 2009). The studies conducted in the EEC countries in order to determine the degree of education impact on economic growth indicate a close interdependence of population education level and the growth of macroeconomic indicators. In particular, the increase of enrollment in secondary school by 1 % leads to the annual increase of GDP per capita at the amount of 1-3 % (Gafurov, 2013). This circumstance makes schooling an important tool for human potential development (Avraamova, Loginov, 2014).

Human potential determines the national wealth of the country (Maksakovsky, 2011), it is considered as the most significant reserve for the economy efficiency improvement (Sakharovsky, 2012). The high interest of researchers in human potential is conditioned by a number of reasons, most of which lie in the plane of awareness of the human factor influence on the prospects for the socio-economic development of the state and its institutions (Bailey, 1991; Periklis, 2013), the increase of knowledge, the preservation of cultural heritage (Urmina, Horvat, 2017). The dominant approach to the study of human potential phenomenon is based on the idea of “capability approach”, which allows us to consider the development of any state not through the focus of economic prosperity growth and through the empowerment of its citizens (Sen Amartya, 2005). The expansion of the social choice of young people, the development of sustainable life success models for graduates is of key importance (Alkire, 2009). As the part of this approach to the understanding of human potential economic essence and its relationship with the educational industry, the position that economic growth determines the development of the human factor dominates when it provides the increase of income per capita and also allows you to maintain an adequate level of investment in social sphere (Sen Amartya, 2001).

An equitable distribution of resources in the economy provides the opportunity of consideration in a single analytical framework: the demand for educational services, the impact of the educational industry on economic growth and social stratification. At the same time, the development of internal rates of return as the regulator of investment distribution between the education system and other sectors of the economy, makes it possible to evaluate the effectiveness of public investments in education (Joo Hyun-Jun et al., 2010; Hooge Edith, Honingh Marlies 2014). “In economics, the assessment of the return rates from primary education ranges from 50 % and above, from secondary education - about 20 %, and from higher education – no more than 10 %, and this indicator has tended to decline recently in the conditions of certified labor force overproduction” (Rogach, 2016). A number of authors who consider human potential among the priority prerequisites for the development of territories determines the relationship between the size of the investment in human resources and the increasing performance of population needs (Kapelyushnikov, 2007; Kuzminov, 2014).

Developing these ideas, the concept of human potential begins to evolve in the search for parity between the observance of social justice and the achievement of economic efficiency (Mahbub ul Haq, 1976). Most researchers note that the government policy focused on the growth of macroeconomic indicators does not fully take into account the key needs of the population and does not pay enough attention to their satisfaction, thereby stimulating individual economic activity (Mincer, 1989; Romanova, 2008). Therefore, in the current socio-economic conditions of the leading country development, the position of the state focused not on consumption equality observation, but on equality of opportunities provision looks more promising (Darling-Hammond, 2006). This is of particular importance in the field of education and health care (Schischka, 2002).

In Russia, the topic of human potential, while remaining quite pragmatic and closely linked to the socio-economic objectives of state-building, is based on an activity approach. This provision makes it possible to single out the system of needs, abilities and the readiness of social actors to

accept social roles and perform socially necessary activities among the basic components of human potential (Ivanov, 2010). Considering this circumstance, the increased relevance of human development limitation and resource study is conditioned by its sociocultural orientation, where the institution of education forms the cultural level, spiritual needs, interests and the value system of social actors. Family and education are the primary institutional factors in human potential development and use (Sakharovsky, 2012)

In practical application to economic realities, the role of school education in the development of human potential lies in the formation, the consolidation and the translation of successful social practices that reflect the value orientations of leading social groups and the economic interests of state development. The role of school education in the development of human potential cannot be expressed in terms of value due to the impossibility of its reduction to a quantitative assessment. For a deeper understanding of this relationship, it is important to assess the quality of social life and the existing economic conditions for the potential formation and implementation among modern schoolchildren: their needs, abilities and the readiness to perform successful behavioral models (Chaucer, 2012; McCann et al., 2012; Shpakovskaya, 2015).

Based on the ideas, the authors aim to study the specifics of the impact of modern school on the formation of human potential, as well as the analysis of key barriers and opportunities for its development in the modern system of Russian secondary education. In the formation of the hypothesis that requires empirical testing, the authors relied on modern human potential studies that reveal its relationship with the development of knowledge and support of gifted children (Periklis, 2013), ensuring equality of access to educational opportunities (Darling-Hammond, 2006; Schischka, 2002; Sen Amartya, 2005), the expansion of social choice of young people, the formation of sustainable models of success of graduates (Chaucer, 2012; McCann et al., 2012; Shpakovskaya, 2015). In particular, the authors put forward the following hypothesis: sustainable human development is limited by the dysfunctions of the modern Russian school, the key of which are the insufficient level of equality of opportunities for quality education, the problems of implementation of the educational function of the school, the insufficient level of efficiency in the system of selection and support of gifted children.

2. Materials and Methods

The object of the study was the educational complexes of the city of Moscow, since it was the capital that received the greatest opportunities for educational system development. In Moscow, as an economically powerful and dynamically developing subject of Russian Federation, the scale of socio-economic transformations and tasks to be solved manifests itself most vividly, and here the trends of a qualitatively new level reaching for Russian school are visible most of all. It is important to note that the conclusions of the study are relevant to the context of large cities, and should not be interpreted without taking into account a number of assumptions as appropriate for small urban or rural settlements.

The focus-group study of high school student parents was used as a leading research method. The sample was made of 90 people. Predominantly female parents were interviewed (81.4 %). The average age of the respondents in the sample was 40.15 years with the range of 26-46 years. 88.4 % of parents in the sample have a higher education: 9.2 % have academic degrees. 22.1 % of parents rate their income as low, 65.8 % of parents have an average income, and 12.1 % have a high income.

In order to increase the relevance of the research and clarify the key points of the research results obtained during the focus groups, this analysis was supplemented with the data from the questionnaire survey of the respondents mentioned above. The questionnaire offered to respondents consisted of the questions relating to the assessments of the potential development of a child's personal potential in the school system, the assessments of the school educational and upbringing functions, and the determination of the key barriers to human development.

The results of the study were analyzed by using the Pearson's χ^2 test. Statistical significance was set at $p < 0.05$.

3. Results

The results of the study showed that in a fairly short period of time the offer of educational services made a significant leap towards the development of the non-state education sector, which

is not balanced by the previously dominant effective demand. This practice can be considered as the mechanism of artificial barrier creation for low-income families in quality education obtaining. There was a widespread opinion that educational services were transformed from a free privilege provided by the state into a kind of non-material goods, which not every family can afford to “buy”. The current situation causes a particular anxiety and discontent among schoolchildren parents. The parents who have the opportunity to pay for additional educational services provided by the school on a fee basis rate the school system higher, since commercial services supplement the gaps in free education. The parents who cannot afford to pay for additional commercial educational services point to the gaps in the school system and note the low level of opportunity development for a child’s personal potential in the school system. During the study, a certain relationship was established between the availability of commercial educational services and the assessment by parents of the development potential of a child’s personal potential in the school system ($\chi^2(4) = 12.208; p < 0.05$).

Table 1. The dependence of child personal potential development in the school system and the degree of commercial educational service accessibility in parent community estimates.

Evaluation of commercial educational service availability	Evaluations of the child’s personal potential development in the school system		
	high	average	low
High	9	4	5
Average	15	22	8
Low	4	10	13

The perception of the very practice of market management mechanism introduction in the educational sphere is negative by the parental public. The orientation of modern education to market mechanisms, in their opinion, is the dominant factor of free accessible education share reduction. A separate attention should be paid to corruption offenses of educational institution employees. According to the study, more than half of the parental community made payments “for good performance” under the guise of sponsorship to the school. “We had to pay for extra classes with the teacher so that they would not underestimate the grade. It does not give any additional knowledge, but at least they will not find fault during the lesson.” Every second parent talks about preventive measures in this area. “In addition to gifts from the class, we give teachers and school leaders separately from ourselves in order to make them treat our child with understanding. And we are not the only ones.” For low-resource families, this practice seems unacceptable both because of the absence of additional funds and a negative assessment of “payment for teachers by the means of parents”.

In view of this circumstance, the position of the parent community is dominant, according to which the state does not ensure the equality of opportunities for quality education. The differentiation on this basis affects not only the regions and individual municipalities, but also the educational complexes of the capital. The spontaneous nature of the educational service market development has led to the increase of informal sector share, which is accompanied by the lack of complete and reliable information from the parents of schoolchildren about the degree of the education market saturation, and, consequently, by the decrease of young people social choice. The results of the study showed that the factors initiating the increase in the informal sector of the economy at the educational service market are the following ones: low wages for teachers, the difficulties in tutoring service legalization, the desire to reduce financial costs, an insufficient training for USE passing. “I understand that you can’t do without a tutor today. It is much more convenient than the visit of official courses and paid classes at school. First, it’s even cheaper sometimes. Secondly, the quality is higher.” “Sometimes it seems to me that this system is specially built so that teachers can earn money. Without a special preparation, the exam will not be passed. Even the best students go to the tutor to pass the exam.”

During the study, parents noted that the modern education system poses barriers to the development of talented young people from low-income families. The inability to pay for additional commercial services reduces the possibility of a successful life trajectory development for a

schoolchild ($\chi^2(4) = 26.742; p < 0.01$) and increases the risks of passing the Unified State Exam at the level insufficient for university entering free of charge.

Table 2. The ability to develop a successful life trajectory of a student depending on family income level

Family income level	The evaluation of student successful life trajectory development possibility		
	high	average	low
High	18	5	0
Average	14	21	6
Low	5	10	11

The results of the study show that there are no institutional factors controlling commercial educational services in modern conditions in terms of the quality of their provision and the inadmissibility of corrupt practices in the provision of quasi tutoring services via bribes.

The study showed that the majority of representatives of the parent community agree with the statement that the school does not implement its functionality effectively. According to the respondents, the school implements activities related to the transfer of knowledge to students relatively better than other tasks, while the evaluation of the educational and motivational function is significantly lower. "The salary of teachers does not depend on a child's interest at school." The results of the study illustrate the growing dissatisfaction of parents with the ability of the school to develop a sufficient cultural level of students, to build the system of spiritual needs, values and interests for young people (Rogach et al., 2017).

Certain deformations are observed in teacher-student interactions. "Today, a teacher does not educate his students, and moreover allows himself to shout at them, speak insultingly with them. What can such a teacher teach if children feel negative about themselves?" The current situation is inherently bilateral. The student-teacher social relations, refracted in the prism of the formal interactions of "client" and "educational service provider", initiate the deformation of the educational space and the distortion of traditional roles. The parents of schoolchildren believe that the modernization of school education should include the transformation of teacher's social role, the enhancement of his social status. "Today a teacher has neither the authority nor the ability to stop rudeness among students. He cannot get a student out of the classroom, he can't also take the phone away."

Thus, in the course of focus groups, quite destructive characteristics of a modern teacher activity are revealed which have polar positions. On the one hand, there is indifference, the conniving attitude towards deviant manifestations in the adolescent environment on the part of the pedagogical corps, which is determined by a rather weak social position of a teacher, the need to maneuver constantly between the school administration and the parents. On the other hand, the dysfunctions of the legal field, the lack of legitimate disciplinary opportunities for a student's behavior control initiate destructive manifestations (cry, aggression, etc.). Organizational and economic dysfunctions of the school system functioning (a teacher's overload with routine paperwork, high pedagogical load combined with the need for tutoring, high conflict risks) initiate professional burnout and the deformation of the modern teacher social role.

Table 3. Distribution of answers to the following question: "Select the main barriers that impede the effective implementation of the educational function at school" (no more than 3 answers)

Main barriers	Number of men	%
teacher overloading with paperwork, high pedagogical workload, etc.	52	57.8
the lack of disciplinary levers used by a teacher	28	31.1
the lack of support from the administration	10	11.1
a teacher's low authority	35	38.9
the lack of partnership with parents (a unified approach to the educational process)	14	15.6

teacher's indifference	56	62.2
low professional level of a teacher	20	22.2
other	27	30.0
hard to answer	4	44.4

The educational system at school is characterized by a high level of activity imitation, the actual reduction of the mechanism for its implementation to a set of educational activities. "Holidays, theatrical performances are held for a tick at school, parents spend time and energy on the preparation of scenery, and teachers report, show how well they worked with the children."

Table 4. The dependence of school educational function effectiveness degree and the assessment of the teacher's authority (in the assessments of the parental community) ($\chi^2(4) = 10.374$; $p < 0.05$)

Teacher's authority level evaluation	The degree of school educational function effectiveness (from 0 to 2, where 0 is completely ineffective, 2 - very effective)		
	2	1	0
High	3	6	1
Average	7	15	10
Low	3	20	25

It is noteworthy that the institution of education in modern socio-economic conditions loses the social elevator function. "Weak performance students are sometimes much more successful than their classmates who have done well", "In our society, communication and acquaintance are much more important, and education is an additional factor to this." In essence, the development of successful life strategies by the graduates of schools is not associated by Russian parents with the quality of school preparation. The development of the ability and the readiness of the younger generation to accept social roles and perform socially necessary activities are taken out from the context of the modern school possibilities.

The results of the study showed that the orientation towards the support of "gifted" children, including those from low-resource families, as the factor of human potential development (typical for most developed countries) (Mueller-Oppliger, 2010; Shavinina, 2012) is seen as one of the key components for education modernization. In particular, this trend, according to parents, will help to overcome the inherent school education standardization of the learning process, stereotyping and the averaging of schoolchildren knowledge. The development of creative spaces is of particular importance in this context within the school environment, with the aim of educational policy course changing from the "mass character" of school training towards the development of high school graduate potential.

The implementation of this trend will allow, in the opinion of schoolchildren parents, to reduce the destructive consequences of the formally declared variation in education. Today, the variability of educational programs is limited to the class profile, which significantly reduces the possibility of student professional choice. "Already in the 8th grade, a child must decide and choose a profile. It is difficult for him to choose even between the legal and natural science class, let alone talk about the choice between an in-depth study of physics or chemistry. It would be much better if a child could try himself in different fields." The consequence of this provision is the decline of student interest in learning, which is noted today by all parties of the educational process.

It is fair to note that this opinion is less characteristic of parents whose children are trained in gymnasiums and schools with the in-depth study of subjects. The high weight of the creative component in the educational process and the individual approach to the preparation of students in these educational institutions are complemented by a significant number of extracurricular hours (visiting of museums, theaters, project preparation, etc.), which, according to parents, reduces the negative consequences of the learning process standardization. Despite the increased parental burden with this approach to learning, they recognize the high efficiency of gymnasium training for children. The traditionally high competition for the admission to gymnasiums and

lyceums is, in fact, the reflection of parent opinions on the trend in which modern school education should be developed.

4. Discussion

The special interest of researchers in the subject of human potential in the focus of studying the problems of school education is due to the inextricable relationship of social and economic source of social development. At the same time, the complexity of the quantitative assessment of this relationship makes it urgent to ensure the availability of opportunities for school education, equality of educational opportunities and support for gifted children, the implementation of the school educational function, as well as the impact of school education on the success of building students a successful life trajectory. These provisions were considered by the authors as a hypothesis, which was confirmed in the course of the study.

Limitations. As a limitation of the study, the following assumptions should be taken into account: the empirical base of the study is represented by a large metropolis, which requires verification of the findings for small towns and rural settlements, according to the specifics of their socio-economic development. In addition, the grading of educational institutions on secondary schools, schools with in-depth study of subjects, private schools, etc., creates a certain reserve for the formation of new correlation dependencies unaccounted for in this study.

5. Conclusion

Throughout the history of social development, the institute of education has been the main tool for younger generation education, the most significant factor in human potential development. The essence of this function is to transfer the cultural values, interpreted in the broadest sense to the younger generation through the institution of education: scientific knowledge, the achievements in the field of literature and art, the norms of behavior and moral values, the knowledge and skills inherent in various types of professional activity, etc.

At the present stage of Russian society development, the sustainable human development is limited by certain dysfunctions of the modern school.

The spontaneous nature of the educational service market development in Russia has led to the increase of the informal knowledge economy share. An insufficient efficiency of market management mechanism adaptation to the specifics of the educational industry initiates the deformation of the economic interaction between the main actors of the educational space. At the same time, the declaration of ideas about the need to attract additional financial resources to the school through the commercialization of educational services does not find support among the parent community. The consideration in a single analytical framework: the quality of education and the investment in human potential suggests a significant impact of the educational industry on social stratification and the reproduction of social inequality.

At the same time, many parents show doubts about the ability of their children to accept social roles and perform socially necessary activities in the future. The contradiction between parents' expectations of intellect, social and communicative skills, the moral qualities of students and actual learning outcomes in a modern school is aggravated. Professional burnout, the deformation of the social role of the modern teacher significantly reduces the effectiveness of the educational impact on the younger generation.

The authors conclude that the institutional goals of educational policy should be correlated with the socio-economic conditions of society development. The development of creative spaces in the school environment is of particular importance in this context, with the aim of changing the course of educational policy from the "mass character" of school training towards the development of high school graduate potential; the orientation to "gifted" children support; and also the organization of a constructive dialogue between the main subjects of the educational space.

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Study of Implementation of Academic Rights by University Students: Problems and Trends

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Abstract

The article presents the results of a study on the implementation of academic rights of university students (awareness of their rights, successful implementation, main difficulties and problems). The results of the survey of 1st year students were compared with those of graduate students', faculty of law.

The results showed that the majority of students know the academic rights stipulated in the Federal law "On Education in the Russian Federation", but only a small part said that they managed to implement these rights in practice (3-14 % of the 1st year students and 5-11 % of the 4th year). At the same time, only a small part of their rights is used by students (10-20 %). The exception was the right to choose an educational organization: its successful implementation was indicated by 53 % of the 1st year students and 21 % of 4th year students.

To change the existing situation the authors organized an activity in which university students and teachers participated in identification of ways on how to identify trends in the development of higher education and outlined ways to improve the implementation of academic rights from the standpoint of the development of students' subjectivity in four areas: improving the regulatory framework, informing students, the competencies of university employees and increasing the activity of students and student government bodies.

The main areas of improvement include: informing via the university's website using a comprehensible language that students understand, conducting explanatory talks, advising, and introducing changes to the Federal and university regulatory framework, taking into account existing problems and trends in the future development of higher education.

Keywords: academic rights of students, awareness and implementation of academic rights by students, trends in the development of higher education, ways to improve the implementation of academic rights from the standpoint of the development of students' subjectivity.

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1. Introduction

Providing students, including university students, with a wide range of academic rights (corresponding to their respective duties) is an important achievement of civil society and a developed democratic state. The effective implementation by students of the academic rights granted to them is an important condition for obtaining high quality education, as well as successful future employment, professional and career growth, and self-realization. If during a period of study at a university, a student becomes an active subject of the implementation of his academic rights, then in the future this will manifest itself in his active civic position, knowledge and realization of his rights in various spheres of life.

A number of foreign studies address the problems of implementation of academic rights of schoolchildren and students, in particular, the right to effective education (Barrett et al., 1991), to active participation in it (“participation rights” (Smith, 2002), “students' engagement in school” (Veiga et al., 2012). Separate studies are carried out for other categories of students, for example, graduate students (Schniederjans, 2007), (Schniederjans, 2001), and also concerning specific rights (for example, the rights of the student press (Washington lawmakers ..., 2007) There are also studies that reveal a general philosophical view on the implementation of the academic rights of students (Smith, 2006).

One should note significant differences in the understanding of individual rights of students in Russia and abroad, in approaches to their legislative consolidation and implementation. Thus, with regard to the right to health preservation in Russia, there is more focus on safety precautions and the introduction of health-saving technologies, while in developed European countries the problems of preserving mental health, such as overcoming depression, anxiety, and frustration, are becoming more urgent (Smith et al., 2004).

In the countries of the European Union and the United States, academic rights of students are differentiated into several groups. The academic rights of students include their constitutional rights, rights as consumers (in this case, educational services) and rights determined by the agreement (contract) with the university. In Canada, students' rights are differentiated into material (actual rights that students must use) and procedural (procedures by which students can protect their rights, declare them). Therefore, a different legal and regulatory framework stipulates these rights. Constitutional rights are enshrined in the constitution, state laws (for example, in the United States the Law on Civil Rights, the Law on Higher Education), the rights of students as consumers of educational services – the relevant state laws (the Law on Consumer Protection), contractual rights – internal regulatory university documentation (XXII. Student bill ..., 2007); (University of Minnesota-Twin Cities, 2007). In some countries, academic rights of students are governed by an independent law (for example, in Canada, the Charter on the rights and freedoms of students (Canadian Charter of Rights and Freedoms), in Romania - the Romanian National Student Code of Rights and Responsibilities).

In the EU countries and the USA there are public organizations lobbying the rights of students and promoting their more effective implementation: the European Student Union (ESU) and the United States Student Association (USSA). Their activities are aimed at strengthening students' voices in the process of making legal decisions, collecting information on the implementation of students' rights, creating and maintaining information resources explaining to students their academic rights, and providing opportunities to make critical comments on their implementation. Thus, ESU sees its mission in “promoting the educational, social, economic, and cultural interests of students”, to “represent, protect and strengthen the educational, democratic, political, and social rights of students, promote them at the European level in relation to all relevant bodies” (European Student Union, 2018).

In the countries of the European Union and the USA, a wide range of academic rights is granted to university students (for example, in Romania, the leader in terms of the number of such rights is provided with more than 100 academic rights).

Despite a widespread propaganda of knowledge about academic rights, their lobbying at the level of student associations, there are cases of violation (in particular, in France, in the case of Al-Bajo, three teachers were accused of violating the student's right to privacy – espionage on electronic mail; in *Dezick vs Umpqua Community College* (1979), a student was compensated because the classes offered by the dean were not provided; in the United States vs. *Fordiche* (1992), they were forbidden to use ACT scores in the hospitals in Mississippi, because the gap between the

ACT score of white and black students was larger than the gap of GPA, which was not taken into account at all).

In Russia, the academic rights of students are stipulated by the Federal Law “On Education in the Russian Federation” No. 273-FZ. This law establishes 29 academic rights of students (Article 34 “Fundamental rights of students and measures of their social support and stimulation”, p. 1), including such significant rights as the right to participate in creating the content of their professional education, mastering educational programs along with other disciplines at a higher education institution, a credit for disciplines studied at other universities, etc. At the same time, polls show that “every second student, in one way or another, faces challenges or direct non-observance of his rights, guaranteed by the laws of the Russian Federation” (Belova, 2015). One of the first domestic universities that received empirical evidence of problems in this area was St. Petersburg State University. In this university in 2015, a study of the attitude of teachers and students towards academic rights and freedoms was conducted. The materials of this study indicate the ineffective implementation of a number of academic rights of students, in particular, the right to participate in creating the content of education and the choice of elective subjects. The study showed a high percentage of respondents who said that they did not use any rights. In the comments they indicated that they “were not given any rights” (Belova, 2015). However, this study does not cover the implementation of all academic rights of students defined by Federal Law No. 273, it is unclear what causes the existing problems: lack of awareness about such rights by students, low student activity in their implementation, loopholes in legislation, or the lack of the necessary conditions at the university. In addition, it is interesting to study whether the awareness and realization of their academic rights differ for students of the first and final years, to obtain data on the knowledge and implementation of specific academic rights by students. To this end, we conducted a study of the implementation of academic rights by students of Sochi State University.

2. Materials and methods

In conducting the study, we relied on domestic research (Belova, 2015), (Kirillovich, 2017a), (Kirillovich, 2017b), (Mutagirov, 2014), (Timofeeva, 2015), (Yarovaya, 2010) and foreign (Barrett et al., 1991), (Smith, 2002), (Veiga et al., 2012), (Schniederjans, 2007), (Schniederjans, 2001), (Smith, 2006), (Smith et al., 2004) of students’ academic rights, legislative documents (Federal’nyi zakon..., 2012), survey techniques.

To achieve the goal of the study, the following methods were used:

- analysis of scientific literature, strategic and regulatory documents, local acts of universities, law enforcement practices related to the implementation of academic rights of students;
- a paper-based survey of students of the university, followed by a comparative analysis of the results of students of law and non-legal areas of training, full-time and part-time tuition, first and final years;
- content analysis of open data (university websites (XXII. Student bill ..., 2007), (University of Minnesota-Twin Cities, 2007), studies conducted (Scholars at Risk, 2014);
- foresight method: an exercise on identifying trends in the development of higher education;
- project method: development of recommendations for improving the institute of academic rights of students, taking into account existing problems and trends in the future development of higher education.

A total of 55 undergraduate students from Sochi State University took part in the survey, majoring in Jurisprudence (36 first-year students and 19 fourth-year students).

Students were offered a list of 28 academic rights as they are stated in the Federal Law No. 273 “On Education in the Russian Federation”. It was necessary to characterize their own knowledge and own practice of implementation of each right, putting any sign in the columns: “I am aware of this right”, “I do not know about this right”, “I used this right”, “I managed to successfully implement this law”, “I faced with difficulties and problems in the implementation of this right”. The students were also invited to express their own opinion about the need to improve the practice of realizing students’ academic rights and to give suggestions for its improvement in the following aspects: improving the Federal regulatory framework; improvement of internal regulatory documentation of universities; improving the competence of university staff; informing students; increase activity of students and student government bodies.

37 people took part in the exercise on the identification of trends in the development of higher education, including students from Sochi State University (SSU) at various levels (bachelor, Master, postgraduate), teachers, administrative staff of SSU, representatives of social partners (ANO "Sea of ideas", Sochi Research Center of the Russian Academy of Sciences, etc.). The game was conducted as follows: the participants were engaged in the Rapid Foresight-session technology, in accordance with which the concept of trend was explained, the professional trainer answered the questions, the cards were distributed, the task was to formulate trends in the development of higher education in the Russian Federation and Sochi State University in this context; a group discussion of the recorded trends was conducted, trends supported by the majority of participants were selected.

3. Results

Knowledge of academic rights by students. We obtained data on students' awareness of academic rights and compared the indicators of knowledge of such rights by students of the 1 and 4 years of the law faculty using 2-sample z-test for two population proportions (Table 1).

Table 1. Awareness of academic rights by students 1 and 4 years, faculty of law

Academic law	Know about this law		Z-Score	value	Significance of differences (if p= 0,05)
	1 year, ppl.*	4 year, ppl.**			
the choice of the organization carrying out educational activities, ways of study and forms of education	34	18	-0.0454	0.96012	not significant
provision of conditions for learning, taking into account the peculiarities of their psychophysical development and health conditions	32	18	-0.7174	0.47152	not significant
individual curriculum	22	18	-2.6626	0.00782	significant
participation in the formation of the content of their professional education	23	18	-2.4974	0.01242	significant
selection of elective subjects, courses, disciplines (modules)	29	19	-2.0575	0.0394	significant
mastering, along with major subjects, courses, disciplines (modules), any other subject, course, discipline (module) taught at the organization, as well as in other universities	27	19	-2.3831	0.01732	significant
verification of students' credits by a university of the results of mastering of academic subjects, courses, disciplines (modules), practice, additional educational programs in other universities	30	18	-1.2066	0.22628	not significant
military service deferment	34	19	-1.0466	0.29372	not significant
respect for human dignity, protection from all forms of physical and mental violence, personal abuse, protection of life and health	36	18	1.3892	0.16452	not significant

freedom of conscience, information, free expression of own views and beliefs	36	19	NaN	0	significant
holidays	35	19	-0.7332	0.4654	not significant
academic leave	30	19	-1.8853	0.05876	not significant
transfer to study another major, specialty and/or area of training	34	19	-1.0466	0.29372	not significant
transition from paid to free education	35	19	-0.7332	0.4654	not significant
transfer to another educational organization that implements an educational program of the appropriate level	33	17	0.269	0.78716	not significant
re-enrollment in an educational organization that provides main professional educational programs	33	19	-1.2941	0.19706	not significant
participation in the management of an educational organization in the manner prescribed by its charter	31	18	-0.9757	0.32708	not significant
familiarization with the documents regulating the organization and implementation of educational activities in the university	29	18	-1.4185	0.1556	not significant
appeal against university acts in the manner prescribed by the legislation of the Russian Federation	21	16	-1.9449	0.05238	not significant
free use of library and information resources, educational, industrial, scientific base of the university	32	19	-1.5089	0.13104	not significant
use of therapeutic and recreational infrastructure, cultural facilities and sports facilities of the university	27	19	-2.3831	0.01732	significant
development of their creative abilities and interests	36	18	1.3892	0.16452	not significant
participation in research, scientific, technical, experimental and innovation activities carried out by the university	32	19	-1.5089	0.13104	not significant
trips for training and research, internships, to other universities and scientific organizations	32	18	-0.7174	0.47152	not significant
free of charge publication of works in university bulletins	25	19	-2.6939	0.00714	significant
encouragement for success in educational, physical education, sports, social, scientific and technical, creative, experimental and innovative activities	32	18	-0.7174	0.47152	not significant
combining education with work without detriment to the their own educational process	31	18	-0.9757	0.32708	not significant

receiving information from the university on the employment opportunities in the Russian Federation in the desired field	31	15	0.6829	0.4965	not significant
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* Of the 36 people who participated in the survey; ** out of 19 people who participated in the survey

The students are most aware of the following rights: the right to freedom of conscience, information, the free expression of their own views and beliefs; the right to vacation; the right to re-enroll with the university; the right to develop their creative abilities and interests.

Academic rights that are least known to students: the right to appeal against acts of an educational organization in accordance with the procedure established by the legislation of the Russian Federation; the right to study by an individual curriculum; the right to participate in the creation of the content of their professional education; the right to publish their work in university bulletins free of charge; the right to master, along with the educational program, other disciplines taught at the university; the right to use the medical and recreational infrastructure, cultural facilities and sports facilities of the university.

Implementation of academic rights by students. Table 2 presents data on academic rights that 1 and 4 year students actually implemented. The table includes only those rights for which non-zero values are at least in 1 group of students (1st or 4th year). There were found 21 of the 28 rights. A comparison was also made of the implementation of academic rights by students of courses 1 and 4 years using 2-sample z-test for two population proportions (Table 2).

Table 2. The implementation of academic rights by students 1 and 4 years, faculty of law

Academic law	Used their rights		Z-Score	value	Significance of differences (if p= 0,05)
	1 st year, ppl.*	4 th year, ppl.**			
choice of the organization that provides educational services, ways of study and forms of education	5	1	0.9757	0.32708	not significant
individual curriculum	0	1	-1.3892	0.16452	not significant
participation in the formation of the content of their professional education	0	1	-1.3892	0.16452	not significant
selection of elective subjects, courses, disciplines (modules)	3	2	-0.269	0.78716	not significant
mastering, along with major subjects, courses, disciplines (modules), any other subject, course, discipline (module) taught at the organization, as well as in other universities	3	1	0.4169	0.67448	not significant
military service deferment	1	1	-0.4682	0.63836	not significant
freedom of conscience, information, free expression of own views and beliefs	1	0	0.7332	0.4654	not significant
holidays	5	1	0.9757	0.32708	not significant

transfer to another educational organization that implements an educational program of the appropriate level	2	1	0.0454	0.96012	not significant
re-enrollment in an educational organization that provides main professional educational programs	0	1	-1.3892	0.16452	not significant
participation in the management of an educational organization in the manner prescribed by its charter	1	0	0.7332	0.4654	not significant
familiarization with the documents regulating the organization and implementation of educational activities in the university	2	1	0.0454	0.96012	not significant
appeal against university acts in the manner prescribed by the legislation of the Russian Federation	0	1	-1.3892	0.16452	not significant
free use of library and information resources, educational, industrial, scientific base of the university	1	1	-0.4682	0.63836	not significant
use of therapeutic and recreational infrastructure, cultural facilities and sports facilities of the university	1	0	0.7332	0.4654	not significant
development of their creative abilities and interests	3	1	0.4169	0.67448	not significant
participation in research, scientific, technical, experimental and innovation activities carried out by the university	0	2	-1.983	0.0477	significant
free of charge publication of works in university bulletins	1	1	-0.4682	0.63836	not significant
encouragement for success in educational, physical education, sports, social, scientific and technical, creative, experimental and innovative activities	2	0	1.0466	0.29372	not significant
combining education with work without detriment to the their own educational process	3	0	1.2941	0.19706	not significant
receiving information from the university on the employment opportunities in the Russian Federation in the desired field	1	0	0.7332	0.4654	not significant

* Of the 36 people who participated in the survey; ** out of 19 people who participated in the survey

Academic rights that are most implemented by the students: the right to choose an organization carrying out educational activities and ways of receiving education; the right to vacation; the right to use library and information resources free of charge; the right to develop their creative abilities; the right to choose elective disciplines.

None of the students indicated the implementation of their academic right to include the credits hours and the results of the mastering of academic subjects, courses, disciplines (modules), practice, additional educational programs at other universities by the university they apply to; transition to another major or another field of study, specialty and (or) direction of training.

The rights to study by an individual curriculum, the right for an academic leave, the right to participate in the management of the university, to publish their work in the university publications free of charge are practically not implemented.

The success of the implementation of academic rights by students. Table 3 shows data on academic rights successfully implemented by students, and a comparison of the results of 1 and 4 year students using the 2-sample z-test for two population proportions.

Table 3. Academic rights successfully implemented by students

Academic law	Successfully implemented their rights		Z-Score	value	Significance of differences (if p= 0,05)
	1 st year, ppl.*	4 th year, ppl.**			
choice of the organization that provides educational services, ways of study and forms of education	19	4	2.2682	0.0232	significant
conditions for learning, taking into account the peculiarities of students' psychophysical development and state of health	2	0	1.0466	0.29372	not significant
participation in the formation of the content of their professional education	3	0	1.2941	0.19706	not significant
selection of elective subjects, courses, disciplines (modules)	5	0	1.7038	0.08914	not significant
mastering, along with major subjects, courses, disciplines (modules), any other subject, course, discipline (module) taught at the organization, as well as in other universities	3	0	1.2941	0.19706	not significant
military service deferment	4	0	1.5089	0.13104	not significant
respect for human dignity, protection from all forms of physical and mental violence, personal abuse, protection of life and health	3	2	-0.269	0.78716	not significant
freedom of conscience, information, free expression of own views and beliefs	5	1	0.9757	0.32708	not significant
holidays	5	1	0.9757	0.32708	not significant
academic leave	1	0	0.7332	0.4654	not significant
change of one's major and/or area of training, another form of education	2	0	1.0466	0.29372	not significant
transition from tuition to free education	1	1	-0.4682	0.63836	not significant
transfer to another educational organization that implements an educational program of the appropriate level	4	0	1.5089	0.13104	not significant

participation in the management of an educational organization in the manner prescribed by its charter	2	0	1.0466	0.29372	not significant
familiarization with the documents regulating the organization and implementation of educational activities in the university	3	0	1.2941	0.19706	not significant
appeal against university acts in the manner prescribed by the legislation of the Russian Federation	1	0	0.7332	0.4654	not significant
free use of library and information resources, educational, industrial, scientific base of the university	8	0	2.2228	0.02642	significant
use of therapeutic and recreational infrastructure, cultural facilities and sports facilities of the university	3	0	1.2941	0.19706	not significant
development of their creative abilities and interests	7	0	2.0575	0.0394	significant
participation in research, scientific, technical, experimental and innovation activities carried out by the university	4	0	1.5089	0.13104	not significant
trips for training and research, internships, to other universities and scientific organizations	2	0	1.0466	0.29372	not significant
free of charge publication of works in university bulletins	1	0	0.7332	0.4654	not significant
encouragement for success in educational, physical education, sports, social, scientific and technical, creative, experimental and innovative activities	4	1	0.7174	0.47152	not significant
combining education with work without detriment to the their own educational process	3	0	1.2941	0.19706	not significant
receiving information from the university on the employment opportunities in the Russian Federation in the desired field	1	0	0.7332	0.4654	not significant

* Of the 36 people who participated in the survey; ** out of 19 people who participated in the survey

Problems and challenges in the implementation of academic rights. Unexpected was the absence of difficulties and problems in the implementation of academic rights in the overwhelming majority of students. Their presence was noted by a small number of students only in relation to individual rights:

- the right to choose an organization that provides educational services (5 % of 4th year students);
- the right to master, along with the major program, other subjects taught at the university (5 % of 4th year students);
- the right to deferment from military service, the right to re-enrollment at a university, the right to develop creative abilities, the right to use the health and sports infrastructure of the university, the right to combine education with work, the right to receive information from the

university on the employment opportunities in the Russian Federation in the chosen areas of training (3 % of first-year students encountered difficulties);
 - the right to have trips to other educational organizations for training and research (6 % of first-year students faced difficulties).

The opinions of students about the need to improve practices of implementation of students' academic rights are presented in [Table 4](#), the proposed measures for improvement – [Table 5](#).

Table 4. Opinion of students on the need to improve practices of the implementation of academic rights

Does the practice of implementation of academic rights need to be improved?	1st year Law students Intramural, ppl.	χ^2 emp.	χ^2 crit. if $p=0,05$	4th year law students Intramural, ppl.	χ^2 emp.	χ^2 crit. if $p=0,05$
Yes	18	7.166	5.991	12	9.584	5.991
No	5			6		
Hard to say	13			1		

Discrepancies between the distributions of students' opinions on the need to improve practices of implementation of academic rights, given in [Table 4](#) are statistically significant.

Table 5. Students' suggestions on improvement of the academic rights

Aspects of Improvement	the need to improve			χ^2 emp.	χ^2 crit. if $p=0,05$	Suggestions for improvement
	yes	no	Hard to say			
	4th yr., ppl.	4th yr., ppl.	4th yr., ppl.			
Improving the Federal regulatory framework	8	21	7	10.166	5.991	Update some academic disciplines Increase the number of budget places at universities Expansion of the legislative framework
Improving the internal regulatory documentation of universities	2	27	7	29.166	5.991	Depends on the competence level of the university itself
Improving the competence level of university employees	2	27	7	29.166	5.991	Attracting government employees Not all rights are implemented de facto. Depends on the qualifications and salaries of university employees Increasing the salary of university employees, which will lead to an increase in their competence and quality of work

Informing students	10	18	8	4.666	5.991	Free textbooks for every student Information stands, more awareness activities Creation of more advanced sites and electronic journals More information about the labor market and other special opportunities Lectures, classes on the implementation of academic rights Conduct separate lectures, explaining all the rights of extramural students: timely notification of students about upcoming classes
Increasing the activity of students and student government	8	21	7	10.166	5.991	Depends on the profile of the university and the students themselves Promotion, rewards for participation Depends on the students themselves

The discrepancies between the distributions of students' opinions on the need to improve certain aspects of the implementation of academic rights, given in Table 5, are statistically reliable in all aspects except “informing students”.

Thus, the results of the survey demonstrated a large gap between the knowledge and the implementation of academic rights by students. To improve the current situation, we conducted an exercise to identify trends in the development of higher education and, within the framework of these trends, formulated proposals for improving the practices for the implementation of students' academic rights (Table 6).

Table 6. Possible directions of improvement of the institute of students' academic rights

Identified Trend	Ways to improve the institute of students' academic rights
Growing number of students with an unclear idea of their chosen profession	University should post on its website the statistics of organizations in which the graduates are employed. Provide students with more opportunities to transfer from one educational program to another. On the job practice from the 1st year of study. Creating conditions in higher education institutions for learning according to an individual curriculum, expanding opportunities for students to participate in shaping their own content of education
Growth in the number of graduates who do not find a job in the acquired specialty	
Reduction in the number of manufacturing enterprises	
Increase of information noise	Inclusion in the number of academic rights of students the right to be protected from harmful information, as well as the right for protection from improperly used study time (available in US law, according to this right, teachers cannot waste students' time to provide non-course information, students have the right to know the objectives and course content)

Digitization of all spheres of life	The responsibility of universities should include the creation of convenient digital educational content, and the students' rights should have - the rights of free unlimited use of digital educational content of the university
Growing need to exchange emotions	Inclusion in the number of academic rights of students the right to choose a teacher and the right of students to create educational networks for the development of academic disciplines
The content of education ceases to be a key factor in selection of a higher educational institution (more important is brand, parents' opinion, etc.)	
Growth in interaction of universities with external organizations	Improving the regulatory framework governing the interaction of the university with social partners and the student with external organizations - partners of the university
Increased student involvement in public events of the university	Include in the academic rights of students' the right to alternative mastering of academic disciplines and practices in the form of developing, implementing and defending social projects (including volunteer projects)
Higher cost of higher education	The academic rights of students should include the right to receive educational loans, and to receive clarifications on educational loans and credits
Students' low interest in attending classes	The academic rights of students should include the right to effective teaching (for example, such right is granted to students in the USA)
Growing demand for specialization in several areas	Provide universities with the right to form and implement educational programs with several profiles (similar to some pedagogical institutions; subjects can be from various fields)
Employers' increased requirements for practical training of graduates	
The growing number of people opting out for free education, independent educational trajectory (outside educational organizations)	Expansion of opportunities for training according to an individual curriculum, opportunities to master disciplines in the form of an external subject with the compliance with the required quality of training
The growth of easy-to-understand accessible information, in comparison with which the educational information offered by university teachers is difficult for students to understand	
Growth in the number of organizations offering electronic educational content more accessible and of better quality than in universities	
Increased competition in the educational market	

4. Conclusion

The study showed:

Most students (from 58 to 100 % of some individual rights in 1st year students and from 79 to 100 % in 4th year students) know the academic rights granted to them by the Federal Law.

Knowledge of most academic rights during the period of study at the university does not change. Significant differences in the knowledge of rights by students of the first and graduate years were registered in only 7 out of 28 academic rights. As for the awareness of the other 21 rights, the differences are not significant.

Despite the knowledge of most academic rights, the rights are not sufficiently implemented by students. Only 3-14 % of 1st year students and 5-11 % of 4th year students exercised their academic rights.

The activity of students in the implementation of academic rights from junior to senior courses practically does not change. Significant differences in the implementation of academic rights by students of 1st and graduate years were revealed in only one of the 21 implemented academic rights (the right to participate in research activities). For the implementation of the remaining 20 rights the differences are not significant.

Only a small number of students (up to 22 % of 1st year students and 5-11 % of 4th year students) succeed in implementing of some of their academic rights during the period of study at the university. The only exception is the right to choose an educational organization (53 % of 1st year students successfully implemented it).

The success of implementation of academic rights from junior to senior courses practically does not change either. Significant differences in the successful implementation of rights by students of the 1st and final years were registered in only 3 out of 25 successfully realized rights. For the implementation of the remaining 22 rights, the differences are not significant.

Students of both 1st and the graduate years practically did not encounter difficulties in the implementation of academic rights (apparently, because they did not implement them). The existence of such difficulties and problems was indicated only in relation to the implementation of 4 academic rights out of 28 analyzed.

The need to improve the practice of exercising academic rights was indicated by 50 % of 1st year students and 63 % of 4th year students. The most relevant aspects of improvement, in the opinion of students, are the improvement of their awareness and improvements to the Federal regulatory framework.

The results of the survey showed a large gap between the knowledge and the implementation of academic rights by students. To remedy this situation, a complex of measures is needed: explanatory work (placing information on the university website, conducting explanatory talks, formulating academic rights in a language that is understood by students, etc.), stimulating activity, developing students' subjectivity in the implementation and protection of academic rights (through student self-government bodies, awareness activities), improving the regulatory framework (Federal and university level), high-quality organization of the work of the administrative staff of the university, regular monitoring (for example, conducting research similar to *Scholars at Risk* type ([Scholars at Risk, 2014](#))).

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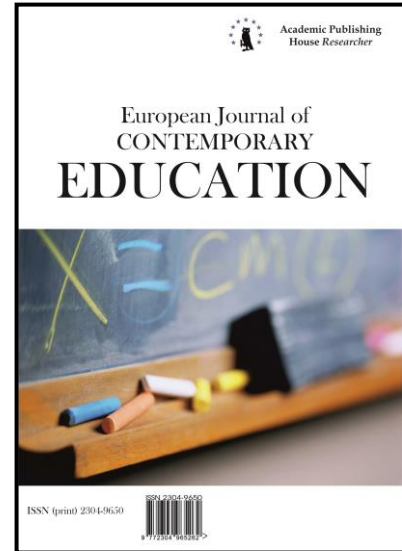
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The Conceptual Approach to the Development of Creative Competencies of Future Teachers in the System of Higher Pedagogical Education in Kazakhstan

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Abstract

The significance of the innovative development of the modern society of the Republic of Kazakhstan (RK) has actualized the need for creative individuals, who determine progress in various spheres of social life. In this regard, the fundamental goal of the modern higher pedagogical school was the development of creative personalities capable of self-actualizing their skills for the benefit of the society. The purpose of the article is the development of conceptual recommendations on the formation and development of creative competence of future teachers as a potential human factor in shaping the value system of the future generation. The criteria for assessing the levels of the formation of creative competence in future teachers in the context of its structural components have been developed. Interviewing helped to analyze the qualitative levels of the formation of creative competence of students of pedagogical universities in Kazakhstan. The article substantiates the main destructive factors of development of students' creativity in the system of higher pedagogical education in modern conditions. The authors developed the structural and logical model for the development of the creativity of future teachers based on the principle of problem education. The authors also developed a diagnostic approach to assessing the effectiveness of the practical implementation of the pedagogical conditions of the creativity model in the educational process of future teachers in higher educational institutions of the Republic of Kazakhstan. The article proves the complex of the actions promoting the evolution of creative competence of students of a pedagogical specialty.

Keywords: creative competence, future teachers, the system of higher pedagogical education, competence approach, creativity, pedagogical conditions, forms and methods of teaching.

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1. Introduction

After the RK signed the Bologna Declaration, the issue of introducing a creative competence approach into the system of higher pedagogical education in 2010 as a new innovative approach to goal-setting in education (Pak et al., 2014). Student creative competence was established as a new target category, which caused the shifts in higher education from the subject-centric orientation of the educational process: transfer of emphasis from content to results, from knowledge to the development of the personality of future teachers (Herppich et al., 2017). In the current conditions of the modern development of the system of higher pedagogical education, the requirements for such qualities of the future teacher have been actualized: how to find non-standard solutions in various situations, openness to learning new experiences, creative attitude to the learning process. The education faced the task of upbringing and training, contributing to the development of the individual, his creativity, adaptation to the ever-changing social environment (Bergsmann et al., 2015). However, in the current conditions of the functioning of the traditional system of training future teachers, the implementation of a competency approach in Kazakhstan is characterized by enhanced substantive training (Rakhmetova et al., 2016). More than 60 % of the student's educational process is devoted to specialized disciplinary training. However, no more than 2 % of the curriculum and hours are spent on psychological and pedagogical training (Uzakbaeva, Zholdasbekova, 2015); moreover, it is carried out outside the context of the vocational training concept. The initial generation of professional experience is minimized: pedagogical practice takes only eight weeks (5 % of study time) from 40 months of study in a higher educational establishment (Uzakbaeva, Zholdasbekova, 2015). This approach creates a threat of a loss of fundamentalism in higher pedagogical education, which involves the cumulative development of the subject and psychological and pedagogical components of it. In such conditions, the quality of the individual and the norms of behavior are adequately formed, corresponding to the creativity and teacher-qualifying profession. In this regard, the purpose of this study was the development of conceptual recommendations that contribute to the formation of pedagogical conditions that ensure the sustainable development of creative competence of future teachers in higher educational establishments of the Republic of Kazakhstan. The research solves the following scientific objectives: assessment and analysis of the level of the formation of creative competence in future teachers in the system of higher pedagogical education of the Republic of Kazakhstan; argumentation of the primary destructive factors of the development of the creativity of pedagogical students; development of a structural and logical model for the development of the creativity of future teachers; substantiation of principal directions of the integrated approach to providing pedagogical conditions for the development of creative competence of students in pedagogical higher educational establishments of the Republic of Kazakhstan.

2. Materials and methods

The methodological basis of the study is interviewing, an expert assessment, and a pedagogical experiment.

The interviewing is an expert method that was used to assess the level of creativity of students – future teachers of physics and consisted of blocks of questions (tasks) that characterize the motivational, cognitive and activity components of creativity. The use of interviewing as a method of research is due to the fact that this method allows for describing the personal attitude of the respondents to the problem in question, quantitatively measure the non-formalized phenomena, which is creativity, for further analysis and development of a model for its development (Shapiro, 2017).

One of the most critical tasks of interviewing is to ensure the sufficiency of a sample set, which is determined by the following formula (Reid, 2015):

$$S = \frac{D(\alpha)^2 \cdot v \cdot (1 - v)}{\varepsilon^2}, \quad (1)$$

where S is the sample's size;

$D(\alpha)$ is the standard deviation determined by the level of confidence (α);

v is the sample's deviation;

ε is the acceptable error level.

Expert assessment was used to theoretically justify the components of creativity and their characteristics. Its results are evaluated by the level of expert competence expressed with the following coefficient (Rousseau et al., 2018):

$$K_i = \frac{\sum_{j=1}^m e_{ij}}{m}, \quad (2)$$

where K_i is the competence coefficient of the i -th expert;

e_{ij} is expert evaluations corresponding to value 0 if the expert considers another one incompetent and does not deem it appropriate to include them in the expert group, and to value 1 if the expert has expressed the need to include another expert in the group;

m is the number of experts.

Levels of motivational, cognitive and pragmatist components of creativity of future students are determined by the results of a интервьюирование (by summing the number of points on blocks) using the Fibonacci rule (Ruiz, Luca, 2017):

$$\begin{cases} e_1 = e_{min} + 0.38(e_{max} - e_{min}) \\ e_2 = e_{min} + 0.62(e_{max} - e_{min}) \end{cases} \quad (3)$$

Where e_{min} is the minimum possible number of points for each block of creativity assessment of students;

e_{max} is the maximum possible score for blocks;

$[e_{min}; e_1]$ is the interval of low values of the creativity index;

$(e_1; e_2]$ is the interval of medium values of the creativity index;

$(e_2; e_{max}]$ is the interval of high values of the creativity index.

In order to assess the effectiveness of the introduction of the proposed model for the formation of students' creativity into the educational process, the pedagogical experiment used the method of purposeful reproduction of the elements of the educational process and its evaluation (Li et al., 2018). This method allows for determining the nature of the impact of the proposed model on the level of creativity of students, quantify the change in the level of motivational, cognitive, and pragmatist component of students' creativity as a result of using the model. The effectiveness evaluation was carried out based on comparing a part of students with high, medium, low creativity in the control and experimental groups. The hypothesis about the effectiveness of the proposed model of creativity formation is confirmed if, according to the results of the experiment, an excess of a part of students with a high and medium level of competence in the experimental group is revealed in comparison with the control group.

The statistical significance of differences between the level of creativity in the control and experimental groups of students is checked with Student's t-test. The empirical value of the criterion, calculated by Equation (4), exceeding the tabulated one indicates statistical significance of the differences; the exceeding tabular value indicates insignificance (Rousseau et al., 2018).

$$t = \frac{M_1 - M_2}{\sqrt{m_1^2 + m_2^2}}, \quad (4)$$

where M_1 is the arithmetic mean estimate of the level of creativity in the experimental group;

M_2 is the arithmetic mean estimate of the level of creativity in the control group;

m_1 is the experimental group mean error;

m_2 is the control group mean error.

3. Literature review

From the perspective of the competence approach, the level of education is determined by the ability to solve problems of varying complexity based on the available knowledge and focuses on the ability to use the knowledge gained (Bergsmann et al., 2015).

The concept of "competence" reflects the essential quality of the individual, the general ability and readiness of her to activities based on knowledge and experience acquired in the process of education and socialization, focused on independent and successful participation in activities (Herppich et al., 2017). The authors believe that the competence of the future teacher should be considered in a broader sense than the competence of any other professional activity. Based on the

theoretical analysis in the pedagogical literature of the concept of the competence of the future teacher, it is possible to single out the main structure-forming components:

- exclusive and professional competence in the field of the subject to be taught;
- methodical competence in the ways of formation of knowledge and abilities of students;
- socio-psychological competence in the sphere of communication;
- differential psychological competence in motives, abilities,
- and orientation of the students;
- experimental and research competence is carried out in the study of educational disciplines, assignments of pedagogical practice, and writing diploma theses;
- autopsychological competence of analyzing the advantages and disadvantages of one's activity and personality (Blaskova et al., 2015; Herppich et al., 2017).

The experimental-research competence contains the following components: 1) Professional, large component: a) knowledge of the essence and technology of the primary research methods; b) research skills and abilities; c) the general level of creativity. 2) Professional-pragmatist component: a) a vision of the problem; b) the formulation of questions; c) the hypothesis; d) mastering the skills of setting and conducting experiments; e) ability to structure the material; f) proof and protection of one's ideas. 3) Professional-personal component: a) motivation and cognitive activity; b) independence in the process of cognition, decision-making and evaluation; c) value orientations; d) manifestation of creativity in a problem situation. Research activities (RA) is a practical and useful condition for the development of creative abilities of students. It aims to create conditions for the comprehensive development and realization of the creative and scientific potential of higher educational establishment students. The basis of the research activity of the future teachers of physics is: possession of the logic of the research process, technology of search and creative activity (forecast of results, problem solving plan, choice of appropriate methods, analysis of results); the ability to prepare and conduct an experiment, evaluate the results of own activities, determine the ways and ways of their correction, mastering the technology of design and presentation of research results. Lessons with elements of research activity are of great interest to students, and this in their turn motivates the learning process.

The fundamental meaning of the concept of artistic creativity is the concept of "creativity."

The modern pedagogical literature there is a stable tradition of understanding creativity as personal integral qualities of individuals to form original values, develop approaches to non-standard solutions, go beyond the generally accepted (Hughes et al., 2018). Numerous scientists synonymize "creativity" and "imagination" as sources of inspiration as a result of human mental associations (Mynbaeva, Galimova, 2015; Pavlenko, 2016; Dubrovskaya, 2017). The authors believe that such an approach is debatable since imagination determines the activity for the process. Creativity is a process of creative activity aimed at creating a qualitatively new product (cultural and material values), searching for a non-standard solution to the problem. However, this term does not provide for the mandatory availability of the result of activities (Kalyuzhnaya, 2015; Anikina, 2016). At that, creativity is the process aimed at the result (Eremina, 2014; Mynbaeva, Galimova, 2015). The result of the activity is a necessary and most important component of the creative process. That is, creativity is a result-oriented process with the goal of creating an end product (Eremina, 2014; Shamaeva, 2014; Mynbaeva, Galimova, 2015). Therefore, creativity can be understood as the ability to create, the ability to create creative results, the ability to the original vision of the problem and situation. The lack of creativity, that is, the competency formed at an insufficient level, causes destructive manifestations of the individual's thinking and, as a consequence, leads to a decrease in creativity. In turn, the identification in the personality of such a phenomenon as creativity leads to the development of its creative potential, the appearance of a perspective for the realization of competencies obtained in the process of education.

In general, it should be noted that there are three approaches to the essence of creativity. The first group of authors distinguish the cognitive nature of creativity as the intellectual ability of an individual to form structural links between different ideas (divergent thinking) (T. Simon, C. Spearman, J. Guilford, F. Galton, E. Torrens) (An et al., 2016; Huang et al., 2017; Hass, 2017).

The point of view of the second group of scientists is positioned on the personal basis of creativity on opportunities, personal potential, self-actualization of the individual. They see it as a specific ability of the individual, due to the presence and combination of various personal qualities.

(W. Duff, E. Toulouse, A. Maslow, C. Rogers, V. Antonishin) (Lai et al., 2018; Neubauer, Martskvishvili, 2018).

The third group consists of definitions in which researchers rely on the social nature of creativity, taking into account the influence of environmental factors on the formation, development, and identification of creativity. They consider creativity as the ability to create an original, unusual product that meets the needs of the surrounding reality (F. Barron, D. McKinnon, R. Sternberg) (Rubenstein et al., 2018).

When it comes to analysis of the approaches, available in the scientific literature, to understand the essence of the creativity of the individual, it can be argued that creativity is not knowledge gained or scientific activity, but a specific skill that can be improved through various methods. It is a stable ability to produce innovation without regard to time, age, image, manner, path, technology, preferences, circumstances, and limitations. It should be noted that understanding this phenomenon as a person's ability to create something new and unique. These new formations occur on the basis and with the adoption of the created by others. This ability assumes a long process of purposeful training, education, and development, as a result of which the individual finds the opportunity to generate original ideas. In other words, creativity develops and is acquired throughout the entire educational process, formed due to the influence of the social environment, the individual's value orientations, the requirements imposed on the individual, the organization of the information flow and the target orientation of all activities.

Based on the foregoing, it can be stated that creativity should be viewed from the point of view of system-content analysis as an integrated category: personal ability and result of personality, social neoplasm - the result of purposeful activity of the individual taking into account the influence of the social environment; the result of human's creative inspiration. Creativity is inextricably linked with intellectual, emotional, reflexive, volitional, motivational and activity spheres of personality.

Thus, within the framework of this research, the creative competence of the future teacher implies the essential dynamic ability of the individual to develop creative abilities on a professional basis among those who will be taught and to the constant self-development of personal creative abilities.

4. Results

Within the framework of this study, interviewing was conducted in the universities of the Republic of Kazakhstan by future teachers of physics in order to determine the level of the formation of creative competence of students. The respondents were 350 students of 1-4 years studying at the specialties 5B011000, 5B060400 "Physics" at the Faculty of Natural Science of Akhmet Yassawi International Kazakh-Turkish University, the Physics and Mathematics Faculty of Auezov South Kazakhstan State University, Natural-mathematical faculty of Korkyt Ata Kyzylorda State University.

In order to ensure the representativeness of the interviewing results, the population of the sample, calculated by the formula 1, should not be less than 273 people (with the volume of the general population – the number of students in the specialty 5B011000, 5B060400 "Physics," more than 100 people.). The survey involved students from versatile and pedagogical universities in Turkestan, Shymkent, Kyzylorda.

Exceeding the minimum threshold for the sufficiency of the sample, the professional orientation, the coverage of all courses of study at the undergraduate level, profile and geographical diversification attest to the representativeness of the interviewing results to determine the level of competence of students-future physics teachers in the Republic of Kazakhstan.

The interviewing was conducted through a computer survey.

The creativity of students was diagnosed by its three components: motivational, cognitive and pragmatist. In order to determine the level of creativity of students for each component, development levels are allocated: low, medium, and high.

The method of common assessments is used to determine the components of creativity and the characteristics of their development levels. The composition of the expert group of 10 people included specialists from the Kazakhstan representative office of the International Association of the Triple Spiral, a non-governmental non-profit organization (KROIATS), whose mission is to develop a creative cluster in the RK, to increase innovation activity (Triple Helix, 2018); governing

bodies of the participants of the Autonomous Cluster Fund, whose purpose is to support the innovation activities of its participants and the development of innovative activities in the country (Techgarden, 2018); teachers of psychology and sociology, physics of Yassawi International Kazakh-Turkish University, Auezov South Kazakhstan University, Korkyt Ata Kyzylorda State University based on which the survey was conducted.

The inclusion of experts from KROIATS and the Autonomous Cluster Fund into the expert group made it possible to study the applied aspect of creativity, and teachers – the psychological and social aspect of the creative competence of future teachers of atomic physics. The expert group consisted of international experts involved in the development of creativity in students, as well as academic teaching staff members of universities of the Republic of Kazakhstan with more than 10 years of experience, which indicates a high level of expert competence. Additionally, to confirm the competence of experts, the competence coefficient was calculated (Equation 2), the value of which is at least equal to 0.8 for all experts, with a minimum acceptable level of 0.5.

Participatory expert assessment was carried out remotely (via the Internet) in several steps until a consistency of expert opinions was achieved: complete concordance of 8 out of 10 experts, in the absence of fundamental objections from the other 2 experts.

The high competence of experts in the problem under study and the consistency of their opinions indicate the importance of the evaluation results, which resulted in the formation of 3 components of student creativity (motivational, cognitive, activity) and determined the levels of development of these components (low, medium, high) (Table 1).

Table 1. Qualitative levels of assessment of the creative competence of future teachers concerning its components

Creative component	Development level	Level characteristics
Motivational	Low	Lack of interest and motivation for creative activity; lack of emotional satisfaction with creative work
	Medium	Episodic interest in the creative activity and unstable motivation; changeable emotional satisfaction with creative work
	High	Constant interest and high level of motivation for creative activity; high level of emotional satisfaction with creative work
Cognitive	Low	Low level of knowledge; lack of ability to identify the problem; inability to systematize and process information on the subject area quickly and qualitatively
	Medium	Not always a high level of knowledge; there are problems with the formulation of the problem, the systematization, and processing of information
	High	High level of knowledge; the ability to identify and formulate the problem, identify tasks that are needed to solve it; ability to process information about the problem without problems; high speed in performing tasks
Pragmatist	Low	Student's solution of stereotypical tasks; the ability to use only standard algorithms in solving problems; standard thinking
	Medium	The solution of stereotyped and diagnostic tasks; the ability to generate single ideas about the solutions to the problem
	High	The solution of heuristic tasks; the ability to generate a large number of ideas; multivariance in solving problems; quickness, originality of thinking

The motivational component of creativity was diagnosed by the level of emotional involvement and satisfaction with creative activity, the level of motivation. At a low level of

development of the motivational component, there is no interest and motivation for the creative activity. There is no emotional satisfaction with creative work. At the medium level, there is an indirect interest in the creative activity and inconstant motivation, changeable emotional satisfaction with creative work. At a high level, there is a constant interest and a high level of motivation for the creative activity, a high level of emotional satisfaction.

The cognitive component of creative competence reflects the availability of knowledge that contributes to the generation of ideas, the ability to formulate a problem, generalize and systematize information on this issue by future teachers. The low level of development of the cognitive component corresponds to the absence of systematized knowledge, the lack of ability to identify the problem, the inability to systematize and process information quickly and qualitatively and to determine the ways to solve it. The medium level corresponds to the presence of problems with the level of knowledge, the ability to formulate the problem; high - a high level of knowledge, the ability to quickly and efficiently process information on the subject area, identify the problem, formulate tasks aimed at solving the problem.

The pragmatist component determines the possibility of using creative competence to perform tasks on the chosen subject area and includes the ability to generate ideas, solve non-standard problems, and obtain a result. The low level of development of the activity component implies the standard of thinking, the ability to use standard algorithms for solving stereotyped problems; middle level - the solution of stereotyped and diagnostic problems; high level - the solution of heuristic tasks that require the generation of a large number of ideas, multivariance in solving problems, speed and originality of thinking.

A written survey was used to assess the level of development of the motivational, cognitive, and pragmatist components of the creative competence of future teachers.

The motivational component was assessed on issues relating to the personal attitude of students towards the creative activity:

1. How do you assess the level of your motivation for creative work?
 - a) High motivation;
 - b) Inconsistent motivation;
 - c) No motivation.
2. How do you assess personal interest in creative activity?
 - a) High interest;
 - b) Episodic interest;
 - c) No interest.
3. Do you get emotional satisfaction with creative work?
 - a) Yes;
 - b) Partially;
 - c) No.

Answers a) are estimated at "3" points, b) - at "2" points; c) - at "1" point. The minimum sum of points for the block of questions is 3, and the maximum is 9.

The cognitive component was evaluated on the basis of knowledge of basic concepts and formulas in atomic physics, such as "photon", "wavelength", "pulse", "energy", "Thomson atom model", "nuclear model of Rutherford atom", "parameter", "Rutherford scattering", "impulse diagram", "differential scattering cross section", "Bohr postulates", "Compton effect", "physical quantity operator", "Heisenberg uncertainty principle", "Bohr formula for the energy of a hydrogen-like atom", "The Balmer-Bohr formula for the one-electron atom", "Einstein equation for the external photo effect", "kinetic energy of formula relativistic particles". Each correct answer was estimated at 0.5 points. The minimum number of points to measure students' knowledge is "0," and the maximum is "9".

Students are asked to solve three tasks of different levels of complexity to evaluate the activity component:

Task 1 (stereotypical). Determine the speed β of the particle relative to the core, if the speed of the core is $0.9 \cdot 10^8$ m/s, and the speed β of the particle is $1.2 \cdot 10^8$ m/s.

Task 2 (diagnostic). The beam $\forall \alpha$ of particles with a kinetic energy of 1.4 MeV was dispersed when passing through a gold foil three μm thick. Determine the probability that the dispersion angle range will be $70^\circ - 90^\circ$.

Task 3 (heuristic). The binding energy of an electron at rest in an atom is 69.3 keV. What should be the impulse for a photon with a wavelength of 15 pm to snatch an electron from the atom that flew at an angle of 80° to the direction of the flying photon?

Correctly solved tasks with explanations, proof of their point of view and justification of the conclusions were evaluated at "1" points (for the stereotypical task), "3" points (for the diagnostic task), "5" points (for the heuristic task). The minimum score for the tasks is "0", the maximum score is "9" points.

The quantitative expression of levels of development of creativity is determined by the Fibonacci rule (formula 3), proceeding from the minimum and the maximum possible number of points for each block of questions. Quantitative criteria for determining the low level of development of the motivational component (3-5), medium - (6-7), high - (8-9]. According to the calculated values, the high level of the motivational component of creativity is determined if the student's motivation, interest in the creative activity, emotional satisfaction are at the highest level, or when one of these indicators is medium, and the other two are high. At the medium level, or all indicators are at the medium level, or 2 indicators – on medium and 1 – at a high level of development of the motivational component of the creative activity. At a low level, all indicators are at low or low and partly on medium (1 or 2 indicators).

According to the cognitive and pragmatist component, the low level corresponds to scores (0-3), medium (3-6), high (6-9). Low level of knowledge in the students who correctly answered less than 34 % of the answers, the medium – 34-67 %, high – over 67 % of the correct answers. The pragmatist component is at a low level if the correctly solved stereotype task is half diagnostic, on the medium – if the correctly solved stereotyped problem and more than half are diagnostic, at high – if the maximal score is solved stereotype and diagnostic problem and more than half – heuristic.

The results of the assessment of the level of creativity of future teachers of atomic physics in the RK are shown in Figure 1.

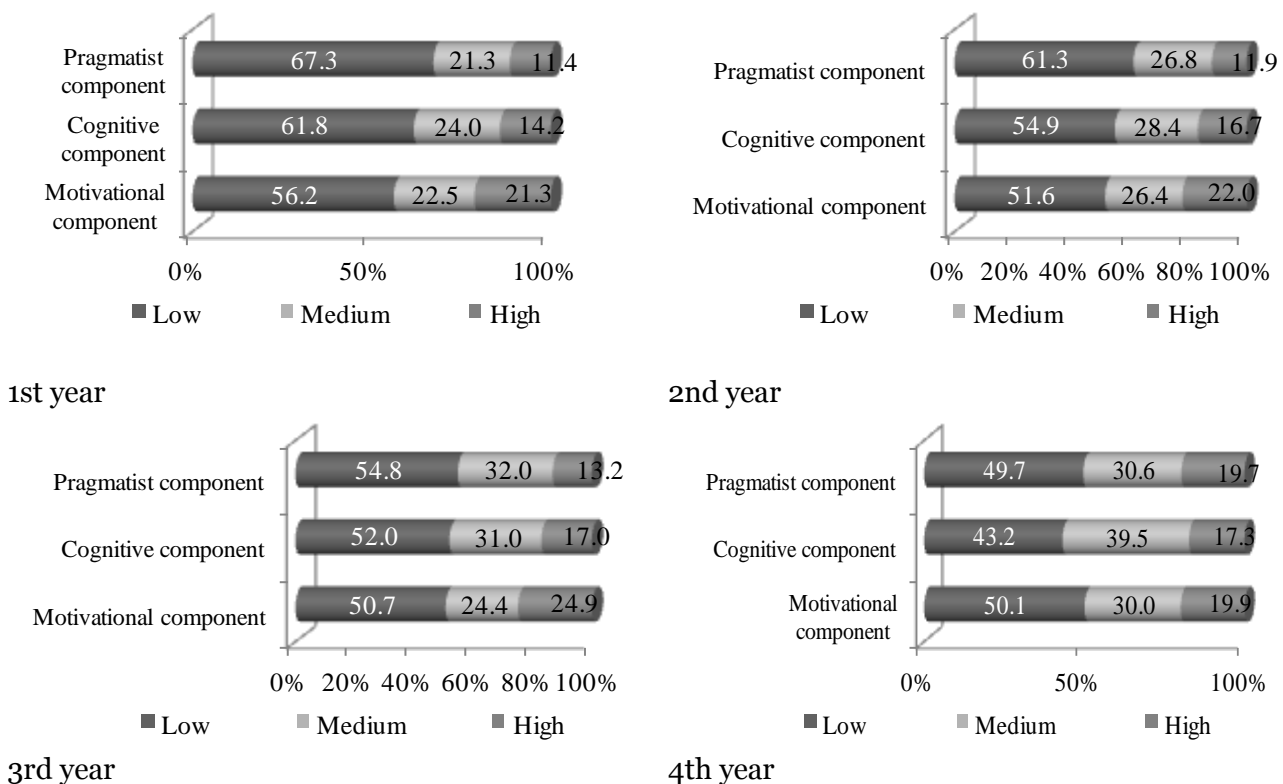


Fig. 1. Assessment of the formation of creative competence of future teachers of atomic physics in higher educational establishments of the Republic of Kazakhstan

According to the interviewing results, the following conclusions can be drawn. The first year students mainly demonstrate a low level of creative competence - the average number was 61.8 %. Only 22.6 % of the total number of students have a medium level of creativity and 15.6% – high. The highest number of future teachers in atomic physics is characterized by the lack of a pragmatist component of creativity – 67.3 %.

The second-year students show 55.9 % with a low level of creative competence; 27.2 % – with the medium; 16.9% – with high. The third-year students show that 52.5 % of future teachers have a low level of creativity; 24.1% – medium and 18.4 % – high. Diagnosis of creativity in the fourth year witnessed a steady trend of decreasing the number of students with a low level of creative competence: 47.7 %. The number of students with the medium level increased to 33.4 %, from high to 18.9 %.

The approaches explain the current situation to education in higher educational establishments. The higher school, when preparing future teachers in the Republic of Kazakhstan, in the process of learning the development of creativity, it is not given sufficient attention either from the point of view of the selected tasks, either from the point of view of their performance or from the point of view of organizing the educational activity. The realization of the competence approach is characterized by the intensified subject preparation of future teachers. This approach creates a threat of a loss of fundamentalism in higher pedagogical education, which involves the cumulative development of the subject and psychological and pedagogical components of it. In such conditions, the quality of the person and the norms of behavior are adequately formed, corresponding to creativity, which meets the requirements of the teacher's profession.

The reason for the formation of a non-creative style of thinking is also the fact that the traditional system of pedagogical education in the Republic of Kazakhstan is primarily the transfer of information from the teacher to the student, which, as a rule, is provided with the necessary answers without formulated questions (Uzakbaeva, Zholdasbekova, 2015). Practical training material, as a rule, has the only correct solution (Kukeyeva et al., 2014). As a result of such training, a person develops a type of thinking based on previously formed knowledge and operations. While the originality and independence of thinking, the flight of fantasy and ideas, etc. can develop if there is an opportunity to train on tasks and tasks of an "open type," providing for independence in choosing the method of solution. That is, the higher school crystallizes the formal type of training, the result of which is the formation of formal knowledge of future teachers.

The value orientation of future teachers in Kazakhstan's higher school is shaped by the attitude toward "result," which in turn negatively affects the students' quest for research (Rakhmetova et al., 2016). Since modern teachers are encouraging more and more comfortable qualities of students such as conflictlessness, conformity, diligence, etc., but not the real aspiration of the individual to cognition. The current situation threatens creatively gifted individuals, suppressing in them the possibilities of expressing creative potential, in conditions of inadequate evaluation of their successes.

The problem is that the experience of the traditional system of education in higher education (to adapt to the existing structure, rather than create something new) is subsequently projected and produced by future teachers in their professional activities. Evidence of the negative consequences of poor-quality teacher training in Kazakhstan can be evidenced by data on pupils' progress in schools and the level of innovative activity in the country. Upon completion of the primary school, according to official data, more than 80 % of students have a qualitative level of academic achievement "excellent" and "good" (Information and Analytical..., 2018). In the future, their specific weight decreases every year, and at the end of the school their number is less than 10 %, and at the completion of a higher education institution – 0.1 % (Information and Analytical..., 2018). Not the development of creative competence in the system of higher and secondary education forms the risk of reducing the potential of innovative activity in the country as a factor of economic progress. Even though Kazakhstan has improved its position in the world rating on creativity for the last six years by 16 points, nevertheless, out of 126 countries the world, the republic took only 100 places in 2018 (The Global Innovation..., 2018).

Two components provide creation of creativity in students. Subjective component is conditioned by the personal qualities of students (independence, determination, self-confidence, risk appetite, level of development of the imagination). Objective component is the pedagogical conditions in which the creativity of students is formed.

It is advisable to use "active" forms of training to achieve maximum effect in the formation of students' creativity: problem lecture, business game, project method on all types of classroom and after-class work: lecture, practical, laboratory classes and in the independent work of students (Btemirova, 2016; Lovcheva, 2016; Molodtsova et al., 2017).

The problematic lectures provide for the presentation of material that includes the most pressing problems of the discipline under study and requires independent research and development activities of students. Such lectures have a differentiated approach to learning – with the separation of formal groups according to the levels of possible activity and which consists of the stages of the problem posing, its analysis and the participation of students in its solution (Molodtsova et al., 2017).

The business game is used in practical and laboratory classes to consolidate the knowledge gained in lecture classes and independent work. The use of business games develops the ability of students to critical thinking and conducting a well-grounded discussion on a given topic with the necessary arguments in favor of their scientific position (Lovcheva, 2016).

Another form of training that promotes the development of artistic qualities is the method of projects. This method involves solving progressively more complicated practical tasks requiring integrated knowledge, research solutions, the need for independent work (Btemirova, 2016).

When implementing these forms of activating student search and research activities and developing their creative qualities, methods such as Brainstorm, Omega-Mapping, Matrix of Possibilities, etc. were used, which allow for generating many ideas and finding a non-standard, excellent solution to the problem.

Within the framework of the research a structural-logical model "Development of Creative Activity" for future teachers was developed (Figure 2).

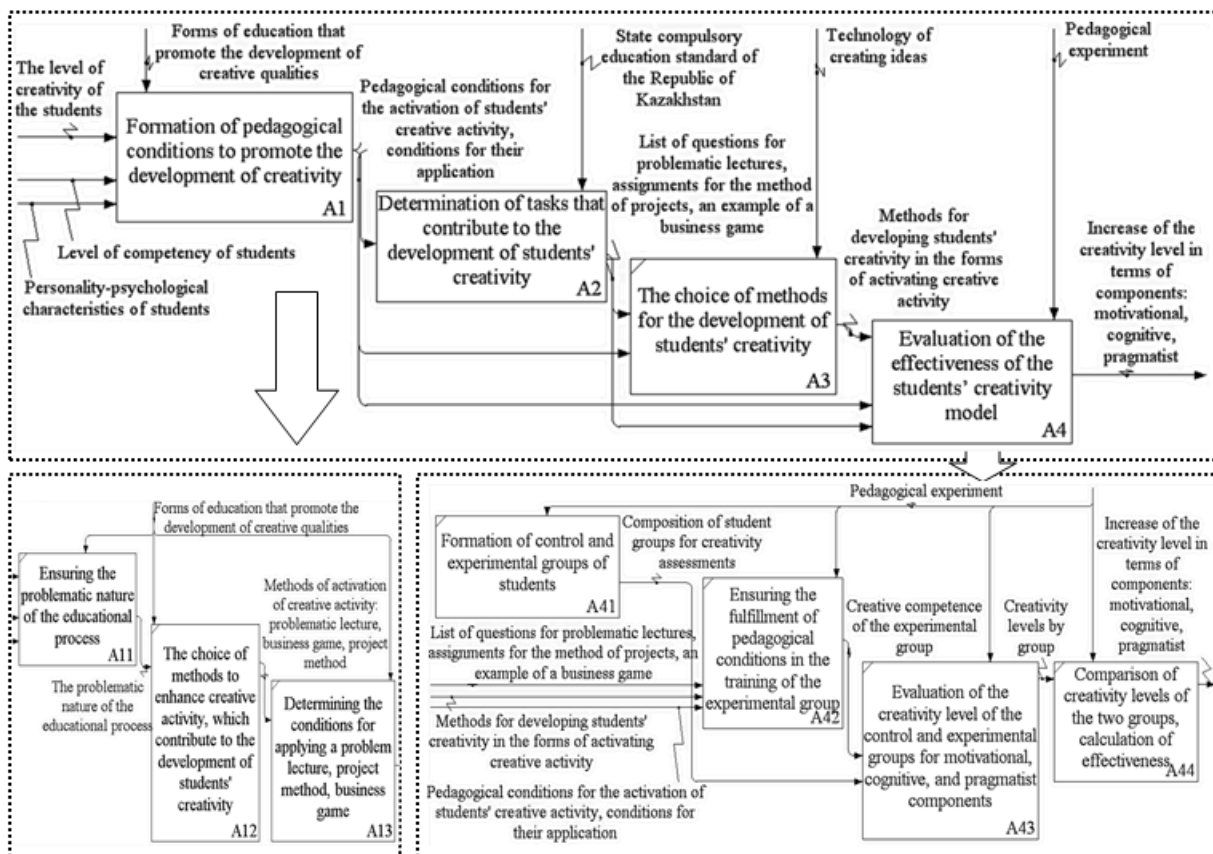


Fig. 2. Structural-logical model "Development of Creative Activity" for future teachers

As an example, a topic from the section of atomic physics "Electronic shell of an atom and Bohr's theory" was chosen as an example for demonstrating the model of creativity formation of students of pedagogical universities in the specialty "Physics."

Creation of students' creativity is proposed to be implemented using the forms mentioned above of activating search and research activities: problem lectures, business games, and project methods.

The following problem questions are raised to develop the creative abilities of students on the chosen topic, requiring the use of non-standard solutions using essential competencies in the field of atomic physics, mechanics, thermodynamics, electrodynamics.

The questions of the problematic lectures:

1. Explain the origin of the main regularities of the emission (absorption) spectrum of ions containing one electron in the electron shell.
2. Find the contradictions of the Bohr's postulates in classical physics.
3. Prove the inconsistency inherent in the Bohr's theory, and the reasons for its occurrence.
4. Determine the possibility of the existence of a static and planetary dynamic model of an atom from classical electrodynamics.
5. Determine the possibility of applying the conclusions of the Bohr's theory for the hydrogen atom, ions containing one electron in the electron shell, and also more complex atoms.

An example of a business game used in the study of the electron shell of an atom and the Bohr's theory.

The topic of the business game: "Contradictions of the Bohr's theory." The rules of the business game provide for the formation of 3 groups of students, each given his task. The task of the first group is to evaluate the scientific and practical significance of Bohr's postulates for atomic physics and physics in general. The task of the second group is to find the contradictions between Bohr's theory and the postulates of classical physics, to reveal inconsistencies in Bohr's theory itself. After the heard arguments of the first and the second groups, there is a scientific discussion, according to which the third group summarizes the contribution of Bohr's theory to the development of atomic physics and physics in general.

Organizational arrangements for the formation of groups and the assignment of tasks are allotted 5-10 minutes; for preparation for the performance of groups – 20-25 min. (5 minutes for generating ideas and 15-20 minutes for their justification); on the performance of the first and the second groups – 10 min each; on the rethinking of the arguments of the participants, the search for counterarguments, scientific discussion – 20 minutes; on the performance of the 3rd group – 10 min, for resuming the results of the game by the teacher – 10 min.

Tasks for use in practical classes when implementing the project method:

1. Two hydrogen atoms are in the ground state. What is the minimum speed that must be given to one of them so that as a result of a collision with another atom, one of them emits a photon? What is the energy of the moving atom? The collision is frontal inelastic.
2. What minimum energy should a photon have, so that when an ion falls onto a singly ionized hydrogen atom, the electron disconnects? Moreover, to make the kinetic energy of a detached electron is 2 eV?
3. Explain what kind of Bohr formula is used to determine the energy of a hydrogen-like atom, if the nucleus of an atom is immobile?
4. What are the speed of motion and the energy of the electron in the first orbit of the helium ion at $n=2$?
5. What is the velocity of the electron in the second and the third orbit of the ionized lithium atom?

The use of problematic lectures on this topic will contribute to the consolidation of theoretical knowledge on the structure of the shell of the atom, as well as on the postulates of Bohr. It will ensure the development of creative thinking aimed at solving non-standard tasks by identifying the laws governing the development of scientific theories and expanding the scope of their application, searching for inconsistencies in Bohr's postulates with classical physics. The use of business games will promote the development of communicative competencies, the skills of reasoning their point of view and making a decision; method of projects - the development of integrative and creative competencies in solving problems. Thus, the problematic lecture contributes to the development of the cognitive component of creativity, the method of projects contributes to the development of the pragmatist component, and the business game contributes to the development of motivational and cognitive components.

The most effective is the application of Brainstorming, Omega-Mapping and the Matrix of Possibilities to solve these problems (Al-Samarraie, Hurmuzan, 2018; Steele et al., 2018). These

methods allow, on the one hand, to systematize knowledge on formalized tasks, which are physics tasks, and, on the other hand, to develop creative, critical thinking necessary for performing heuristic tasks in physics.

The method of brainstorming is a method of group generation of ideas. It is applied during the business game when each participant in the discussion for 5 minutes expresses (writes down) as much as possible of variants of the decision of a task in view. After the ideas are generated, they are processed: they get scientific reasoning using examples that support this or that point of view. The method of brainstorming is applied at the stages of preparation for the performance and search for counterarguments.

The application of the omega-mapping method allows us to find non-standard solutions for the given initial conditions and the final result. This method is most suitable for implementing such a form of activating student search and research activities and developing their creative qualities, as a method of projects, when the condition of the problem (initial conditions) exists and the goal set is to find the unknown (final result). The application of the omega-mapping method involves the implementation of 2 stages: fixing the initial conditions of the problem and the choice of the main idea, which will lead to the final result. It is possible to use an omega-card, which consists of 2 poles (the initial condition and the final result) and branched branches that eventually connect these poles to visualize the solution of the problem. Branches are corresponding to the variants of the solution of the problem, the properties of individual bodies and phenomena described in the problem, formulas, postulates of theories (for example, the properties of an atom, an electron, a photon, Bohr's formula, kinetic energy, etc.).

The matrix of possibilities is used to solve the problems of a problem lecture. It is a matrix in which the properties, principles, laws of the process or phenomenon under study are reflected and by various combinations of elements of this matrix, there is a creative solution of the studied problem.

5. Discussion

Thus, the study revealed that during the education in the higher education system, future teachers are characterized by an increase in the level of the formation of creative competence in the context of traditional education. The number of students with a low level of creativity in the fourth year decreased by 14.1 % compared to 1 course, with the medium level increased by 10.8 %, and with high level – by 3.3 %. Nevertheless, the majority of students have a low level of the formation of creative competence during the four years of studying at a higher educational establishment. At the same time, the most significant number of students in the 1-3 years have a low level of development of the pragmatist component of creativity. The fourth year at a higher educational establishment features the prevalence of future teachers (50.1 %) with a problem with the motivational component. In general, according to the results of the study, more than half of the future teachers of Kazakhstan are characterized by a low level of the formation of creative competence in all its three components.

The developed structural-logical model "Development of Creative Activity" is aimed at the formation of special pedagogical conditions for the development of the creative skills of future teachers. It consists of four blocks forming the educational process of future teachers within the framework of the competence approach. Block A1 consists of the selection of priority "active" forms of students' education, ensuring the development of the need for creativity, creative consciousness and the ability to manage the creative process. Block A2 contains directly the need to develop creative tasks aimed at obtaining variational and non-standard solutions, independence of thinking of future teachers. Such exercises should be the basis for the formation of positive motives for learning and personal self-improvement of the student. Block A3 reflects effective teaching methods in the framework of "active" forms of the educational process: Brainstorming, Omega-mapping, Matrix, and others, providing development of decision-making and systemic thinking skills.

Let us note that the professional activity of the teacher implies a constant analysis of the situations that arise in the educational process. The last block of the model, A4, provides diagnostics of the level of the formation of creative competence among students. Block A4 can be performed out with the periodicity necessary for the definition of the expediency of introduction of the model of increase of creativity. As a diagnostic tool, it can serve as a basis for increasing the practical effectiveness of the entire model in the educational process of future teachers.

The effectiveness of using the methodology for increasing the creativity of future physics teachers was demonstrated through a pedagogical experiment that was conducted on 3rd-year students of the specialty "Physics" at the Faculty of Natural Science of Akhmet Yassawi International Kazakh-Turkish University, the Physics and Mathematics Faculty of Auezov South Kazakhstan State University, Natural-mathematical faculty of Korkyt Ata Kyzylorda State University, in the study course "Physics of atoms and atomic nuclei." The procedure of the pedagogical experiment provided for the formation of 2 samples: experimental (E) and control (C). The control sample studies according to the work program, and the experimental sample studies using the proposed methodology for increasing the level of students' creativity. In order to ensure an initially equal level of creativity and competence in the experimental (E) and control (C) groups, the entire aggregate of students for whom the discipline "Physics of atoms and atomic nuclei" is taught was divided according to the level of academic achievement into 3 groups: with a high level of academic performance, medium and low. Then a random and proportionate selection is made from each group for the experimental and control groups. This approach to the formation of groups ensures the equivalence of 2 samples and the adequacy of the results of the experiment.

Questions to check the level of creativity of students after studying the topic "The electronic shell of the atom and the theory of Bohr" are formed in a similar way as for carrying out interviewing to determine the level of development of the motivational, cognitive, pragmatist component of the creativity of students – future teachers of atomic physics in the RK, but also considering the topic of the lesson.

The results of the evaluation of the creativity of the experimental and control groups are given in [Table 2](#).

Table 2. Results of evaluating the effectiveness of practical implementation of the "Development of Creative Activity" model for the future teachers in the universities of the Republic of Kazakhstan in the educational process

Creative component	Yassawi International Kazakh-Turkish University			Auezov South Kazakhstan State University			Korkyt Ata Kyzylorda State University		
	C	E	Δ, p.p.	C	E	Δ, p.p.	C	E	Δ, p.p.
Part of students with a high level of creativity, %									
Motivational	22.6	26.3	3.7	25.6	30.1	4.5	21.7	24.9	3.2
Cognitive	17.5	21.6	4.1	18.2	22.1	3.9	16.5	20.6	4.1
Pragmatist	13.3	17.2	3.9	14.8	18.3	3.5	11.3	14.9	3.6
Part of students with a medium level of creativity, %									
Motivational	23.8	27.9	4.1	25.1	29.4	4.3	21.2	25.9	4.7
Cognitive	31.1	37.8	6.7	31.5	38.1	6.6	29.6	35.7	6.1
Pragmatist	30.1	35.2	5.1	32.4	37.9	5.5	29.4	37.1	7.7
Part of students with a low level of creativity, %									
Motivational	53.6	45.8	-7.8	49.3	40.5	-8.8	57.1	49.2	-7.9
Cognitive	51.4	40.6	-10.8	50.3	39.8	-10.5	53.9	43.7	-10.2
Pragmatist	56.6	47.6	-9	52.8	43.8	-9	59.3	48	-11.3
C – control group; E – experimental group; Δ is the deviation of the experimental group from the control group, expressed in percentage points									

As a result of testing the development model of creativity of future physics teachers, it is determined that after the introduction of the model, a part of students with a high level of creativity in the studied universities will, on average, increase by 3.8 pp by motivational component, by 4.2 pp – by cognitive and by 4 pp – by the pragmatist.

Some students with a medium level of creativity development will increase by 4.5 pp on the motivational component, 6.5 on the cognitive component, six on the pragmatist component. The percentage of students with a low level of creativity will decrease by 8.3 pp, 10.8 pp, 10 pp. on motivational, cognitive and pragmatist components, respectively.

The statistical significance of differences in the level of creativity in the control and experimental groups was tested using Student's t-test (Equation 4). When the tabular value of the criterion is 1.967 (for the error level $p = 0.05$ and the number of degrees of freedom $df = 348$), the empirical (calculated) value of the criterion was 3.73 for the students of Akhmet Yassawi International Kazakh-Turkish University, 4.01 for the students of Auezov South Kazakhstan State University, 3.93 for the students of Abai Kazakh National Pedagogical University, and 4.62 for the students of Kostanay State Pedagogical University. The calculated values of Student's t-test exceeding the tabulated ones indicate that with the confidence level of 95 % one can assert statistical significance of differences in the levels of creativity in the control and experimental groups of students across all the universities and, therefore, statistical significance of the pedagogical experiment.

As a result of introducing the proposed methodology into the educational process, the percentage of students with a high level of creativity increases, and it decreases in all studied universities for the students with low level of creativity. This indicates the unreliability of the obtained results and does not require additional evidence of the statistical significance of the experiment.

It should be noted that the developed model of the development of creative competence has a universal nature since it can be used to develop creativity in students of various educational specialties. The advantage of the expanded model is the development in the aggregate of all the components of creativity:

- motivational component, including personally significant motives and values; positive attitude to the formation and development of creative abilities and the need for their application in practical activities; self-education and self-development; independence and creative manifestation of personality in professional activities
- cognitive component, including a system of knowledge of the methodology of teaching particular disciplines based on the use of creative technologies;
- pragmatist component that includes research, organizational, design skills that enable the realization of creative technologies for the formation of pedagogical knowledge and skills, to organize independent creative work, to plan educational and creative work;
- personal component, which is a set of pedagogically significant personal qualities of the future teacher: ability to creativity, to solve problem problems; the flexibility and criticality of the mind, intuition, identity and self-confidence; the ability to set and solve non-standard problems, the ability to analyze, synthesize and combine, the ability to transfer experience, predictions, and the like; associativity, imagination, a sense of novelty, sensitivity to contradictions, the ability to empathy; insight, the ability to see a familiar in an unknown; overcoming stereotypes; the propensity to risk and the desire for freedom.

The cumulative development of all components of creative competence is provided by the problematic nature of the proposed development model. The problematical principle combines the learning process with the processes of cognition, research, and creative thinking. Formation of pedagogical conditions based on the problematic education is reduced to the fact that in the learning process the character and structure of cognitive activity of students are transformed, which determine the development of the curative competence of future teachers. The developed model is based on the discrepancy between the existing knowledge base of students and new requirements. Future teachers face with new practical conditions for using the generated knowledge in order to find non-standard ways to use them in practice or to resolve contradictions between the theoretically possible way of solving the problem and the practical impossibility or inexpediency of the chosen method.

Along with the introduction of the proposed model of creativity in the educational process of future teachers, it is advisable to implement the following activities.

The qualification of teachers is a decisive factor for the success of the development of creative competence of students of any specialty in the higher education system. It is necessary to conduct an expert evaluation of the teacher as an organizer of educational activities. The expert evaluation

should be carried out both in the form of introspection, and in the form of evaluation by other teachers, and in the form of an assessment of the primary consumers of educational services-students. It is the lack of necessary knowledge and skills of pedagogical personnel that is one of the main reasons for the low level of creativity of the majority of students in Kazakhstan (Uzakbaeva, Zholdasbekova, 2015).

The following shall be used as the evaluation criteria:

1. Knowledge of educational material: the ability to present educational material; - the ability to find bright, imaginative examples; the ability to show students non-standard opportunities to use the knowledge gained in practice, the ability to establish intersubject communications.

2. Knowledge of the variety of forms and methods used: the ability to transform forms and methods of teaching; the ability to identify in each occupation something new, the possession of active teaching methods; the ability to identify any limiting beliefs or assumptions in an ineffective situation

3. Level of development of creative skills and abilities: the ability to involve students in work; the ability to set and solve creative tasks and produce unique ideas, the ability to create new values and systems independently, invent new ones; the need for self-realization and self-development;

At the level of higher educational establishments, the problem of improving the creativity of pedagogical personnel in the system of higher education in the Republic of Kazakhstan should be solved through special seminars and workshops, reading of specialized literature and the possibility of consulting a specialist. As the analysis witnesses, international practice assumes that if a teacher does not have the necessary preparation for organizing a creative educational process, he/she passes individual courses (Tolegen, 2015). In Kazakhstan, it is advisable to introduce a similar requirement, taking into account the problems of traditional education. In addition to workshops, seminars and training courses for teachers, the activities related to the exchange of experience, in particular, mentoring programs, will be of great benefit.

The active participation of professional non-profit organizations will also contribute to the formation and development of creative competence of future teachers in higher educational establishments of Kazakhstan. These are professional non-profit organizations that have generated a great deal of experience in developing creative skills. Due to the high level of management flexibility, they are carriers of modern and effective methods and can solve the most complex tasks. The development of mechanisms for attracting professional non-profit organizations to the educational environment of the higher education system of the Republic to provide services for pore formation and educational support for future teachers, as well as the training of teachers and staff, will contribute to the outflow of knowledge and stimulate competition in these services. In turn, the introduction of a program of state grants for research and methodological development related to the development of creative competence of students will be a motivational factor to activate professional non-profit organizations.

Along with the proposed activities, the development of the creativity of future teachers will be facilitated by the improvement of the legislative framework, such as adoption of amendments to the Law of the RK "On Education" and the necessary state standard of higher education specifying the psychological and pedagogical preparation of students - future teachers. It is advisable to reorganize the structure of the educational process in higher education, with a reduction in the specific weight of the subject training of future teachers and with an increase in the share of psychological, pedagogical and practical training. This can be guided by the Association for children education international standards. Such an approach will ensure the quantitative and qualitative changes in the field of knowledge, skills, and motives. Quantitative changes are characterized by replenishment of the motives of the chosen profession, increased need for self-development and self-realization, accumulation of general and specialized knowledge. Qualitative changes are characterized by the actualization of motives, knowledge, skills in the teaching process and pedagogical practice.

6. Conclusion

Based on the empirical study, the following conclusions were drawn.

1. In conditions of the prevalence of the subject orientation of pedagogical education in the higher school of the RK, a low level of the formation of creative competence in more than 50 % of future teachers in higher educational establishments of the country is determined. This creates a

threat of loss of fundamentalism of higher pedagogical education, based on the harmonious development of the subject and psychological-pedagogical components of it. The current situation is conditioned by intensified subject preparation of future teachers, the organization of the educational process as a means of transferring information focused on a clearly defined result; lack of pedagogical conditions to ensure the activation of creative thinking of students; deficiency of creative skills of pedagogical staff in higher education.

2. The structural and logical model "Development of Creative Activity" has been developed, the functional purpose of which is the formation of special pedagogical conditions for the development of the creative skills of future teachers. Practical implementation of the model assumes a consistent implementation of the stages in the selection of priority "active" forms of teaching students, the development of creative assignments aimed at obtaining variational and non-standard solutions, the independence of thinking of future teachers, the use of effective teaching methods and diagnosing the level of creative competence among students in the learning process. The educational model has a universal nature and is developed based on the principle of problem learning. Based on the results of the pedagogical experiment in the higher educational establishments of the Republic of Kazakhstan, the introduction of the proposed methodology into the educational process ensures the development in the aggregate of all component components of creativity.

3. The manuscript reasoned the system of measures on development of creative competence of future teachers in the educational process of the higher school of Kazakhstan. These recommendations are aimed at developing the creative skills of teaching staff; on the organization of cooperative cooperation between higher education and professional non-profit organizations; on the reorganization of the structure of the educational process with a decrease in the proportion of subject training. Such an approach will provide for a foundation for the constant development of the creative abilities of future teachers as a factor in the formation of an innovative educational paradigm capable of preparing cadres of creative teachers that play an essential role in the upbringing and education of new generations.

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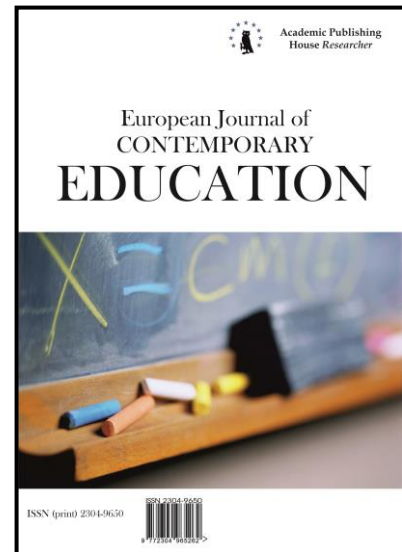
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Improvement of the Robotics Cross-Cutting Course for Training of Specialists in Professions of the Future

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Abstract

The research is devoted to the actual problem of upgrading the existing model of robotics training in connection with the urgent need for implementing a strategy for training highly qualified specialists in the most demanded and promising sectors of the future, taking into account the requirements of business, society, and the State.

The aim of the study is to theoretically justify and experimentally test the effectiveness of the task approach in teaching robotics to form the required cross-professional competencies of the future.

The methodology of the study is based on the analysis of psychological, pedagogical, methodological scientific literature, Rapid Foresight methodology, system analysis, generalization of teaching experience, pedagogical experiment.

Results. First, the didactic and interdisciplinary potential of the robotics course is studied. Secondly, specific content for key cross-professional competences in the field of robotics and engineering is proposed. Thirdly, the basic ideas of the methodology for improving the existing system with a focus on the formation of key cross-professional competencies, the core of which is the system of tasks, are formulated. Fourthly, the effectiveness of the changed methodology of the training course to improve the quality of the educational process is confirmed.

In conclusion, findings that confirm that the improvement of the course of robotics will provide to obtain a useful skill – to be able to learn, to be prepared for the professions of the future are drawn.

Keywords: cross-professional competences, robotics and engineering, teaching methods, system of tasks, challenges of the future.

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1. Introduction

1.1. The relevance of the issue

The providing technological development in the field of information technology and supporting for the usage of new digital services in various activities are actual trends of upgrading the modern science of education. In addition, this direction is a priority in the program of the "Strategy for the Development of the Information Technology Industry in Russia for 2014–2020 and up to 2025" (*Strategiya razvitiya...*, 2013). This research is significant due to the fact that robotics is one of the most demanded and promising industries over the next 15-20 years as it has a significant potential of training of specialists to achieve the intended goals of the social and economic development of Russia. However, there are some objective problems in the developing of educational and scientific robotics, due to the contradiction between the models of robotics learning in educational institutions on one hand and the requirements of business, society and the State to specialists in professions of the future, on the other.

1.2. The aims and objectives of the study

Thus, the purpose of the study is determined from the need to change the cross-cutting course of robotics and is the theoretical justification and experimental verification of the effectiveness of the task approach in training for the formation of demanded cross-professional competencies of the future.

The objectives of the study are:

- to explore the didactic potential of the robotics course within the model of education implemented by educational institutions, based on the traditional trajectory "preschool education – school – university – additional education" in the context of the requirements of business, society and the State;
- to offer the specific content for key cross-professional competencies in the field of robotics and engineering;
- to formulate the basic ideas of the methodology for improving the existing robotics courses with a focus on the formation of popular cross-professional competencies of the future;
- experimentally confirm the effectiveness of the proposed model of training, the core of which is a system of tasks.

2. Relevance

2.1. Russian scientific literature review

The conditions for the development of digital technologies and robotics were formed due to the State support of nano-technologies, electronics and programming. According to this fact a great number of researches are conducted to define or to specify basic concepts: "robot", "automaton", "robotics", "mechatronics", "cyberphysical system", "artificial intelligence". The most significant of them are the works of G.N. Alekseev (*Alekseev, 1986*), V.M. Glushkov (*Glushkov, 1986*), I.P. Kuznetsov (*Kuznetsov, 1976*). These studies are devoted to the phenomenon of constructing models of management activity, social cognition and philosophical interpretation of automation processes of people's intellectual activity under scientific and technological revolution.

These studies are the result of the rising of the practical, educational and social necessity in training specialists for interacting with robots, inventing them and introducing modern robotic technologies into industry, agriculture, medicine, etc. The functions of robots are also determined in the papers of the following authors: T.V. Nikitina (*Nikitina, 2014*), I.A. Kalyaev, V.M. Lokhin, I.M. Makarov (*Kalyaev et al., 2007*), etc. The works of S.A. Vorotnikov (*Vorotnikov, 2005*), N.N. Bondareva (*Bondareva, 2016*), etc. are devoted to study the questions and branches of the robot usage. After the new requirements to specialists in the professions of the future have been worked out, the most important priorities for the development of the personality are determined. They are the initiative, the ability to think creatively and to make non-standard decisions, the motivation to learn throughout life. Under these circumstances the new researches are emerging in which the significance of engineering and construction for training people of the future is determined (N.T. Vishnevskaya and A.A. Zudina (*Vishnevskaya, Zudina, 2017*), O.B. Mizyakina and A.V. Mendel (*Mizyakina, Mendel, 2018*), etc.).

Among the main works on theoretical robotics we note the research of V.A. Glazunov, R.Yu. Sukhorukov and T.V. Silova (*Glazunov et al., 2011*). In this study the authors substantiated

all the principles of robotics, basic concepts and cross-curriculum connections, the influence of robotics on the development of science and systems thinking from the position of synergetics.

The didactic potential of robotics is described in detail in the studies of M.G. Ershov (Ershov, 2011), N.A. Ionkina (Ionkina, 2018), V.I. Filippov (Filippov, 2016), S.A. Filippov (Filippov, 2013), etc. In (Ionkina, 2018) the author formulated the problems of training teachers in fields of robotics at schools. The problems of the organization of research and technical activity covering students from the 1st to the 11th grades (including the choice of the robot-kits) are partially solved in the work of V.V. Chetina (Chetina, 2017).

Although the fact that robotics is considered as an interdisciplinary activity based on mathematics, computer science, technology, and it offers new advantages for education in general at all the levels, there is no single methodological understanding of how to organize an effective response to the requirements of society, business and the State to specialists in the professions of the future within the interdisciplinary cross-cutting course.

2.2. Analysis of foreign researches

The importance of teaching and cognitive activity in the robotics training, the impact on the development of the child's thinking are justified both in classical and modern scientific works on robotics. Thus, the key ideas of modern methods of teaching robotics can be found in the works of S. Papert, developer of the Logo. Papert introduced and substantiated the thesis that, the Logo environment allows to teach children by studying artificial intelligence (Papert, 1993). A.R. Carberry and A.F. McKenna note the importance of project activity in modelling for high-quality engineering training of sought-after experts (Carberry, McKenna, 2014).

In studies (Crawford, 2014; Tocháček et al., 2016) it is noted that the robotics course has a powerful tool for motivating and encouraging students due to the development and management of robots by means of specific programming languages. Foreign authors also introduce such a term as “computational thinking”, which is most effectively formed in solving a series of problematic tasks (Atmatzidou, Demetriadis, 2016; Ioannou, Makridou, 2018).

The researches (Gaudiello, Zibetti, 2016; Gabriele et al., 2017) show that the study of robotics has a positive impact on the development of students' critical thinking, problem solving skills and metacognitive skills. In (Kim, Kim, 2018) the authors propose an integrally whole methodical approach that is based on the unified educational program, which assumes theoretical cross-industry knowledge (engineering, mathematics, etc.) in the process of robotic engineering.

The attention of researchers is also paid to the resources of robotics in relation to social-economic development, the introduction of innovations for the implementation of automation trends, globalization and competitiveness (Keisner et al., 2016). Various training programs and curricula are offered to achieve theoretical, applied and educational goals of robotics, for example, the curriculum ROBOESL (Alimisis, 2018).

The most important methodical idea, from the position of the conducted research, is presented in the study (Ospennikova et al., 2015). Robotics training should implement a three-component educational technology: a) robot as a subject of study, b) robot as a mean of cognition, c) robot as a mean of learning, development and upbringing. This trinity reflects one of the essential principles implemented in foreign programs for training highly qualified experts in the trend of robotics and engineering.

3. Materials and methods

3.1. Theoretical and empirical methods

Theoretical methods: analysis of psychological, pedagogical, scientific and technical literature, studying methodological works on the teaching of robotics at all levels of learning; analysis of construction kits and software to support the students' technical activity; studying of robotic systems in the creative projects made by participants of the educational process.

Praximetric methods: studying the practice of teaching robotics in the model “preschool education – school – university – supplementary education” for the description, identifying the characteristics, analysis of methods, means, forms of organization and control; systematization and generalization of ideas, patterns and the principles of didactics in the teaching of robotics.

The Rapid Foresight methodology: for developing a core set of tasks and recommendations for changing the used model of training robotics for the challenges of future professions and for

proposing mechanisms for coordinating of the goals of employers, the students themselves and the education system.

Empirical methods: observation, questioning, testing, analysis of cognitive activity of students to obtain up-to-date information about the developing key cross-professional competences in the field of robotics and engineering.

3.2. The base of research

The experiment involved 204 students of different classes of schools (Kirov and Kirov region), including 30 preschoolers, 100 middle school students, the remaining 74 respondents – high school students.

At the sampling stage, the pairwise selection strategy was used. The experimental and control groups were made up of individuals equivalent in significant for the experiment side parameters (age, class, method, software, teacher, the type of construction kit). The selection of homogeneous subgroups was carried out according to this principle. Experimental (100 people) and control (104 people) groups were determined. The experiment was conducted in the 2016-2018 academic year.

3.3. Stages of research

The research was conducted in three steps.

In the first stage, an ascertaining experiment was conducted. We examined the current state of issues and problems of robotics training within the model implemented by educational institutions based on the traditional system “preschool education – school – university – supplementary education”. For this purpose we analyzed the psychological, pedagogical, mathematical and scientific-methodological literature on the research problem. Also we made the comparative analysis of the experience of teaching robotics in Russia and in other countries to identify directions for improving the course of robotics.

The second stage was devoted to the development of a methodical approach to the design of a cross-cutting course of robotics training as a basis for the developing of fundamental knowledge in computer science, information technologies, object and process management. In addition, we carried out analysis of the requirements of business, society and the State for specialists of the future. The content of key cross-professional skills for demanded professions in the field of robotics was clarified, and a corresponding system of tasks was developed for the selected set of competences.

The third stage of the study covers the experienced teaching and improving the course of robotics, an experimental evaluation of the effectiveness of the proposed approach in developing key cross-professional competences in the field of robotics and engineering, cyber-systems and artificial intelligence. Teaching the course is accompanied by permanent monitoring of the results of students' cognitive activity, which allows one to improve the proposed methodology consistently.

4. Results

4.1. Clarification of the essence of key cross-professional competences

Cross-professional skills or soft skills play an important role in the modern world. We define these abilities as a complex of non-specialized meta-subject skills, responsible for successful participation in the work process and high productivity. According to the Atlas of new professions, they include environmental thinking, project management, systems thinking, collaboration with people, work in conditions of uncertainty, computer programming, robotic skills, knowledge in the field of artificial intelligence and lean production, skills of artistic creativity, multilinguality and multiculturalism, cross-industry communication, customer-oriented approach ([Nadprofessional'nye navyki](#)). It is necessary to note that these skills are only listed in the Atlas, and they are not particularized for definite industries and professions. All these competences are represented in professions in the branches of robotics and engineering (a home/medical robots designer, an engineer-composer, a designer of industrial robotics, etc.). Therefore, one of the problems in improving the robotics cross-cutting course is to clarify what each competence exactly includes for the training of engineering and management staff.

The content of a set of key competences for such a profession of the future as “Medical robot designer” includes systems thinking, cross-industry communication, project management and programming (artificial intelligence).

Systems thinking. Systems thinking combines two closely related aspects. The first is to consider the object (study, design, etc.) as a system and take into account all the characteristics of its system being. This includes the following principles: a) the principle of mutual determination, b) the principle of structure's hierarchy, c) the principle of the object's integrity, d) the principle of purposefulness of the object and e) the principle of the object's historicity. The second aspect is the organization of the activity process as a systemic one in its logical structure and in used tools and methods. Here we can distinguish the following principles: a) system-challenge problem, b) system analysis of the object under study (including morphological, structural and functional analysis of the object) and c) synthesis of the results of system analysis. In other words, an expert in the sphere of robotics and engineering should understand the "language of systems", be quickly enough to solve complex problems and see a complete view of a particular problem (Mizyakina, Mendel, 2018).

Cross-industry communication. Cross-industry communication skills development implies understanding of technologies, processes and events in various related and non-related areas of activity. Indeed, in today's world, advanced products are manufactured by the cross-sectoral industries: IT and medicine, construction and nanotechnology, science and art. This competence allows students to learn faster, to take the best from different areas, to support development within the area of activity due to such "cross-transmission". Therefore, experts in professions of the future should understand the technologies, processes, development of scenarios in different industries and they also should have a wide range of knowledge to compete in the future job markets.

Project management. In the future this competence will no longer be the prerogative of special trained managers. The enterprises will move away from a strict hierarchical structure in the organization and management, so the leadership ability, skills of setting priorities in solving problems, ability to choose the right team are becoming decisive in these circumstances.

Programming / Artificial intelligence. It goes without saying that competition with machines in the future will simply be useless in some areas. However, a person can become indispensable for the employer, if he/she learn how to design and program robots, machines, cyber-physical systems, artificial intelligence for the tasks set by a human. The minimum requirement for specialists in professions of the future is to master programming at the basic level, because of computer literacy as it understood traditionally will not be enough.

Thus, we have clarified the content of cross-professional competences for the profession of the future "Medical robot designer". The next important issue of the robotics cross-cutting course for training specialists in demand is to change the methodical system of training.

4.2. The system of tasks as a core component of teaching methods in robotics

Any methodical system in didactics is characterized by learning objectives, the place of the topic in the course, content, means, methods, organizational forms and control. However, the specialist in profession of the future should be able to navigate in changing conditions quickly, to anticipate scenarios, to assess the occurrence of the so called "wild cards" (they considered to be potential storylines for future development). Under these circumstances the "strict" teaching technology with the logic between the content lines, specific software, clearly defined goals and traditional methods of learning becomes ineffective. In the future we need specialists with both fundamental theoretical knowledge and ability to develop and improve their skills. So in the new method of teaching, in robotics in particular, the cognitive component comes to the fore – the development of skills to constantly expand the range of knowledge, to find points of growth in one's professional activity, to anticipate and predict.

The requirements of society, business, and the State to educational results allow one to assume that for professions of the future such component of the methodological system of teaching as "learning objectives" should be replaced by "cross-professional competences" for more effectiveness. Also the components "place in the course" and "tools" should be qualified by students themselves. Indeed, in new conditions, it should not matter by which mean to implement the algorithm – the specialist of the future should be able to change one construction kit or programming language to any other. A similar situation is with the "place in the course" component, as the moment of studying the topic depends on the problem situation and the practical task. The particular attention should be given to the "control" component. Despite the emergence and increasing usage of interactive assessment methods and game tools of control in training, the leading form of verification in the course of teaching robotics should be monitoring

the results of students' cognitive activity (in the form of project, model, system, the solution of the problem, etc.). It is impossible during the training of robotics to reduce control to evaluation through tests, quests, crosswords, since the learner gets the necessary fundamental theoretical knowledge precisely through experimentation and object manipulation.

All of the above is relevant for the “Medical robot designer” profession of the future. They are professionals in the designing of biocompatible robotic complexes and cyberdevices for medicine and the biotechnology industry (for example, robotic surgeons, diagnostic robots, cyberprotezes, etc.). The employees of this profession should be specialists of high qualification, should have the ability to conduct large-scale scientific research, to manage the projects, to generate and implement innovations, using knowledge from such industries as IT, molecular biology, chemistry, histology, physics, ecology, etc.

Such components as “methods” and “organizational form” expand significantly in new environment. Different innovative technologies such as project activity, E-mentoring, virtual assistant, “flipped” learning, etc. are implemented and propagated. However, despite of the digital resources diversity, the “content” component determines the formation of fundamental theoretical knowledge. The most important idea of the proposed approach is to get new knowledge through the “task”. This idea is fully consistent to the requirements for experts of the future, which should be able to solve or to predict solutions for a variety of tasks. At the same time, “task” is defined broadly. The process of robotics training can be considered as a process of resolving the contradictions between the cognitive and practical tasks on one hand and the existing level of competences and student’ intellectual development on the other.

The main point of the task approach is that the acquisition of new knowledge occurs through the process of cognitive activity in solving the problem, which is set by a system of specially selected tasks. For the development of systems thinking, the characteristics of the system that are formulated in clarifying the content of this competence are taken as a basis (Table 1).

Table 1. Cross-professional competence “Systems thinking”

Preschool education	School education	University and supplementary education
<p>Consider each of the following objects as a system that interacts with the environment. Describe the inputs and outputs of this system: a thermometer, scales, an inhaler. Select subsystems in the following systems: hospital, wheelchair, robot-surgeon. Determine the part of what these are: a figure, a bandage, an arrow.</p>	<p>Consider each of the following objects as a system that interacts with the environment. Describe the inputs and outputs of this system: a robot surgeon, a diagnostic robot. For each system, select subsystems. Implement an automatic device that diagnoses the air temperature in the room and signals to change the room temperature to comfort mode. Provide the possibility of manual configuration of the device. Identify the possible subsystems of the developed device. List the possible versions of the modification.</p>	<p>Consider each of the following objects as a system that interacts with the environment. Describe the inputs and outputs of this system: a robot surgeon, a diagnostic robot. Make an expert system that diagnoses a respiratory disease or indicates the disease (e.g. diabetes mellitus). Describe the inputs and outputs of this system. Consider its parts, determine the part of which external system this system can be.</p>

The specific practical problems that will be relevant in the future are taken as a basis to form skills in programming and automation of robotic systems (Table 2).

Table 2. Cross-professional competence “Programming/Artificial Intelligence”

Preschool education	School education	University and supplementary education
<p>Make up a possible dialogue between the patient and the doctor at the initial (return) visit. Make up an algorithm for taking blood tests, for the procedure of vaccination.</p>	<p>Develop an automatic device called “The mechanical hand”. Calculate the dose of the medicine in dependence on the patient’s weight. Write a program that determines the fastest route for an ambulance from point A to point B on the basis of a city map (including traffic data).</p>	<p>Write a program for recognizing the variant of flat foot (or lack thereof) using the footprint. Choose the most appropriate methods for implementing a program for diagnosing a respiratory disease. Develop “a mobile companion” for diabetes patients, which would allow to take into account the products eaten during the day (encourage or blame for them) and recommend some kinds of products. Write a library file (module) for the wristlet (that could count the steps and measure the heart rate) for the heart-disease patients to keep the statistics of every day.</p>

For the development of skills in project management, the projects of our own experience in teaching robotics are taken as the basis. These examples take into account the requirements for a specialist in the profession of the future (Table 3).

Table 3. Cross-professional competence “Project management”

Preschool education	School education	University and supplementary education
<p>Organize the learning process for students to manipulate with the following subjects: a thermometer, a chameleon mug, a mood ring, a doll whose hair color depends on the water temperature. Implement the project “Thermosensitive items”. The aim of the project is to get acquainted with the temperature, as a characteristic of the objects of the surrounding world and living beings, to learn how to measure temperature, to study the temperature characteristics of different objects.</p>	<p>Implement the project “Application of thermochromic objects in medicine”. The purpose of the project: Investigation of the thermosensitive properties of materials and the development of objects used to diagnose the temperature characteristics of different objects.</p>	<p>Implement the project – “Cardiologist’s assistant” (pressure and pulse are measured at home), “endocrinologist’s assistant” (the sugar level is measured at home). Develop a mobile application that allows you to send to the email or to the database the results of patient tests that they can independently determine at home. Thus, doctors can observe their patients in more detailed dynamics.</p>

Various demand and promising for the next 15-20 years spheres are used as a basis to form and develop skills in cross-industry communication (Table 4).

Table 4. Cross-professional competence “Cross-industry communication”

Preschool education	School education	University and supplementary education
<p>Biology: Study the structure of the human body, build a puppet-doll (an automated model on gypsum form/foil). Determine which parts of the human body are represented as unique one (that is, one cannot live without them), and which of bodily organs have a pair. Perform a study to identify flat feet from a footprint on paper.</p> <p>Ecology: Implement the project “The air which we breathe”. The purpose of the project is to study the human respiratory organs, determine lung volume, detect air properties and investigate human dependence on air quality.</p> <p>Physics (optics): Project for the use of lenses in everyday life. The purpose of the project: to get acquainted with the concept of lenses, to study the types of lenses and how to use them to improve human life.</p>	<p>Biology: Study the structure of the internal organs of a human body. Build an automated model of the human heart.</p> <p>Ecology: Investigate the air characteristics, determine what parameters of the air environment can threaten human health and life. Develop an automated device “Fire Safety System”. A device based on a gas sensor should determine the level of smoke and flammable gases, such as liquefied natural gas, butane, propane, methane, alcohol vapors and hydrogen/ It also should make a signal in the case of danger for persons’ life or health.</p> <p>Physics: Study the properties of sound waves and implement a project for the application of ultrasonic in medicine. Develop an automated device for diagnosing acuity.</p>	<p>Physics / Biology: Calculate the power for closed-chest heart massage, depending on the weight and age of the patient. Develop an automated device for closed-chest heart massage. Calculate the pressure and volume of oxygen for anapnotherapy. Develop an automated device for anapnotherapy.</p> <p>Ecology Implement the project “Automated system of forecasting air quality in your city”: develop mathematical models and a complex automated system, oriented to the forecast of air quality in different regions for calculation of background characteristics of air pollution.</p>

The proposed set of tasks possesses the following characteristics, valuable from the point of view of the training the most sought after experts:

- continuity between levels of learning and the possibility of getting knowledge at time determined by student;
- orientation of the cognition subject’s activity to the possible development of scenarios;
- formation of fundamental theoretical knowledge through experimental work;
- taking into account the requirements of the State, society and business for the skills and competences of future professionals.

The presented set of tasks does not pretend to be universal and ultimate. The purpose of the research is to demonstrate the possibility of composing the system of core tasks for forming the required cross-professional competences and to show its didactic potential for improving the quality of the existing path of robotics training.

4.3. Experimental evaluation

4.3.1. The ascertaining stage of the experiment

To assess the effectiveness of the proposed approach, a statistical analysis of the results of cognitive activity of students in the work with construction kits and software was carried out and the formation of a key set of cross-professional competencies was assessed.

At the first stage of the experiment, the students were given a control test on robotics, concerning the simulation of an automated system in accordance with the presented professional

skills. Thus, it was possible to collect experimental data on 204 students of various educational institutions (94 students in the 2016-2017 academic year, 110 students in the 2017-2018 academic year). Since as a result of the preliminary control measures was revealed almost the same initial level of preparedness of students participating in the pedagogical experiment of three years, we can consider them as a general sample of 204 people. On the basis of the pairwise selection strategy, groups of individuals equivalent in significant experimental side parameters (age, class, method, software, teacher, the type of constructor kit) were distinguished. Thus, experimental (100 people) and control (104 people) groups were formed. Characterizing the sample, we note that the experimental group consist of 75.3 % of girls and 24.7 % of boys.

4.3.2. Forming stage of the experiment

Theoretical classes for students were conducted in the same way, and practical work in the computer class was organized in different ways. Students in the experimental group were trained according to the proposed method, and students of the control group studied the material in the traditional way in accordance with the teaching materials, performing tasks on specific topics of the course.

In order to assess the effectiveness of the proposed methodology at the end of the educational process, students were offered a test, which contained one task from each type of formed cross-professional competence (system thinking, management of projects, cross-industry communication).

Excellent evaluation was exhibited, if the student in the solution of all tasks of the control for a set of individual elements sees the system integrity, its structure, the relationship of the system and the environment; completely independent in choosing the scope of practical application of the device, the preparation of the algorithm and the method of solution; correctly interprets the messages of the software environment (error information); searches for ways to improve the mechanism.

Good evaluation corresponded to the cases when the student in solving one task finds it difficult to independently determine the inputs and outputs of the systems in question; does not always search for the optimal state of the system and the scope of its practical application; allows one or two errors in the design solution of the project and the software component.

A satisfactory assessment was made in a situation where a student in solving problem projects focuses only on one of the features of the elements, highlights the essential features of the system object, identifies the relationship between the elements, but does not know how to actively use this ability in specific practical situations. This category included decisions when a student tries to propose his/her model, but does not understand the meaning of the executed algorithms. The successful implementation of the project was accompanied by the constant support of the teacher.

In all other cases, the rating was "unsatisfactory".

The results of the control work are shown in [Table 5](#) and displayed in the diagram (percentage of correctly solved problems of different types) in [Figure 1](#).

Table 5. Distribution of students based on the assessment

Groups	Rating				
	Excellent	Good	Satisfactory.	Unsatisfactory	
Experimental group	32	40	18	10	100
Control group	18	28	40	18	104
	50	68	58	28	

Criteria for assessing the formation of competence: the ability to form the problem in such a way as to use a computer and other means to solve it; logical systematization and analysis of data; the ability to provide information on abstractions, models; the ability to automate solutions based on a series of ordered steps; identification, analysis and implementation of possible solutions in order to achieve the most optimal combination of steps and resources for maximum effect; the ability to generalize and transfer the algorithm for solving a specific problem on a wide range of similar problems.

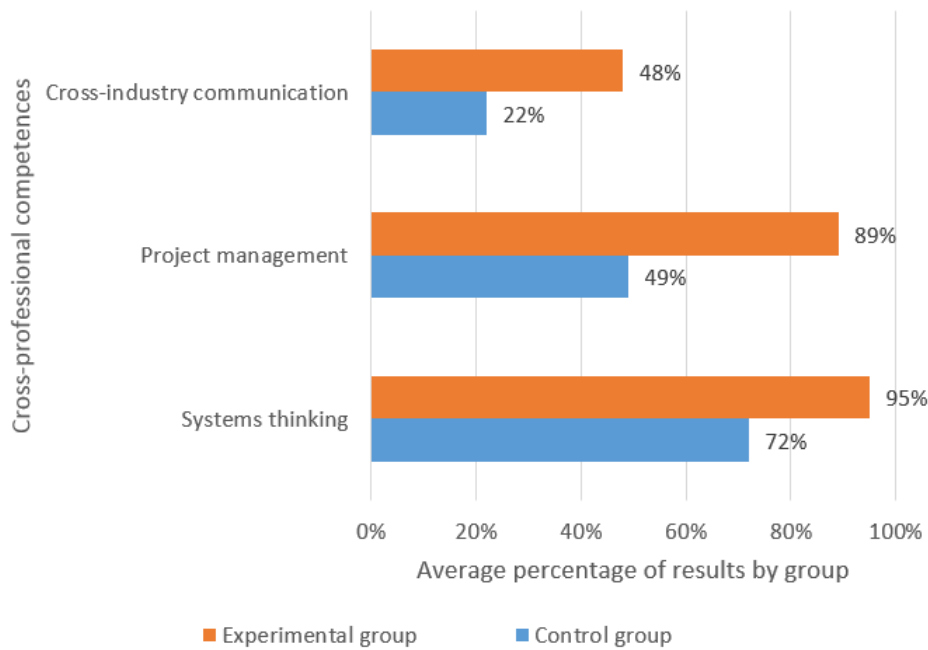


Fig. 1. Results of control works

4.3.3. Control stage of the experiment

Statistical differences in the levels of formation of cross-professional competences in the control and experimental groups before and after changes in the system of robotics teaching were evaluated using the Pearsen criterion χ^2 (chi-square). Let us assume the following hypotheses: 1) H_0 : the level of cross-professional skills of students of the experimental group is statistically equal to the level of cross-professional skills of students of the control group; 2) H_1 : the level of cross-professional skills of students of the experimental group is higher than the level of cross-professional skills of students of the control group.

Calculating the value of the criterion statistics:

$$\chi^2_{observ.} = \frac{1}{100 * 104} \left(\frac{(32 \times 104 - 18 \times 100)^2}{32 + 18} + \frac{(40 \times 104 - 28 \times 100)^2}{40 + 28} + \frac{(18 \times 104 - 40 \times 100)^2}{18 + 40} + \frac{(10 \times 104 - 18 \times 100)^2}{10 + 18} \right) \approx 16,6$$

At the significance level $\alpha = 0,05$ and the number $c = 4$, the number of degrees of freedom is equal:

$$n = c - 1 = 3$$

According to the tables of distribution χ^2 for $n = 3$ and $\alpha = 0.05$ the critical value of statistics is equal:

$$\chi^2_{critic.} = 7.82$$

Therefore, the following inequality is satisfied,

$$\chi^2_{critic.} < \chi^2_{observ.}$$

According to the decision rule, the null hypothesis must be rejected and an alternative hypothesis accepted.

Thus, the experimental assessment confirms the qualitative difference in the level of formation of cross-professional competence in the control and experimental groups on the example of training specialists of the profession of the future “Medical robot designer”.

5. Discussion

The most noticeable influence on the formation of cross-professional competencies (based on the results of the experiment) is provided by the following factors supported by the cross-cutting system of tasks: activity in cognition; self-reliance in creativity, design of robotic systems;

convergence of the learning process with the process of real knowledge, career guidance and socialization; continuity between the levels of training.

The influence of these factors affected the following types of cognitive activity of students when working with construction kits and software:

- the choice of optimal ways and means of implementation of activities (the ability to plan and carry out cognitive work with machines, cyber-physical systems, artificial intelligence, to structure information, to determine the option of its adequate representation);
- development of the ability to manage their activities, the work of the team to solve problems (the ability to assess the correctness of their actions and the team, the work of the technical means; obtaining skills of self-control and decision-making).

The significance of the research is in the fact that for the implementing of the program “Digital Economy of the Russian Federation” at national level ([Strategiya razvitiya..., 2017](#)) it is the improvement of the crosscutting robotics course that will provide the theoretical basis in the field of Informatics, Cybernetics and Artificial Intelligence, in time to orient in the profession, in time to give a useful skill – to be able to learn, to be prepared for the professions of the future. The most important thing is to remember that features and result of educational and cognitive activity should contribute both to the individualization of human development and to the development of IT competence corresponding to the level of information culture determined by the conditions of one’s life in robotic society.

The proposed improvements fully comply with the directions of the strategy of scientific and technological development of the Russian Federation.

6. Conclusion

The results of the study prove that the course of robotics has a rich didactic potential for the formation of demanded by society, business and the State cross-professional competencies of the professions of the future, as it is interdisciplinary, enriches cognitive activity of students with new tools of knowledge, provides opportunities for obtaining skills of project and team work.

A significant result of the research is the clarification of the content of cross-professional competences in the industry through the example of a particular profession of the future – “Medical robot designer”: systems thinking, cross-industry communication, project management.

The authors formulate the basic ideas of the methodology for improving the existing course of robotics with a focus on the formation of popular cross-professional competencies of the future, the central element of which is the system of tasks. The value of the technique is that it is the task that motivates the need for new knowledge, and only in the process of solving the problem new knowledge is born. The set of tasks is the core around which the cognitive (project) activity of students is built. In addition, the set of tasks determines the trajectory along which the student moves from ignorance to knowledge and further to understanding. All this takes place in the design, development of robotic systems, experimental activities that are based on the needs of students.

The effectiveness of the proposed approach is confirmed by the pedagogical experiment, during which the result of cognitive activity was evaluated by a set of criteria corresponding to the essence of competencies.

Thus, experimentally proved the effectiveness of the proposed model through the robotics course for the formation of popular cross-professional competencies of the future.

The results of the research can be used:

- to develop a methodical system for training teachers in robotics as a promising branch of the future;
- to ensure the individualization of the educational path due to specially organized areas of supporting for creative, cross-industrial, cognitive research activity of students at all levels of studying robotics;
- to continue working on the solution of scientific problems in the training of robotics in the framework of the used model implemented by educational institutions;
- to improve the methodology of educational robotics.

The perspective direction of improving the proposed methodology is seen in the addition of its aspects related to the construction of a nonlinear individual educational path of studying robotics and engineering.

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The Soft Dimension of the Shanghai Cooperation Organization's Fight Against the "Three Evil Forces". Insights on Counterterrorism Preventive Measures and Youth Education

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Abstract

This article examines the comprehensive and participatory component of the Shanghai Cooperation Organization's (SCO) approach to the fight against the "Three Evil Forces" within the theoretical framework of smart counterterrorism. After analyzing the problematic definitions of the concepts of terrorism and extremism, the authors choose to focus on the non-coercive preventive pillar of the SCO's counterterrorism strategy through the prism of youth education. The emphasis is placed on the strikingly similar practices of SCO Member States in this field, whereby state and non-state actors foster partnerships to conduct cultural activities promoting the same values of patriotism, civic identity, interethnic and interfaith dialogue as a counter-ideology to the dissemination of radical ideas among the youth. The experience of SCO Member States in implementing inclusive counterterrorism programs serves as a basis for the evolution of SCO's soft diplomacy, which has very recently entered a new phase in its development, following the first SCO Youth Assembly and Uzbekistan's decision to support the SCO Youth Council. In this paper, the youth is analyzed as the primary target and actor of the SCO's preventive counterterrorism efforts.

Keywords: extremism, terrorism, separatism, the "Three Evil Forces", the Shanghai Cooperation Organization, smart counterterrorism, soft counterterrorism, counternarratives, community resilience, education, patriotism, multiethnic harmony, the SCO Youth Council, the SCO Youth Assembly.

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1. Introduction

The Shanghai Cooperation Organization (SCO) is a permanent intergovernmental organization founded on 15 June 2001 by the Russian Federation, the People's Republic of China, the Republic of Kazakhstan, the Republic of Kyrgyzstan, the Republic of Tajikistan and the Republic of Uzbekistan. Stephen Aris, senior researcher at the Center for Security Studies (CSS), points out that the SCO is a regional organization focused on non-traditional security ([Non-traditional security..., 2014](#)) and is not hostile to the West ([Aris, 2009](#)). In the early stages of its creation, the SCO elaborated the doctrine of the “Three Evil Forces” based on the crimes of extremism, terrorism and separatism. The threat of committing or the act of committing anyone of these three crimes falls under the anti-terrorist legislation of SCO Member States and triggers extradition. Hence, separatism and extremism are assigned equal weight and seem to be interpreted as interconnected crimes by the SCO. In 2005, the SCO Member States adopted a Cooperation Agreement establishing the principle of “mutual recognition” of terrorist, separatist or extremist acts *“regardless of whether the legislation of SCO Member States includes a corresponding act in the same category of crimes or whether the act is described using the very same terms”* ([Concept of Cooperation, 2005](#)). This clause provides for the harmonization of the anti-terrorist legislations and practices of SCO Member States. It can be noticed the SCO pursues the common objective of eradicating internal threats to the security of its Member States through the implementation of non-military instruments. Although the SCO officially acts as a security blanket in the region, it has so far not given any external assistance to its Member States in the fight against the “Three Evil Forces”. This is not surprising since the SCO does not provide for a collective defense clause in the event of a national crisis, nor for a rapid response force in emergency situations ([Laruelle, Peyrouse, 2013: 251](#)). Within this framework, the SCO’s role is mostly limited to expressing concerns or giving moral support without intervening directly. The SCO’s non-interventionist position meets in full the principle of non-interference in domestic affairs which serves as a building block of the Organization’s development path. Besides, SCO Member States seemingly prefer, through bilateral agreements or autonomously, to define their own modalities of counterterrorism interventions ([Tolipov, 2006](#)). Russia and China, for example, manage independently and without the aegis of the SCO the threat posed by Chechen and Uyghur separatist movements within their own borders ([Tolipov, 2006](#)). However, the SCO's refusal to establish itself as a platform for dialogue on water management and migration issues in Central Asia has greatly frustrated the expectations of its Central Asian Member States. As noted by Marlene Laruelle and Sebastien Peyrouse: *“The gap between the organisation’s official discourse on the fight against “non-traditional dangers” and the – quasi-non-existent – mechanisms in place to enable collective or at least concerted action constitute the main component for the disillusionment of Central Asian experts”* ([Laruelle, Peyrouse, 2013: 245](#)). Yet it is worthy the note once more that the SCO’s approach to combating terrorism is not interventionist and global, but rather consensus-based and regional. Hence, the “Three Evil Forces” doctrine mainly satisfies the purpose of defending its Member States’ stability and territorial integrity and of defining a common regional approach to counterterrorism.

2. Data and methodology

The authors analyze the SCO’s fight against the “Three Evil Forces” through the lens of smart counterterrorism, a concept introduced by Joseph Nye and Richard L. Armitage in 2008. Although the SCO does not employ this term in its conventions, the authors believe the notion of smart counterterrorism is a relevant analytical tool to examine the SCO’s response to non-traditional threats. The holistic approach built on four pillars which flows from the Action Plan of the UN Global Counter-Terrorism Strategy (2006) serves as a basis for the study of SCO preventive antiterrorism programs. The sources used in this paper are the SCO’s official conventions on combating terrorism, extremism and separatism, analysed in the context of international law standards. Furthermore, the authors examine the counterterrorism programs of SCO founding Member States in a comparative perspective. Primary sources used to discuss the contours of the Organisation’s youth diplomacy are interviews with SCO representatives carried out in Russia and Tajikistan in 2018.

3. Discussion

In the Convention Against Terrorism of the Shanghai Cooperation Organization (2009), the SCO draws a straight line between the concepts of “terrorism” and an “ideology of violence” by laying out the following definition: “*Terrorism – an ideology of violence and a practice of influencing decision-making by the authorities or international organizations through the commission of or the threat of committing violent and (or) other criminal acts connected with intimidating a population and aimed at causing damage to the person, to society, and to the state*” (Konventsiya Shankhaiskoi organizatsii..., 2009). In the same fashion and in accordance with the Convention on Combating Extremism (2017), the term “extremism” now no longer refers to an act, but to an “ideology” and a “practice”. Indeed, extremism is defined as: “*An ideology and practice aimed at resolving political, social, racial, national and religious conflicts through violent and other anti-constitutional actions*” (Konventsiya Shankhaiskoi organizatsii...). In comparison with previous SCO documents, this Convention enshrines a comprehensive system of measures to counter extremism. Prior to the adoption of this new Convention, the SCO cooperation in the field of the fight against extremism was regulated by two documents: the SCO Convention on Combating Terrorism, Separatism and Extremism (2001) and the Concept of Cooperation Between SCO Member States in Combating Terrorism, Separatism, and Extremism (2005) (SCO Secretary-General, 2017).

The choice of the “ideology of violence” criterion to describe the notions of terrorism and extremism raises a number of problems. For instance, Human Rights in China's (HRIC) emphasizes that terrorism must not be defined on the basis of ideology, as political or ideological goals cannot alone constitute the essence of terrorism. In international law, at least two other conditions must be met to confer a terrorist nature to an act: the first condition is a material result (for example the death of a victim), the second is an objective, which in most cases, refers to spreading a state of terror among the population (Human Rights in China (HRIC), 2011). It goes without saying that the concept of an “ideology of violence” is vague, muddled and highly subjective in its interpretation. An ideology refers to beliefs and values that cannot be evaluated objectively and that, moreover, could be associated with the freedom of speech and religion (Human Rights in China (HRIC), 2011). The blurry line between the concepts of terrorism and extremism together with the lack of common views regarding the adoption of a universal definition of these concepts within the United Nations (UN) make these phenomena open to various ambiguous interpretations, both in the theory and in the practice of counterterrorism.

The thorny issue of defining and interpreting the concept of “extremism” has drawn the attention of many researchers. The term “extremism” etymologically originates from the Latin word *extremus*, meaning “situated at the edge” or the “ultimate in degree” (Fasmer, 1986). Oftentimes extremism can lead to violent methods in the pursuit of achieving a specific goal (Oleinikova, 2016) and thus evolve into terrorism. The academic literature devoted to the study of the concept of extremism does not display a common and unequivocal understanding of the issue (Yuritsin, 2017). In this paper, we shall use the terms “terrorism” and “violent extremism” as synonyms. The concept of “extremism” will be intended as an important step in the staircase of radicalization. This is because extremism is likely to evolve into terrorism once the extremist acceptance of violence shifts to the widespread terrorist use violence (The European Institute of Peace, 2018). This said, the notions of “terrorism”, “violent extremism” and “extremism” can appear hand-in-hand or isolated in contemporary counterterrorism strategies.

In today's globalized world, terrorism has become a hydra-headed menace which takes the form of a sophisticated and ramified transnational network, difficult to define, to characterize and to control. As the Council of Europe puts it, this modern form of terrorism is characterized by an “a-territorial” and “a-cultural” dimension, although terrorist claims to a given culture are common (Conseil de l'Europe, 2004). Nowadays, most States across the globe implement comprehensive antiterrorism strategies resulting from a complex blend of hard and soft measures, which in their interaction, reflect the principles of smart counterterrorism (Howell, 2014). Joseph Nye and Richard L. Armitage defined this concept in “Implementing Smart Power: Setting an Agenda for National Security Reform” in 2008: “*Smart counter-terrorism can be defined as a process of prudent integration of a large number of governmental and non-governmental players from various levels, with the aim of reducing terrorist motivation and capacity, and winning the hearts and minds of the population in the public arena. This approach should integrate*

preventive, defensive and offensive measures conducted by a large number of players into an efficient short-term and long-term approach" (Prezelj, 2013).

According to the Canadian counterterrorism expert Margaret Purdy, any counterterrorism strategy should be built upon four interlinked strategic pillars. The first three pillars are criminal justice, public safety and the military response to acts of terrorism. The fourth pillar is the most innovative but is rather tricky to put in place: its aim is long-term prevention through the eradication of the root causes of terrorism. For the fourth pillar to be firmly grounded, it is necessary that the diplomatic, development, private and public sectors foster partnerships to annihilate the very purpose of terrorism (Purdy, 2004/2005: 4-5). Although most modern counterterrorism strategies have long disregarded the importance of the fourth pillar, it is now becoming a central part of national programs designed to form a cordon sanitaire against "homegrown terrorism" (Purdy, 2004/2005: 7). Besides, the Plan of Action of the UN Global Counter-Terrorism Strategy, adopted by consensus in the form of a resolution on 8 September 2006, is based on the holistic four pillar approach and thereby emphasises the need to prevent and address the conditions conducive to the spread of terrorism (UN Global Counter-Terrorism..., 2006).

Preventive counterterrorism strategies are, as mentioned by Margaret Purdy, closely linked to the study of the "root causes" of radicalization. The academic and political debates surrounding this topic are multiple and stormy. However, experts mostly underline the following main "root causes" of terrorism: poverty, precariousness, the marginalization of entire sectors of society, the sudden decline in living conditions in Muslim countries, globalization and the inequalities that flow from it, extremist religious ideologies, unstable, weak and failing States, authoritarian regimes, frozen conflicts (e.g. the Israeli-Palestinian conflict), US foreign policy, feelings of alienation, rage, hopelessness and humiliation (Purdy, 2004/2005: 9-10). Addressing the root causes of terrorism is a long-term process involving informal and community-based measures aimed at the promotion of social cohesion to prevent and counter radical ideologies (Aly, 2013: 4). As noted by counterterrorism expert Anne Aly: "*Soft counterterrorism constitutes an important and necessary element of a comprehensive counter-terrorism strategy both internationally and on the home-front. An alternative framework for developing soft counter terrorism starts from acknowledging that terrorists have an objective of influencing multiple audiences and that these audiences, individually and collectively, have agency in constructing counter-narratives to terrorism*" (Aly, 2013: 16). In order to develop "community resilience" to terrorism, States and international organizations broaden the potential of collective action both formally and informally to build counter-narratives aimed at reducing the appeal of terrorism (Aly, 2013: 11). Given the complex nature of this task, both state and non-state actors have a role to play in the soft dimension of counterterrorism: governments, civil society organizations, businesses, universities and religious institutions (Aly, 2013: 14). The Plan of Action of the UN Global Counter-Terrorism Strategy established the comprehensive and participatory component of international counterterrorism, further reinforced through the adoption of Resolution 2250 on 9 December 2015. This unprecedented resolution encourages UN Member States to put in place inclusive mechanisms at the national level to ensure youth participation, especially in the fight against violent extremism (Resolution 2250, 2015). Countering the ideology of violent extremism through culture and education is an important aspect of soft counterterrorism as it can ensure that learning institutions do not become a "breeding ground for violent extremism". However, as stressed by UNESCO: "*The role of education is not to intercept violent extremists or identify individuals who may potentially become violent extremists, but to create the conditions that build the defenses, within learners, against violent extremism and strengthen their commitment to non-violence and peace*" (UNESCO, 2017)." Counterterrorism through education and culture is destined to the youth, perceived as the primary target of these policies, but also as its chief implementor. It is therefore little surprising that in most countries today, the youth is both the object and the subject of cultural and educational programs on combating the ideology of violent extremism.

According to the Russian Academy of Sciences, the SCO is ultimately an attempt to create a smart diplomatic platform, making use of soft and hard instruments in international relations (Perspektivy razvitiya ShO..., 2016). In this regard, there is no doubt that the SCO's fight against the "Three Evil Forces" carries within itself the seeds of smart counterterrorism, although this term does not appear in the Organization's official documents. Indeed, the SCO makes use of a skillful mix of soft and hard measures in its conventions to prevent, monitor and suppress its non-

traditional threats. For example, the Concept Between SCO Member States in Combating Terrorism, Separatism, and Extremism (2005) sets objectives ranging from the prevention of the spread of radical narratives to the monitoring, surveillance and suppression of the “Three Evil Forces”, the elimination of the consequences of terrorist acts and the fight against the financing of terrorism (Kontseptsiya sotrudnichestva gosudarstv..., 2005). With the aim of building community resilience to all forms of extremism, the SCO encourages the collaboration between state entities, civil society and media actors to elaborate counterterrorism narratives (Kontseptsiya sotrudnichestva gosudarstv..., 2005). In parallel, hard counterterrorism cooperation between SCO Member States covers joint military exercises, intelligence and information sharing, extradition procedures (Kontseptsiya sotrudnichestva gosudarstv..., 2005) and law enforcement cooperation on border control (Mingwen, 2018). Along the same lines, the four pillars of counterterrorism clearly appear in the SCO Convention on Combating extremism (2017) as it intends simultaneously to prevent, detect and curb the tide of extremism while eliminating its consequences, identifying and eliminating the causes and conditions conducive to radicalization (Konventsiiya Shankhaiskoi organizatsii...).

The prevention of terrorism and extremism among the youth has recently grown to become a key area of cooperation in the frame of the SCO. The Ufa Declaration by the Heads of Member States of the Shanghai Cooperation Organization (2015) states that the SCO has built and strengthens a global security system in the information and communications field. It aims to actively fight the spread of terrorist, separatist and extremist narratives in order to prevent religious extremism, racial and ethnic intolerance, in particular among the youth with the support of schools, media agencies, religious organizations, non-governmental organizations and businesses (Ufinskaya deklaratsiya..., 2015). Already in 2009, the Declaration of the Special Conference on Afghanistan Convened under the Auspices of the SCO together with the Plan of Action for combating terrorism, illicit drug trafficking and organized crime signed with the Republic of Afghanistan, stressed the need to promote international, interethnic and interfaith dialogue in the fight against ideologies advocated by terrorists (Deklaratsiya...).

The SCO's increased attention to the youth in its counterterrorism policies is significant. The study titled “Youth and Violent Extremism on Social Media” commissioned by UNESCO provides a global mapping of the assumed roles played by social media in radicalization processes across all the regions of the world. In this study, the youth is considered to be the most affected category of the population to extremism (S raphin Alava, 2017). This, of course, clarifies why the youth also takes center stage in SCO Member States counterterrorism programs. Taking the example of Russia, scholars distinguish different types of extremism which are gaining momentum on the international stage: ethnic extremism, religious extremism, political extremism and nationalist extremism. According to available statistics, the youth is responsible for 80 % of extremist activities in Russia (Agapov i dr, 2015). As argued by Shlegel', most perpetrators of crimes of extremism in Russia are 14 to 30 years old (Shlegel', 2008). Some researchers also include the age range from 30 to 35 years old. Aminov and Oganyan further note that young men are more inclined to commit acts of extremism between the age of 16 and 18, whereas extremist crimes among women are more likely between the age of 18 and 25 (Aminov, Oganyan, 2005). In Russia, a surge in extremism can be observed for the 14-24 age group (65 %). This group is particularly susceptible to embrace extremist ideologies because of increased vulnerability, identity struggles, behavioral problems, delinquency, the quest for significance and self-affirmation. Furthermore, youngsters between the age of 14 and 24 are in average fearless and more confident. They show more readiness to commit crimes than other age groups and justify their behavior by shifting the responsibility of their acts on others (Sergeeva, 2016). However, it should be noted that being part of an extremist youth movement may not initially determine the radical tendencies of its members (Makarov, 2016). As stressed by Rodina, youngsters become extremists gradually, within the process of participating in extremist activities and accepting radical ideologies (Rodina, 2016).

SCO Member States have a great deal of expertise in adopting soft measures designed to counter the spread of terrorist narratives. To repel terrorist and extremist threats effectively and to strengthen the immunity of the youth to radical ideas, SCO Member States promote inclusive youth initiatives built on the values of patriotism and interethnic harmony. In accordance with SCO conventions and national counterterrorism programs of SCO Member States, such traditional values serve as a counter-ideological response to neutralize and defeat terrorism.

The Federal target program “Russian Culture (2012-2018)” highlights multiethnic harmony and patriotism as useful soft power instruments in the prevention of extremism. Indeed, according to this Federal target program, Russia can mobilize its historical memory, its democratic state, its humanism, the unity of its multiethnic state, its traditional family and patriotic values to curb radical ideologies ([Pravitel'stvo Rossiiskoi Federatsii..., 2012](#)). Further, the Strategy of the Russian Federation against extremism up to 2025 emphasizes that the actors of the fight against extremism are federal and regional agencies, civil society organizations and Russian citizens ([Strategiya protivodeistviya ekstremizmu..., 2014](#)). The strategy also stresses the need to base youth education on the spiritual, moral and patriotic values of the Russian Federation ([Strategiya protivodeistviya ekstremizmu..., 2014](#)). In addition, it sets the goal of harnessing the potential of youth and veterans' associations to educate Russian citizens in the spirit of patriotism and unity ([Strategiya protivodeistviya ekstremizmu..., 2014](#)). In the same vein, the draft law on the participation of citizens of the Russian Federation, civil organizations and civil-governmental associations in the rule of law ([Federal'nyi zakon ot 22.08.1996](#)) encourages collaboration in the detection of criminal offenses between non-state actors and the police ([Rossiiskaya Federatsiya...](#)). The Conception on civil security in the Russian Federation (2013) also takes up the notion of soft counterterrorism as it seeks to coordinate the joint action of federal, regional and civil society organizations to develop preventive, educational and propaganda tools capable of tackling the origins and consequences of extremist acts ([Prezident Rossiiskoi Federatsii..., 2013](#)). In this context, it is worth mentioning the widespread practice of students' *družiny* ([Anne Le Huérou..., 1998](#)) which lend a helping hand to law enforcement actors by monitoring and preventing ethnic-based conflicts in schools and student residences ([Agapov i dr, 2015](#)). Cyber *družiny* is another interesting phenomenon in Russia: young volunteers monitor the Internet and search for illegal and extremist content on social media. Although this form of volunteerism already exists in Russia, the party United Russia has recently proposed a draft law to foster and regulate its activities ([BBC News, 2018](#)).

The education of the youth in the spirit of patriotism and traditional values as a means to counter extremism is also relevant for SCO Central Asian Member States. All four Republics are implementing counterterrorism strategies intended to eradicate popular support for radical ideologies. The Republic of Kirghizstan seems to have a great deal of experience in this field. Its Program on combating extremism and terrorism for 2017-2022 pursues the objective of improving the activities of state and non-state bodies in the field of the prevention of extremism and terrorism. Among the main achievements reached, the program states the implementation of various socio-economic programs aimed at improving the well-being of vulnerable groups of the population; the creation of the conditions for interfaith and inter-ethnic dialogue and the introduction of the subject “History of religious culture” into school curricula. The program also identifies areas for improvement ([Programma Pravitel'stva Kyrgyzskoi...](#)). For example, the Republic of Kirghizstan intends to expand the outreach of its program to include the most vulnerable groups to radicalization, strengthen the level of education in religious educational institutions which remains low, adapt the secondary and higher education systems to the challenges of extremism and terrorism, develop a system of preventive measures to counter the ideology of extremism and terrorism in prisons and foster good practices in the rehabilitation and reintegration processes of persons convicted of crimes of extremism ([Programma Pravitel'stva Kyrgyzskoi...](#)).

In 2013, the Republic of Kazakhstan adopted law 63-V, which extends preventive counterterrorism cooperation to civil society actors, the media and educational institutions in order to form and nourish an “anti-terrorist conscience” within society ([Zakon Respubliki Kazakhstan...](#)). In addition, on 2 October 2013, Kazakh President Nursultan Nazarbayev adopted a national program to combat religious extremism and terrorism primarily targeting the youth. The chief goal of this program is to enact preventive antiterrorism measures capable of developing a renewed religious consciousness reflecting the traditions and cultural values of the Republic of Kazakhstan ([Zhanabilov, 2016](#)). Quite similarly, the Republic of Tajikistan's national strategy on combatting of extremism and terrorism for 2016-2020 includes inclusive and preventive counterterrorism measures aimed at preserving national unity as a sustainable barrier against the spread of radical ideas ([O Natsional'noi strategii...](#)). The strategy points out that the ideological vacuum in post-Soviet Tajikistan largely contributed to the outbreak of civil war in the 1990s and led to the erosion of the foundations of national unity. Improving the level of legal culture within society and

promoting social development are among the key guidelines of the strategy ([O Natsional'noi strategii...](#)). With the support of the OSCE Program Office in Dushanbe, Tajikistan has created community councils in various regions to ensure cooperation between the law enforcement and civil spheres at the local level ([OBSE](#)). As regards the Republic of Uzbekistan, it has adopted a new law on combating extremism in June 2018 which sets forth the overall objective of building a culture of resilience against extremism by promoting cultural traditions together with the spiritual, moral and patriotic education of the youth ([Zakon Respubliki Uzbekistan...](#)). To achieve this goal, the law encourages state and non-state actors to implement a series of soft counterterrorism instruments designed to promote legal education, scientific literature and informative workshops ([Zakon Respubliki Uzbekistan...](#)).

China has only very recently laid out its counterterrorism strategy in a legislative framework. The first law of the People's Republic of China on the fight against terrorism was adopted on 27 December 2015. This law views counterterrorism as a "people's war" ([Singh, 2016](#)) which should rely on "civil participation". The goal is twofold: citizens and civil organizations are required to collaborate with state entities as informers and are encouraged to form groups of volunteers in the event of terrorist attacks ([Singh, 2016](#)). Since Xi Jinping took office in November 2012, he has attached great importance to "social stability and long-term security" in Xinjiang Uygur Autonomous Region, where the greatest terrorist threat to China is believed to come from. China bases its counterterrorism strategy in Xinyang on the promotion of patriotic values and interethnic understanding. The ultimate goal of these efforts is for all Chinese ethnic groups to be "tightly bound together like the seeds of a pomegranate" ([China Daily, 2014](#)). To maintain stability and security in Xinyang, the Chinese government has mobilized the de-radicalization efforts of 1.28 million cadres, 0.4 million teachers, and 28000 religious actors ([Zhou, 2017](#)). This year, China's so-called re-education camps in Xinjiang to "carry out anti-extremist ideological education" have received wide media coverage. Human rights organizations claim the Chinese government has detained an estimated up to one million predominantly Muslim people in Xinjiang ([Amnesty International..., 2018a](#)). With the aim of enforcing patriotism and loyalty to Beijing in the region, the Chinese government is allegedly implementing policies of "mass internment, intrusive surveillance, political indoctrination and forced cultural assimilation against the region's Uighurs" ([Amnesty International..., 2018](#)). It follows that China appears to be making a coercive use of soft counterterrorism instruments. This hard reinterpretation of combating extremism through culture and education leads to human rights violations, virulent indoctrination and might also prove ineffective in the long run. China's rather unyielding approach to counterterrorism even in its "soft dimension" seems to distinguish it from its neighbors which, for the time being, have not yet adopted such a hard line. Nonetheless, the Secretary-General of the Shanghai Cooperation Organization, Rashid Alimov, supported the policy of the Chinese authorities in Xinjiang. According to him, Beijing's measures to counter terrorism are not aimed at a specific ethnic group, origin or religion ([Nazvana pol'za..., 2018](#)). Beyond soft and hard counterterrorism through education and reeducation, in SCO countries the preventive public health approach to radicalization is poorly developed even at national level. Soft forms of counterterrorism which should be considered and explored in the medical sphere are psychological treatment programs for youngsters at risk of radicalization. Of paramount importance, especially in the field of extremism prevention, is also the development of rehabilitation and deradicalization structures, presented as a set of measures aimed at restoring lost social ties for people who have, to some extent, been involved in extremist activities.

Among the hard measures implemented by SCO countries in the fight against the "Three Evil Forces", special attention is paid to the implementation of legislation restricting access to extremist content on the Internet. As pointed out by several scholars, the incitement to extremism and violence on social media plays a growing role in the radicalization of the youth in sectarian or political groups ([Séraphin Alava, 2017](#)). Extremist groups have, on the Internet, a global outreach to conduct violent propaganda, recruit supporters and increase their number of "sympathizers" ([Kubyakin, 2011](#)). This is why in parallel with the development of soft counterterrorism instruments, SCO State Members have also specialized in strengthening hard coercive surveillance policies. New Internet security measures were adopted by all SCO Member States, especially in the last few years ([Lain, 2016: 386-405](#)). For example, since 2016 the Republic of Uzbekistan, as indeed the Russian Federation through the Yarovaya law passed in 2016, requires ISPs to keep the metadata of their users for a period of three months ([Prikaz Ministra po razvitiyu..., 2016](#)).

Moreover, the Chinese law requires telephone operators and Internet service providers to “*Provide technical support and assistance, including decryption, to police and national security authorities in prevention and investigation of terrorist activities*” (Prikaz Ministra po razvitiyu..., 2016). The Republic of Tajikistan, for its part, decided in 2015 to transfer the services of Internet providers and telecommunications companies through a single communication center under the control of the government (Lain, 2016: 402). In July 2016, amendments to the Civil Procedure Code of the Republic of Kyrgyzstan were adopted to allow prosecutors to block websites deemed as extremist or terrorist for up to five days before obtaining court approval (Human Rights Watch, 2018). The national approaches of SCO Member State cyberspace surveillance fully meet the information security guidelines supported by the SCO on the international stage. In 2011, the SCO Member States submitted “The International Code of Conduct for Information Security” (the “Code”) to the UN General Assembly. The document was later revised in 2015 and aims to develop information security rules of behavior, as well as to extend the notions of sovereignty and territorial integrity to the virtual sphere, which according to scholars, may be problematic under international human rights law. Unrestricted control over the digital medium and its content could indeed contradict to rights to privacy, freedom of opinion and expression (McKune, 2015). Since the beginning of the Global War on Terror, attempts to prevent online radicalization processes pose a major challenge to the safeguard of freedom of expression worldwide. To strike a balance between security imperatives and human rights, key international standards must be observed to avoid indiscriminate blocking and prosecution, censorship over-reach and privacy intrusions.

The soft dimension of the SCO’s strategy against the “Three Evil Forces” is reflected above all in the area of cultural and humanitarian cooperation which covers a broad spectrum of domains such as education, energy policy, trade, infrastructure and finance. Although cultural and humanitarian cooperation is a key priority for the SCO, it has developed very gradually. The cultural and confessional heterogeneity of the SCO area encompassing Confucianism and Chinese Buddhism, Russian Orthodox Christianity and Sunni Muslims in Central Asia makes the task of developing humanitarian partnerships difficult (Xia, 2015). The foundation stone of cultural and humanitarian cooperation within the SCO was laid in 2002, when the culture ministers of SCO Member States first met and decided to organize the SCO “Days of Culture” to give visibility to artist collectives. Since then, numerous cultural events have been organized to commemorate the important historical dates of SCO Member States, as well as art festivals, concerts, exhibitions and educational weeks (Xia, 2015). Besides, an intergovernmental agreement on cultural cooperation was signed in 2007 in Bishkek. The areas of cooperation include literature and art, research and science, information sharing, personnel exchanges and the prohibition of illegal and criminal activities (Xia, 2015). Under Article 4, the agreement provides for cooperation measures to combat the unlawful expropriation of the cultural property of its Member States.

In the 2000s, the SCO initiated non-governmental cooperation in the humanitarian field which gave rise to multiple civil platforms such as, for example, the SCO Forum of experts, the SCO Business Club and the SCO University Network. The main focus in this paper is on the SCO Youth Council, the junior and civil platform for dialogue of the Organization. At the meeting of SCO Heads of State in June 2006, Russian President Vladimir Putin launched the idea of a Youth Council. In Beijing the following year, SCO Member States signed the Convention on the establishment of the SCO Youth Council, composed by national youth organizations: the Russian Youth Union and the Russian Youth Public Chamber; the Kazakhstan Youth Congress and the “Zhas Otan” youth wing of the “Nur Otan” People’s Democratic Party; the Youth Federation of China, the Civil Youth Council of Kyrgyzstan and the Youth Union of Tajikistan (Molodezhnyi Forum ShOS). The aim of the SCO Youth Council is to build synergies among SCO youth organizations within the framework of cultural exchanges, festivals, exhibitions and art competitions (Molodezhnyi sovet...). An initiative of the Youth Council is the “SCO Youth Card” designed to encourage and facilitate youth mobility within the SCO area (ShOS). The initiator of the “SCO Youth Card” is Aleksey Karpenko, representative of the Russian delegation to the SCO Youth Council, who developed this concept with his Kirgiz counterpart. Aleksey Karpenko described this joint project as “a service of sensations and experiences that allows people to immerse themselves in the culture and traditions of SCO countries” (Karpenko, 2018). The main task set forth is to raise awareness among the youth on the cultural diversity of SCO countries through leisure activities and tourism. In Karpenko’s words: “*As tourists encounter other cultures,*

learn about their lifestyle and traditions their attitude toward neighboring countries change. This is why I believe such projects as the SCO Youth Card are key to preventing extremism in the SCO area, especially bearing in mind that Afghanistan is an observer state to the SCO and Syria might also soon join the Organization” (Karpenko, 2018). Denis Turin, director of the SCO Business Club and founder of the media platform “InfoSCO”, noted that initially the fight against the ideology of extremism and terrorism was supposed to be one of the main spheres of activity of the SCO Youth council. There was indeed the idea of creating a common fund to consider proposals and projects from youth and civil society organizations on the fight against the spread of the ideology of extremism and terrorism. However, if Russia and China supported this initiative, Uzbekistan did not. Furthermore, Kyrgyzstan and Tajikistan were reluctant to invest money on new structures even though, paradoxically, they were the countries which more than any other could have benefited from a civil fund against extremism and terrorism (Turin). Another idea carrying great potential regarded the creation of a regional network dedicated to the fight against terrorism and drug trafficking from Afghanistan (Vasilenko et al., 2017). However, this project seems to have fizzled out after having left the negotiating table.

One of the main obstacles to the development of youth cultural and humanitarian cooperation was, until very recently, Uzbekistan’s longstanding refusal to support the SCO Youth Council (Karpenko, 2018). Islam Karimov’s administration was opposed to the idea of having an Uzbek delegation to the SCO Youth Council composed by national civil society actors (Dajyrbekov, 2018a). The SCO Youth Council maintained dialogue with Uzbek youth associations but could not however invite Uzbek representatives to their events as the Karimov administration refused to grant them visas to leave the country (Dajyrbekov, 2018a). In 2017, Uzbekistan’s new administration under Shavkat Mirziyoyev declared its support to the SCO Youth Council and its civil national delegation was successfully founded in 2018 by the Youth Union of Uzbekistan (Dajyrbekov, 2018a). Seen as the SCO functions on the basis of consensus, a vital missing piece has now been added to the SCO youth diplomacy enabling it to climb up a new step in its development with the support and recognition of all SCO founding Member States and, as a result, of the SCO Secretariat. Uzbekistan’s approval of the SCO Youth Council was accompanied by a renewed attention of SCO Member States to the role of the youth in the fight against extremism and terrorism.

This innovative leap forward is reflected in the Joint Address of the Heads of the SCO to the Youth, adopted at the SCO summit in Qingdao on 10 June 2018. An Action Program followed so as to implement the provisions contained in the address which includes practical steps to support and stimulate the youth to play an active role in the prevention of terrorism and extremism within the SCO framework. The Address underlines the fundamental values the SCO pledges to enhance in its fight against youth terrorism and extremism, namely patriotism, high morality, tolerance, humanity and mutual respect. It further emphasizes the “rich and unique historical, cultural and civilizational heritage” of SCO Member States and praises the way they adhere to “traditional principles and commonly accepted rules of behavior as an alternative to the norms and values of alien morality” (Sovmestnoe obrashchenie..., 2018). In addition, as suggested by the Chairman of the SCO Youth Council, Taalajbek Dajyrbekov, a unifying value which holds great potential for preventive counterterrorism purposes within the SCO is the “Shanghai spirit”; a concept which refers to mutual understanding, mutual support and mutual trust. Commonly known as the Eastern Paris, Shanghai is the city where the SCO was founded in 2001. Its diversity of cultures is a strong symbol for SCO Members States and a constant reminder that together and through mutual understanding many goals can be achieved, including the suppression of extremism, terrorism and drug trafficking (Dajyrbekov, 2018b). Determined to address the “root causes” of terrorism, the SCO declares indeed it fosters a “constructive” dialogue among its Members States intended to find substantive solutions to regional and global challenges through the construction of a more equitable and just world order (Ufimskaya deklaratsiya..., 2015). The measures suggested in the Address to counter the “Three Evil Forces” are ensuring favorable socio-economic conditions, education and job opportunities, self-expression and the discovery of one’s creative potential (Sovmestnoe obrashchenie..., 2018). The SCO thus call upon its youth to implement jointly a set of priorities and tasks in order to prevent extremism and terrorism. These include the development of a culture of tolerance and humanism, the strengthening of interethnic harmony and mutual understanding, the cultivation of patriotism and

internationalism; the promotion of joint economic and humanitarian initiatives aimed at mobilizing the youth in entrepreneurial activities and innovative projects in order to increase their employment; the intensification of scientific and technical exchange and the conduct of joint research ([Sovmestnoe obrashchenie..., 2018](#)). When mentioning the SCO Youth in its Address, the Organization mainly refers to the SCO Youth Council and the SCO Youth League.

The Action program on the implementation of the provisions of the Joint Address of the Heads of the SCO to the Youth (2018) includes four areas of collaboration: politics, science and education, culture, information and communication technologies. In the political sphere, the SCO Youth Council commits to develop and promote proposals on youth rights and the prevention of the “Three Evil Forces”; takes measures to improve national legislations of SCO Member States on combating the ideology of terrorism, separatism and extremism; attracts young generations in entrepreneurial activities and innovative projects in order to enhance their potential and employment opportunities ([Programma deistvii po realizatsii...](#)). In the dimensions of science, education and culture, annual conferences, seminars, round tables, exhibitions and contests on the education of the youth in the spirit of interethnic and interreligious harmony with the participation of religious research centers are on the agenda. The organization of Arts, sports and culture festivals and the development of tourism also appear among the tasks of the SCO Youth Council. Furthermore, the Action plan mentions the initiative of creating an association of young scientists in the framework of the SCO. Projects in the area of information and communication technologies aimed at preventing the spread of radical narratives comprise research and creatives work, documentaries and explanatory guides proving information on the threats of terrorism and extremism as well as on ethnic and religious hatred ([Programma deistvii po realizatsii...](#)).

The first SCO Youth Assembly in the history of the Organization was held in Dongfang (Hainan Province, China) on 8-12 November 2018 under the title “The SCO Youth against Terrorism and Extremism”. As stressed by the Chairman of the SCO Youth Council, Taalajbek Dajyrbekov, the title of the event fully mirrors the essence of the SCO’s creation and activities ([Dajyrbekov, 2018a](#)). The Assembly was organized by the SCO Youth League and launched under the personal initiative of SCO Secretary General, Rashid Alimov ([Zolochevskiy, 2018](#)). It also symbolized the first event by the means of which the SCO Secretariat chose to pay special attention to the SCO Youth Council ([Dajyrbekov, 2018a](#)). The assembly was inaugurated within the framework of the practical implementation of the Joint Address of the Heads of the SCO to the Youth and welcomed the representatives of the SCO Youth Council. During the Assembly, SCO Secretary General Rashid Alimov, while commenting the key importance of the prevention of radical ideologies and narratives among the youth, stated that: “Mass information, ideological and psychological pressure, the imposition of alien values and false religious ideas have broken many young lives, led to terrible human tragedies, caused the death of many people. Those young people who choose such a slippery path are moving away from traditional moral values, losing their moral core, taking the road of life which leads to a dead end” ([Ofitsial’nyi sait Shankhaiskoi...](#)).

As a follow-up to the SCO Youth Assembly and a contribution of the SCO Youth Council to the fight against extremism and terrorism, two main events will be organized next year: the Forum on Tourism Development and the Festival of Arts. Within these events, tourism will be perceived as an instrument to promote cultural diversity and tolerance against extremism, whereas exchanges on humanitarian values will serve as a platform to reveal the beauties of the artistic heritage of SCO Member States. Painting, drawing and singing workshops will also be on the agenda at the Festival of Arts with the goal of expressing, through creativity, the destructive impact of extremism and terrorism on the cultural heritage of the SCO area ([Dajyrbekov, 2018a](#)).

4. Conclusion

The SCO has entered a new phase in its development supported by the firm commitment of collaboration between its founding Members, including Uzbekistan, and SCO youth organizations. At the heart of this collaboration is a comprehensive work plan addressing the patriotic, spiritual and moral education of the youth to prevent it from engaging in radical activities. The adopted Program of Cooperation of SCO Member States on Combatting Terrorism, Separatism and Extremism for 2019-2021 should further contribute to strengthening practical cooperation in this area ([Informatsionnoe soobshchenie..., 2018](#)). For several years now, each SCO Member State organizes separately and unilaterally forums, roundtables and conferences resulting from the

collaboration between national youth associations and state entities to which all SCO youth organizations are invited. Such meetings form the basis of the SCO's youth multilateral soft diplomacy and follow two main forms of action: cultural activities and explanatory work. On the one hand, SCO Member States promote the initiatives of civil society youth associations aimed at cultivating patriotism, tolerance and multiethnic harmony. In these events, the topic of extremism is addressed indirectly through the promotion of tourism, arts and cultural diversity. On the other hand, explanatory work is carried out on the mechanisms involved in the spread of radical ideology and on the behavior to adopt in order to comply with national counterterrorism legislations. Within the SCO youth organizations, this form of action is carried out in an open non-binding discussion format among the young leaders of the SCO Member States. Specific joint projects do not necessarily arise from these forms of action. Hence, the SCO Youth Council mainly functions as a dialogue platform to forge closer links among national delegations which implement educational and cultural programs autonomously or in bilateral forms.

Uzbekistan's lack of support until last year as well as a lack of budgetary funds are the main reasons for which the SCO Youth Council does not take the form of a full-fledged network of youth organizations that jointly and simultaneously elaborate and implement interregional programs on the fight against the "Three Evil Forces". Some SCO activists might however argue that such a network already exists informally. What is certain is that SCO founding Member States have a very similar approach to soft counterterrorism, especially Russian and Central Asian Republics due to their shared historical past and principles. Moreover, the Joint Address of the Heads of the SCO to the Youth undoubtedly reflects a common vision and action program with regard to the instruments which should be implemented multilaterally to prevent the radicalization of the youth in the SCO area. It follows from the above, that such soft counterterrorism instruments already exist in the national systems of each SCO founding Member State and have great potential to unite into a joint, coordinated and interregional struggle against the "Three Evil Forces" led by youth civil society organizations, for example in the form of an antiterrorism civil network. The main stumbling blocks in this area of cooperation will be to attract the marginalized and at risk of radicalization components of the youth, to ensure the funding of counterterrorism multilateral programs, to coordinate interregional partnerships on such a vast geographic area and to retain autonomy of action.

The SCO's soft diplomacy and inclusive fight against violent extremism deals with the complexity of enacting a comprehensive and participatory strategy due to the multiplicity of actors implied, the variety of cooperation areas to cover, the immensity and cultural diversity of the SCO zone. The consensus-based functioning of the SCO and its budgetary limitations, based on the equitable sharing of expenses among founding Member States, further hinder the development of SCO soft diplomacy. Ultimately, the broad and blurry definitions of terrorism and extremism and their interchangeable usage also make the SCO's ideological and practical struggle against the "Three Evil Forces" a very difficult and ambiguous task. Hence, the SCO youth, empowered by its new role of actor in the fight against violent extremism, faces the twofold challenge of preventing radicalization and of improving the SCO's counterterrorism strategy.

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Vietnamese Teachers' Perceptions of Social-Emotional Learning Education in Primary Schools

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Abstract

Teachers are the primary deliverers of Social-Emotional Learning (SEL) program, and therefore their beliefs, attitudes, and support towards SEL influence the adoption, sustainability, and impacts of this program. The aim of the present research is to measure the perception of social emotional learning education among Vietnamese primary school teachers. A group of 250 Vietnamese primary school teachers (142 males and 108 females) participated in the survey. They completed the Teachers' Perceptions of Social Emotional Learning scale (TPSEL). The scale included four subscales which are the Teachers' perceived level of the necessity of SEL education in primary schools (TPN), the Teachers' perceived level of the importance of SEL education in primary schools (TPI), the Teachers' perceived level of concern about SEL education in primary schools (TPC), and the Barriers to the Implementation of SEL Programs (BISEL). Results showed significant differences in BISEL among the teachers with different years of teaching experience. Moreover, various educational backgrounds affected TPN and BISEL considerably. The interaction effect on TPN and BISEL was found. The results suggested that regardless of the differences in educational backgrounds and years of experience, the teachers were all aware of the necessity as well as the challenges when implementing SEL in classrooms in primary schools.

Keywords: educational background, Social and Emotional Learning, teachers' perception, years of experience.

1. Introduction

Social and emotional learning is referred to by many names, including soft skills; non-cognitive or meta-cognitive skills; mindsets, essential skills, and habits (MESH) (Transforming Education); 21st-century skills (P21); and readiness abilities (Krauss et al., 2016). The previous research has suggested that teachers are the primary implementers of SEL programs. Their beliefs

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about SEL likely influence program delivery, valuation, and outcome (Brackett et al., 2012; Buchanan et al., 2009; Ee, Cheng, 2013). The research examined the perceptions of Vietnamese teachers of social emotional learning education in primary schools.

A substantial body of research has reported that teachers have the varying perceptions that may moderate the extent to which an SEL program is delivered as intended by program developers and has the intended impact on students. One research found that many teachers believe that SEL is important, schools should take an active role, receiving support from a variety of professionals would be helpful, and current academic demands decrease the opportunity for SEL (Buchanan et al., 2009). Another research found that the disseminators of knowledge in the classroom, teachers and their beliefs about SEL may shape the learning environment and in turn, impact students' developmental outcomes (Brackett et al., 2012). A third research found that teachers' perceptions of their role in infusing SEL and their doubtful belief that SEL will lead to students' academic achievement may impede the success of their SEL infusion in class (Ee, Cheng, 2013).

A teacher's perception of whether the SEL program is necessary also affects the effectiveness of the SEL infusion in classrooms (Schultz et al., 2010). The teacher's perception of the time limitation also influences the effectiveness of the infusion. It is likely that if the teacher is pressured to ensure the class performs well academically, he or she may think that SEL lessons can be sacrificed in favor of academic subjects (Schultz et al., 2010). This would lead to a less effective infusion of SEL in classrooms. The difference in perception of educators' responsibilities in developing SEL of students also leads to varying results; if the teacher feels that the social and emotional development of a child falls outside of the job scope of a teacher, he or she is not likely to carry out the SEL programs with conviction (Schultz et al., 2010). Although SEL is not a new topic, there are still a limited number of studies done in Vietnam, especially for Vietnamese teachers. To fill this gap, this research is conducted to empirically explore teachers' perception of SEL in Vietnam. The aim of this research is to measure perception of social emotional learning education among Vietnamese primary school teachers.

The research starts with reviewing the empirical literature of teachers' perception of SEL. A simple analytical framework is introduced in the second section, followed by research methodology, result, and discussion. The last section is conclusion.

2. Methods

Research Hypotheses

A 3×4 factorial design was used. The independent variables were two aspects of the teacher: educational background (Associate's degree, Bachelor's degree, and Postgraduate degree) and teaching experience (1-3 years, 3-5 years, 5-8 years, and over 8 years). Four dependent variables were measured: Teachers' perceived level of the necessity of SEL education in primary schools (TPN), the Teachers' perceived level of the importance of SEL education in primary schools (TPI), the Teachers' perceived level of concern about SEL education in primary schools (TPC), and the Barriers to the Implementation of SEL Programs (BISEL). The following null hypotheses were tested:

Ho₁ (main effect): There is no significant difference among the three study groups of different educational backgrounds (Associate's degree, Bachelor's degree, and Postgraduate degree) when they are compared simultaneously on the Teachers' perceived level of the necessity of SEL education in primary schools (TPN), the Teachers' perceived level of the importance of SEL education in primary schools (TPI), the Teachers' perceived level of concern about SEL education in primary schools (TPC), and the Barriers to the Implementation of SEL Programs (BISEL)

Ho₂ (main effect): There is no significant difference among the four study groups of different years of experience (1-3 years of experience, 3-5 years of experience, 5-8 years of experience, and over 8 years) when they are compared simultaneously on the Teachers' perceived level of the necessity of SEL education in primary schools (TPN), the Teachers' perceived level of the importance of SEL education in primary schools (TPI), the Teachers' perceived level of concern about SEL education in primary schools (TPC), and the Barriers to the Implementation of SEL Programs (BISEL)

Ho₃ (interaction effect): There is no significant interaction between educational background and teaching experience when teachers are compared simultaneously on the Teachers' perceived level of the necessity of SEL education in primary schools (TPN), the Teachers' perceived level of

the importance of SEL education in primary schools (TPI), the Teachers' perceived level of concern about SEL education in primary schools (TPC), and the Barriers to the Implementation of SEL Programs (BISEL)

Participants

The convenience sampling method was used to recruit teachers who volunteered to help with the study and administer the survey. The survey instrument was distributed to 280 Vietnamese teachers of six primary schools located in two large Vietnam cities (Can Tho and Ho Chi Minh), of which 250 questionnaires were returned, for an 89.29 % return rate, which exceeds the 30 % response rate most researchers require for analysis (Dillman, 2000). The sample of this study was drawn from 250 respondents who completed the survey instrument.

All participants were provided informed consent after receiving an explanation of the purpose of the research. The research was approved by the ethics committee of the Ho Chi Minh City University of Education. There were more males (56.8 %) than females (43.2 %) among the 250 Vietnamese primary teachers who were surveyed. Of these, the majority of the teachers had a bachelor's degree (48 %), 33.2 % had a postgraduate degree, and 18.8% had an associate's degree. 58.8 % of respondents had 1-3 years of experience teaching in primary schools, 19.2 % had 3-5 years of experience teaching in primary schools, 12.8 % had 5-8 years of experience teaching in primary schools, and 9.2 % of teachers had over eight years of experience teaching in primary schools. Table 1 shows the distribution of participants in the educational backgrounds by groups of teaching experience.

Table 1. Number of Participants in the Educational Background by Groups of Teaching experience Groups

Educational Background	Teaching experience				Total
	1-3 years	3-5 years	5-8 years	Over 8 years	
Associate's degree	12	16	4	15	47
Bachelor's degree	86	22	8	4	120
Postgraduate degree	49	10	20	4	83

Questionnaires

Participants were asked to complete the following questionnaire: the Vietnamese version of the Teachers' perceptions of Social Emotional Learning scale (TPSEL). This is a 26 item self-report scale, based on the original 35-item scale from Buchanan et al. (2009). The scale included four subscales including the Teachers' perceived level of the necessity of SEL education in primary schools (TPN), the Teachers' perceived level of the importance of SEL education in primary schools (TPI), the Teachers' perceived level of concern about SEL education in primary schools (TPC), and the Barriers to the Implementation of SEL Programs (BISEL). It was designed for primary and secondary school teachers. All participants were instructed to read the questions carefully and choose the responses that best described themselves. The TPSEL consisted of 26 questions administered to groups of teachers simultaneously. None of the teachers refused to answer the questionnaire and they were asked to select the option which best corresponded to their beliefs, by circling the number in front of the selected option. The survey consisted of three pages printed front to back and took approximately 10 minutes to complete. A consent form was attached to the cover page. The consent form contained information about the purpose of the survey and intended use of the information as well as instructions indicating that the survey responses were anonymous. Teachers were not offered any compensation for completing the survey. The first section of the survey contained five questions targeting at demographic information. The body of the survey contained 26 questions that asked teachers to respond to items ranging from a low of one to a high of five. Table 2 provides a sampling of the survey questions, listed by content domain.

Table 2. Sample Survey Questions

Domain	Survey Question
Level of the necessity of SEL education	Do you think SEL programs should be taught in the classroom?
Level of the importance of SEL education	Do you think that social-emotional competencies such as self-awareness, self-management, social awareness, relationship management and responsible decision making are important to our students?
Level of concern about SEL education	To what extent are you interested in integrating the social-emotional learning in your teaching?
Barriers to Implementation SEL	What difficulties do you face when trying to infuse SEL into your lessons?

Statistical Analysis

Statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS 22.0). Descriptive statistics were used to analyze the data collected. A two-way multivariate analysis of variance (MANOVA) was performed with two independent variables (educational background and teaching experience) and four subscales of the TPSEL as dependent variables. The average item mean, average standard deviation, F values and effect sizes from MANOVA were calculated for each scale of the TPSEL questionnaire. These analyses were used to investigate differences in Teachers' perceived level of necessary for SEL education in primary schools (TPN), the Teachers' perceived level of importance for SEL education in primary schools (TPI), the Teachers' perceived level of concern with SEL education in primary schools (TPC), and the Barriers to Implementing SEL Programs (BISEL) of primary school teachers according to educational background and teaching experience.

3. Results

Descriptive Analysis

The participants scored in the average range on the TPSEL questionnaire. The mean score for the sample on the TPN subscale was 6.04 (SD = 1.71). The mean score for the TPI subscale was 1.67 (SD = .86). The mean score on the TPC subscale was 2.07 (SD = .81). The mean score on the BISEL subscale was .98 (SD = .64). [Table 3](#) presents descriptive statistics of dependent variables including TPN, TPI, TPC and BISEL results by educational background and groups of teaching experience.

Table 3. Summary of Mean (M) and Standard Deviation (SD) of TPSEL Questionnaire

Educational Background	Teaching experience				Combined
	1-3 years	3-5 years	5-8 years	Over 8 years	
<i>TPN</i>					
Associate's degree					
M	3.083	3.425	2.850	3.080	3.178
SD	.301	.281	.251	.398	.368
Bachelor's degree					
M	3.360	3.463	3.500	3.750	3.401
SD	.378	.292	.512	.300	.376
Postgraduate degree					
M	3.416	3.480	3.530	3.450	3.453
SD	.367	.168	.345	.100	.335
<i>TPI</i>					
Associate's degree					
M	3.333	3.375	3.450	3.346	3.361
SD	.130	.143	.100	.206	.159
Bachelor's degree					
M	3.507	3.281	3.475	3.300	3.456

SD	.300	.210	.353	.476	.305
Postgraduate degree					
M	3.232	3.240	3.3600	3.200	3.262
SD	.309	.157	.166	.230	.264
<i>TPC</i>					
Associate's degree					
M	3.666	3.487	3.750	3.720	3.629
SD	.299	.399	.100	.259	.325
Bachelor's degree					
M	3.883	3.736	3.825	3.700	3.846
SD	.435	.178	.580	.200	.407
Postgraduate degree					
M	3.506	3.760	3.630	3.750	3.578
SD	.458	.126	.313	.500	.407
<i>BISEL</i>					
Associate's degree					
M	3.037	3.511	3.204	3.090	3.230
SD	.179	.232	.239	.206	.292
Bachelor's degree					
M	3.069	3.247	3.250	3.159	3.117
SD	.196	.080	.265	.239	.200
Postgraduate degree					
M	3.120	3.000	3.000	3.136	3.077
SD	.260	.181	.193	.117	.236

Inferential Analysis

The null hypotheses were tested using a two-way MANOVA. In order to run MANOVA, we conducted preliminary assumption check for normality, univariate and multivariate outliers, homogeneity of variance-covariance matrices. To identify the univariate outliers, the variables were examined. No univariate outlier was detected in the sample, as indicated by z-scores falling between -3.29 and +3.29 (Tabachnick et al., 2001). One multivariate outlier was identified in the sample by means of inspection of Mahalanobis distances with $p < .001$ (Tabachnick et al., 2001), but was not excluded from the overall sample, following the recommendations by Field (2013) and Cousineau and Chartier (2010). MANOVA is robust to violations of normality if the sizes of groups are nearly equal or if the size of the largest group is less than about 1.5 times the size of the smallest group (Leech et al., 2005). The largest group in this research ($n = 86$) was about 21.5 times larger than the smallest group ($n = 4$), the multivariate homogeneity of variance-covariance matrices tested with Box's M test revealed that the M value of 250.114 was significant ($p < .05$). Therefore, the assumption of normality and homogeneity of covariance matrices were not satisfied. For this reason, a more robust statistic, Pillai's Trace, was used for reporting the result.

The MANOVA revealed a significant multivariate effect for teaching experience, Pillai's Trace = .126, $F_{(12, 711)} = 2.60$, $p < .01$, partial $\eta^2 = .042$, and a significant multivariate effect for educational background, Pillai's Trace = .180, $F_{(8, 472)} = 5.83$, $p < .01$, partial $\eta^2 = .090$. A significant multivariate effect for interaction was also found, Pillai's Trace = .261, $F_{(24, 952)} = 2.76$, $p < .01$, partial $\eta^2 = .065$. Therefore, the results revealed that all hypotheses were not rejected in this research.

Based on the significant effects found from the MANOVA, a separate two-way univariate analysis of variance (ANOVA) for each of the dependent variables was conducted without undue inflation of the experimentwise Type I error (Grimm, Yarnold, 1995). The Levene's Test of Equality of Error Variances tests the assumption of MANOVA and ANOVA that the variances of each variable are equal across the groups. If the Levene's test is significant, this means that the assumption has been violated. In this research, the value of Levene's test came out to be non-significant for all the variables with the exception of TPI [$F_{(11, 238)} = 5.300$, $p < .05$] and TPC [$F_{(11, 238)} = 7.476$, $p < .05$] factors. So, for the other variables (TPN [$F_{(11, 238)} = 1.213$, $p > .05$], BISEL [$F_{(11, 238)} = 1.953$, $p > .05$]) the assumption that the variances of each variable are equal across the groups was met.

Table 4. Combined univariate ANOVA table

Source	Dependent Variable	Sum of Squares	df	Mean Square	F	p	Partial η^2
Corrected Model	TPN	5.043 ^a	11	.458	3.679	.001	.145
	TPI	3.149 ^b	11	.286	4.063	.001	.158
	TPC	5.724 ^c	11	.520	3.396	.001	.136
	BISEL	3.717 ^d	11	.338	7.802	.001	.265
	TPN	1240.505	1	1240.505	9953.448	.001	.977
	TPI	1222.918	1	1222.918	17358.467	.001	.986
	TPC	1500.182	1	1500.182	9791.278	.001	.976
	BISEL	1088.214	1	1088.214	25127.911	.001	.991
Teaching experience	TPN	.961	3	.320	2.571	.055	.031
	TPI	.314	3	.105	1.484	.220	.018
	TPC	.098	3	.033	.213	.888	.003
	BISEL	.877	3	.292	6.751	.001	.078
Educational background	TPN	3.536	2	1.768	14.186	.001	.107
	TPI	.396	2	.198	2.814	.062	.023
	TPC	.398	2	.199	1.300	.274	.011
	BISEL	.447	2	.223	5.156	.006	.042
Teaching experience * Educational background	TPN	1.613	6	.269	2.157	.048	.052
	TPI	.613	6	.102	1.451	.196	.035
	TPC	1.423	6	.237	1.547	.163	.038
	BISEL	1.819	6	.303	7.001	.001	.150
Error	TPN	29.662	238	.125			
	TPI	16.767	238	.070			
	TPC	36.465	238	.153			
	BISEL	10.307	238	.043			
Total	TPN	2885.400	250				
	TPI	2866.560	250				
	TPC	3495.840	250				
	BISEL	2456.140	250				
Corrected Total	TPN	34.705	249				
	TPI	19.916	249				
	TPC	42.189	249				
	BISEL	14.024	249				

a. R Squared = .145 (Adjusted R Squared = .106)
 b. R Squared = .158 (Adjusted R Squared = .119)
 c. R Squared = .136 (Adjusted R Squared = .096)
 d. R Squared = .265 (Adjusted R Squared = .231)

The ANOVA results as shown in [Table 4](#) revealed significant teaching experience effects on BISEL [$F_{(3, 238)} = 6.75, p < .05, \text{partial } \eta^2 = .07$] among the 1-3 years, 3-5 years, 5-8 years, and over 8 years (1-3 years: $M_{\text{BISEL}} = 3.07$; 3-5 years: $M_{\text{BISEL}} = 3.25$; 5-8 years: $M_{\text{BISEL}} = 3.15$; over 8 years: $M_{\text{BISEL}} = 3.12$). Significant educational background effects on TPN [$F_{(2, 238)} = 14.18, p < .05, \text{partial } \eta^2 = .10$] and BISEL [$F_{(2, 238)} = 5.15, p < .05, \text{partial } \eta^2 = .04$] among the Associate's degree, Bachelor's degree and Postgraduate degree (Associate's degree: $M_{\text{TPN}} = 3.17, M_{\text{BISEL}} = 3.23$; Bachelor's degree: $M_{\text{TPN}} = 3.40, M_{\text{BISEL}} = 3.11$; Postgraduate degree: $M_{\text{TPN}} = 3.45, M_{\text{BISEL}} = 3.07$). A significant interaction effect on TPN [$F_{(6, 238)} = 2.15, p < .05, \text{partial } \eta^2 = .05$] and BISEL [$F_{(6, 238)} = 7.00, p < .05, \text{partial } \eta^2 = .15$] were found.

4. Discussion

This research examined the extent of teachers' perceptions of SEL education in primary schools. Following recent research ([Brackett et al., 2012](#); [Buchanan et al., 2009](#); [Ee, Cheng, 2013](#); [Youngblood, 2015](#)), the hypothesis of this present research was that the teaching experience and the teacher's educational background affect the teacher's perception of the necessity, importance, concern and barriers to the implementation of SEL programs in primary schools.

The main findings indicate that there was a significant difference among groups of teachers with different teaching experiences and educational backgrounds when they are compared in the Teachers' perceptions of Social Emotional Learning scale. These findings showed a relationship between the years of teaching experience and the teachers' perception of difficulties in implementing SEL education in classroom. The results of this research also proved that the teacher with high educational background had high perceived level of the necessity of SEL education in primary schools.

This research highlighted the fact that the teachers' educational background and teaching experience had significant influences in applying SEL education in classroom. Teachers with Postgraduate degree had higher perceived level of the necessity for SEL education in primary schools compared to those with Bachelor's degree and Associate's degree. This finding was supported by the result of [Buchanan et al. \(2009\)](#) who found that nearly all (98.9 %) teachers believed that SEL education played an pivotal role for the success of students. Teacher educators have a special responsibility in developing soft skills like SEL among teacher trainees. In addition, teacher educators have a major impact on the development of SEL for teacher trainees. Unfortunately, an Associate's degree often takes a period of three-year training in university which is not enough to instill SEL into teacher trainees. This is proved by this research's results showing that teachers with Associate's degree find it most challenging when applying SEL in classroom compared to other teacher groups. This result seemed to be consistent with [Schulz \(2008\)](#) and [Esen-Aygun and Sahin-Taskin \(2017\)](#) suggestions. They emphasized that teachers who had their training at the University (Bachelor's degree, Postgraduate degree) were more familiar with the concept of SEL than those training at Teacher Training College (Associate's degree). Therefore, teachers should be aware of their educational developments.

This research also found that teachers with 3-5 years of experience found it most challenging when applying SEL in classroom compared to other teacher groups except for 1-3 years of teaching experience group. This suggests that teachers who have more teaching experience at schools find it less difficult when infusing SEL into classroom as they are more familiar with this concept. For the teacher group with 1-3 years of experience, the figure is lower than other groups since the teachers are usually fresh graduates or interns who are not required to apply SEL in teaching.

The p-values tell us that there is an interaction effect of teachers' educational background and years of teaching experience on the perception of SEL. However, the interaction effect of teachers' educational background and years of experience may not have strong impact on the perceptions of Vietnamese primary school teachers about social emotional learning education. It is important to notice that despite the differences in educational background and teaching experience, teachers were all aware of the necessity as well as the challenges when implementing SEL in classroom.

The limitations of this research pertain mostly to the sample and the self-reported measurements. Although the sample was of good size, it consisted mostly of teachers who had Bachelor's degree or Postgraduate degree. Associate's degree was less present. This might suggest a limitation to the generalization of findings across the years of teaching experience and all teachers' educational levels. In addition, this research employed only self-report questionnaires, which might bias the findings as well, and was a cross-sectional research, which does not allow

concluding about causal relationships between research variables. Future studies should address these limitations, and further examine teachers' social-emotional competencies, and how they contribute to an effective teacher-student relationship in Vietnam.

5. Conclusion

Results from the current research support Buchanan et al. (2009) supposing SEL to be important in school. To the best of the authors' knowledge, this is the first research to examine the perception of Vietnamese teachers about Social Emotional Learning education in primary schools. In addition to the very limited research in this aspect in Vietnam, the results of this research are necessary for Vietnamese teachers to have a better understanding of Social Emotional Learning education. We are hopeful that this research will stimulate similar investigations in an effort to rigorously continue to bridge the gap between research and practice in Vietnam schools.

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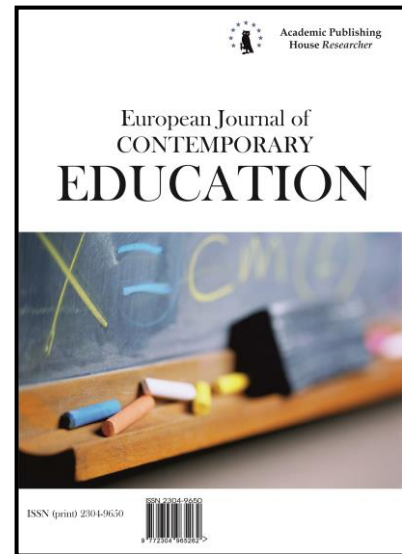
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“Planetary Linguistic Personality” Category and Bi/Polylinguistic Modeling of the Pedagogical Process of Higher School Professional Training: Sochi Linguistic and Rhetorical School

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Abstract

The article substantiates the synergistic concept of complex linguistic and rhetorical (L&R) training necessary for the high-quality professional training of a future specialist of any direction and profile of higher school education; the specification is made on the example of a teacher of a foreign language (foreign languages). The restructuring of the educational process in the framework of the bi/polylinguistic learning model developed by representatives of the Sochi L&R School is based on the positions set out in the article. For the development of a professional bi/polylinguistic personality of a future specialist, more effective than the specialized formation of the L&R competence only in the field of foreign languages is the purposeful and coordinated work of the entire teaching staff in the framework of “the single linguistic-rhetorical and cultural-speech regime” according to the formation of Russian and foreign language L&R competencies of learners. The speech-thinking culture of future specialists, integrating in a bi/polylinguistic relation, including an invariant core and ethno-linguistic- rhetorical variants, is a qualitatively new psycholinguistic formation, which is formed on the basis of the interaction of the substructures of the primary and secondary linguistic personality. A necessary condition for the formation of speech-thinking culture of future specialists is the formation of students' readiness for professional self-designing as a future specialist on the basis of a bi/polylinguistic L&R competence of mixed type.

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Keywords: linguistic and rhetorical (L&R) approach, Sochi L&R School, bi/polylinguistic model of professional training of a future specialist, speech-thinking culture, a foreign language teacher, planetary linguistic personality category.

1. Introduction

The relevance of long-term studies at the Sochi linguistic and rhetorical (L&R) school, which is currently being conducted and completed, is due to the fact that in the informational era of the globalization development of the planet a single global community of a new quality should be formed with objective inevitability. It is intended to reach quickly a consensus and mutual understanding on all the pressing issues of concern to humanity: from peaceful coexistence, victory over hunger and disease, mutually beneficial cooperation, through the formation of a unified poly-ethno-socio-cultural and educational space of the planet and the education of viable, active and creative young generations to large-scale practice-oriented space research and the prevention of impending environmental catastrophe.

In the concept of Sochi L&R School, **the mega-community “Earthlings” qualifies as a single planetary collective linguistic personality of humanity.** Thus, in the work of V.F. Nechiporenko "Ways of linguistics development and its perspectives (From V. Humboldt to G. Guillaume)" the project of "linguistic Manifest", adequate to the coming third millennium, is based on the following leading position: man is a cosmic being, and language, speech, thinking are subsystems of this microcosm, with the help of which we cognize the Universe, and it cognizes us (Nechiporenko, 1997; Ponomarenko et al., 2017). Involving the terminology of the conceptual apparatus of the Russian cosmos-philosophical discourse, firstly, classical, studied under our leadership (texts by V.I. Vernadsky, K.E. Tsiolkovsky and other cosmists) (Tihonova, 2013), secondly, developing its ideas of the modern trend – Philosophy of Synthesis of Russian Cosmism (Serdyuk, 2012), the use of terminological combinations “metagalactic nation of earthlings”, “confederation of earthlings”, “a man of the planet”, “a man of the new era”, etc. is legitimate.

From the standpoint of the L&R paradigm, the structure of such a planetary linguistic personality is a conglomerate modeled with regard to the data of geolinguistic classifications, genealogical and areal, i.e. according to families, branches, groups, and subgroups of languages. In addition, substructures are distinguished on the basis of data of structural-typological linguistics, at the levels of language operations: phonetic-phonological, morphological, and syntactic. The above substructures of the planetary linguistic personality operate through its generalized ethno-socio-stratum representatives; in multinational countries, the “American linguistic personality”, “Russian linguistic personality”, etc. are a complex type of linguistic personality by state affiliation.

In the educational and applied aspect, according to the concept of continuous L&R education in the Russian poly-ethno-sociocultural and educational space, the linguistic personality of the learner as a subject of discursive processes should be formed taking into account the L&R model developed in Sochi L&R School as a strategic guideline: strong linguistic personality of dialogic, democratic, multicultural type; professional linguistic personality (Vorozhbitova, 2015; Vorozhbitova, Issina, 2018 and others).

Theoretical and methodological foundations and model constructions applied to the specifics of research subjects and student contingents developed, refined and tested in large-scale experimental work, which took into account all the realities and complexities of the educational process.

At the university level, in the framework of the scientific specialization 13.00.08 – Theory and methods of professional education, studies have been conducted, including studies (Timofeyev, Vorozhbitova, 2014; Yuryeva, Vorozhbitova, 2014; Datsun, Vorozhbitova, 2018, etc.); in relation to the preschool and school steps, specialization 13.00.01 – General pedagogy, history of pedagogy and education, – studies (Ermakova, Vorozhbitova, 2014, Tikhonova, Vorozhbitova, 2016; Petrovskaya, Vorozhbitova, 2016, etc.).

2. Materials and Methods

The materials used were theoretical, research and methodology papers, data obtained during the educational process at universities where the authors of this paper work. The following theoretical methods were used: analysis of scientific, methodological, educational literature, federal

state educational standards, other regulatory documentation, program-methodical and educational software; generalization of pedagogical experience; pedagogical modeling. The empirical methods used were pedagogical observation, questioning, expert assessment, analysis of the students' works, pedagogical experiment, mathematical processing and interpretation of data, etc.

To verify the research hypothesis we conducted work with 4 groups of students, the two of which were control groups with the other two being experimental. It was not possible to choose probability sampling method due to the nature of the experiment but every effort was taken to make sure the groups were as equal as possible. The control group 1 (CG1) was comprised of 15 second year students and group 2 (CG2) of 16 third year students. The experimental groups (EG1, EG2) included 15 second year students and 15 third year students. The students of all of the groups specialized in foreign languages. In terms of skills, age, academic background and number of the participants the groups were nearly equal which was confirmed by the initial diagnostics tests (See Table 1). When assessing the results control groups 1 and 2 were combined into CG (31 students) and experimental groups 1 and 2 into EG (30 students) respectively.

The students' results were evaluated on a 4 point scale, with 1 for a very low level of the skill being assessed (less than 60 % of correct answers), 2 for low (60 to 75 %), 3 for medium (75 to 90 %) and 4 if the student had a high level (90 % and over).

The Pearson's chi-squared test was used for the results verification first in order to check whether the groups were statistically equivalent and then to make sure that the results of the experimental group were statistically different from those of the control group.

3. Discussion

The strategic goal of the educational process in the field of speech-thinking training at the high school in relation to the Russian language (as native, as state) is determined by the sociocultural model "*Professional linguistic personality: a strong linguistic personality of a dialogical, democratic, multicultural type, possessing high level of L&R competence and professional training*". The Figure 1 shows the structural components of the model. *High level of L&R competence* and general educational, as well as professional *erudition of extralinguistic nature* correlate as the form and content of *ethically responsible* speech-thinking activities, being actualized by the dialogical strategy of sociocultural communication.

The high level of L&R competence, i.e. the effectiveness of all mechanisms of its implementation in different registers, modes, forms of communication, styles, types and genres of speech in actual speech events of different types, turns the subject of speech-thinking activity into a strong linguistic personality. The implementation of a *democratic strategy* of sociocultural communication requires, first of all, a deep-seated personal orientation toward *the equality of communication partners*. It inspires *dialogic L&R toolkit* in an explicit form (art of conversation – business, friendly, secular; skill of a dispute, discussion, controversy, etc.), as well as in an implicit form (oratorical monologue).

The socioculturally demanded communicative strategy of a modern specialist is embodied by the typological features of a linguistic personality of a democratic, dialogical, multicultural type:

- the pursuit of humanized subject relations with the addressee;
- the pursuit of a constructive dialogue, a broad discussion with the aim of reaching an agreement, the adoption of mutually acceptable solutions;
- the desire to harmonize communication based on the general psychological patterns of effective communication, understanding of ethnocultural differences and individual characteristics of the interlocutor.

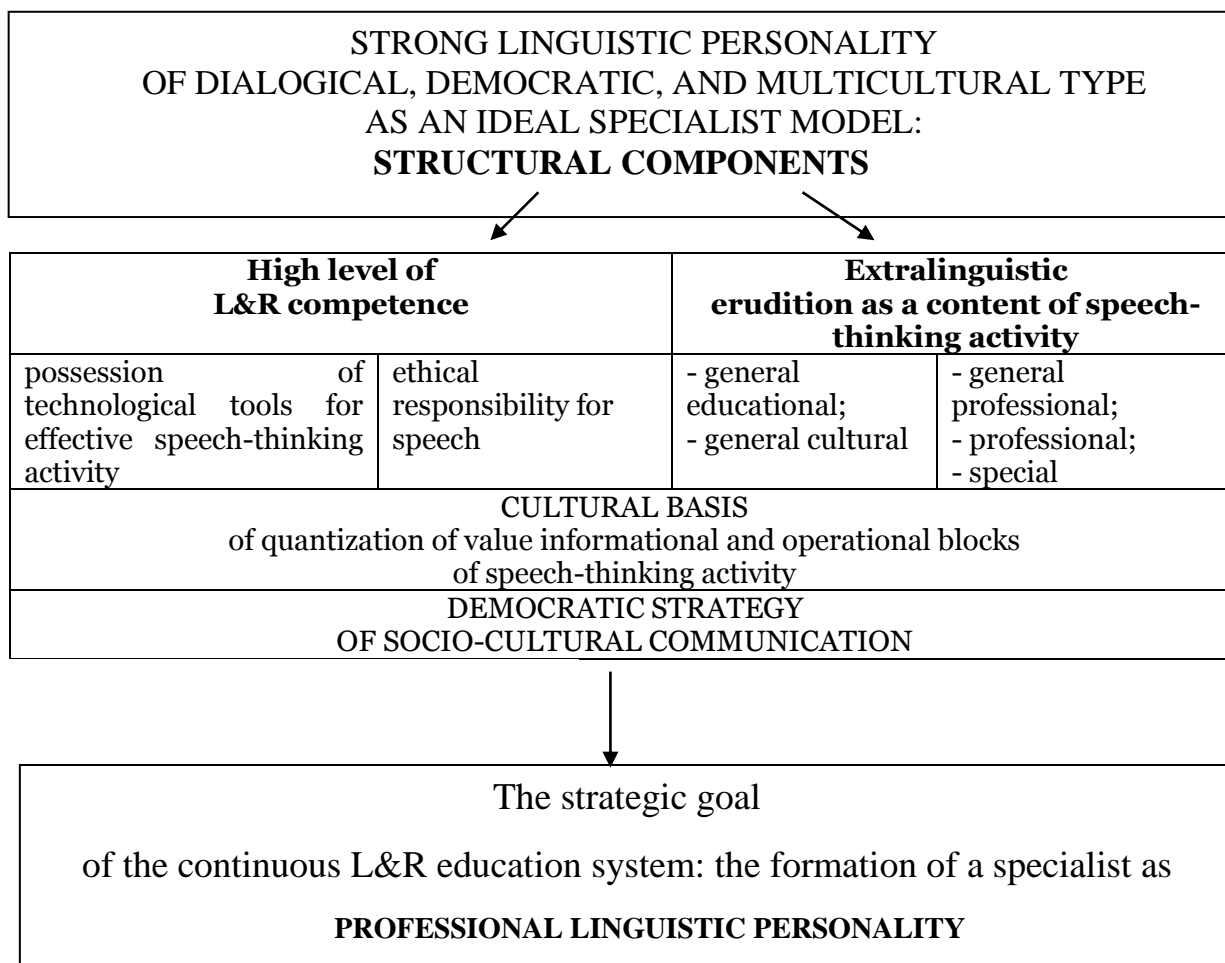


Fig. 1. The ideal sociocultural model of a Russian specialist of the XXI century as L&R ideal of professional linguistic personality

The theoretical-methodological and, at the same time, educational-applied, technological matrix of 16 L&R parameters of effective speech-thinking activity, implemented on the material of Russian and foreign language (s), is formed at the intersection of four categorical series:

1. The ideology of speech act: 1) Ethos (Benefit – Welcome); 2) Logos (Thought – Truth); 3) Paphos (Beauty – Harmony), 4) Sofia (Inspiration – Love).

2. Levels of the structure of linguistic personality as a carrier of ideology:

- 1) verbal semantic (words, grammatical models);
- 2) linguocognitive (definitions, ideas, concepts);
- 3) motivational (activity and communication needs) (Karaulov, 2002);
- 4) synthesizing (a level of adequate situational synthesis).

3. Stages of a universal ideo-speech cycle (basic L&R mechanisms): 1) invention (invention); 2) disposition (location); 3) elocution (language expression); 4) action (pronouncement/letter).

4. Providing L&R mechanisms: 1) indicative; 2) mnemonic; 3) psycho-rhetorical (feedback); 4) editorial-reflective.

In the modern conditions of the development of Russian society, the need for its active creative promotion on the world stage as a guarantor of peaceful coexistence and mutually beneficial cooperation, its need for **qualified school teachers and high school teachers of foreign languages** with mixed bi/polylinguistic communicative competence (Hakuta, 1990; Hamers, Blanc, 2000; Harmer, 2001, etc.) has increased immeasurably. The problem of pedagogical design (Bezrukova, 1996) of the innovative educational process based

on bi/polylinguistic models of professional training of students at the faculties of foreign languages of the pedagogical high schools came to the fore. The latter should be considered primarily as an integrated L&R training of professional linguistic personality, implying a high level of integral L&R competence. This is the interdependent possession of language operations (linguistic component), textual actions and communicative activity (rhetorical component) in the field of Russian (as native, as state) and foreign languages.

The restructuring of the educational process within the bi/polylinguistic learning model developed by representatives of the Sochi L&R School is based on the following positions:

1. For the development of a professional bi/polylinguistic personality of a future specialist, more effective than the specialized formation of the L&R competence only in the field of foreign languages is the purposeful and coordinated work of the entire teaching staff in the framework of **“the single linguistic-rhetorical and cultural-speech regime” according to the formation of Russian and foreign language L&R competencies of learners.**

2. **The speech-thinking culture** of future specialists, integrating in a bi/polylinguistic relation, including an invariant core and ethno-linguistic- rhetorical variants, is a qualitatively new psycholinguistic (Vygotsky, 1996; Gasparov, 1996; Zimnyaya, 2001) formation, which is formed on the basis of the interaction of the substructures of the primary and secondary (Haleyeva, 1995) linguistic personality.

This is a special synergistic phenomenon, a product of counter-discursive processes: designing of an innovative pedagogical process – self-designing of a learner; learning – self-learning; education – self-education; development – self-development of a professional bi/polylinguistic personality.

3. A necessary condition for the formation of speech-thinking culture of future specialists is the formation of **students' readiness for professional self-design as a future specialist on the basis of a bi/polylinguistic L&R competence of mixed type.** This readiness acts as a complex of knowledge, skills, possessions and competencies outlined in the curricula according to the Federal State Educational Standards (FSES): general cultural, general professional, professional, as well as special competencies established by the high school; the proper level of its formation determines the quality of the specialists' training that meets the modern requirements of FSES.

4. The design and implementation of a bi/polylinguistic L&R model of professional training at a high school ensures the integrity of the pedagogical process for the formation of this readiness due to the mutual determinism of the goal-functional, substantive, structural-logical, instrumental-technological, organizational and managerial design positions (the concept of pedagogical designing of Sochi State University, Professor Y.S. Tyunnikov (Tyunnikov, 2000; Tyunnikov, Maznichenko, 2014, etc.) within the framework of the parity, configured and interpenetrating formations of the substructures of Russian and foreign language competencies as an integral multidimensional matrix-associative verbal-cognitive basis of the speech-thinking culture of the future specialist. The desired type of cognitive organization of a linguistic personality is a mixed, balanced bi/polylingualism.

5. Due to the training of a foreign language teacher as an important component of the motivational-reflexive aspect of the readiness and organization of the innovative pedagogical process, the methodological component, self-formation of the “I-concept” is actualized in the course of self-designing as a future school teacher and/or high school teacher – a professional linguistic personality of the bi/polylinguistic type.

When developing a target-functional unit of a bi/polylinguistic model of teaching in a pedagogical high school, we chose students' readiness for professional self-designing based on a bi/polylinguistic L&R competence of a mixed type as the top goal of the pedagogical process. It is defined as a psycholinguistic neoplasm in the structure of the linguistic personality of an integrative motivational-volitional, intellectual-ideological, operational-activity character, which serves as the foundation for the formation of a mixed bi/polylingualism as an individual's cognitive organization that is the basis of the bi/polylinguistic speech-thinking culture of the linguistic personality in the operational professional oriented interaction of its primary and secondary substructures.

Accordingly, **the components of this readiness** and sub-goals of the second level are *motivational-volitional, informational, operational-activity and empirical.*

At the third level, they are specified by the sub-goals in the field of formation:

- Social and personal motives for acquiring a full-fledged mixed bi/polylingualism within the framework of an individualized I-concept of a professional linguistic personality;
- Basic concepts of anthropocentric linguistics, linguistic rhetoric, psycholinguistics, theory of translation and other disciplines, knowledge-criteria;
- A complex of skills of bi/polylinguistic speech-thinking activity;
- Experience of everyday self-formation in speech events of different types of a mixed bi/polylingualism in receptive-analytical, reproductive-constructive and productive-creative registers of speech-thinking activity.

The priority in the selection of content are the criteria for ensuring a holistic pedagogical process on the conjugate formation of the substructures of the bi/polylinguistic L&R competence and organization of monitoring positive developments in the field of language operations, textual actions and communicative activities among students. At the same time, special attention is paid to the educational arrangement of the educational process – raising students' interest in learning their native language and recognizing its value while mastering a foreign language, drawing their attention to negative phenomena and deformations of the Russian language in the early 21st century, and discussing the problem of social and cultural status of the Russian language in a polyethnic multicultural state. All this contributes to the successful mastery of the basis of bi/polylinguistic speech-thinking culture by strengthening the translation component of the training content, chosen as the leading means of optimizing all other types of speech activity – speaking, listening, reading and writing.

The systemic nature of the knowledge, skills and abilities developed by students, worldview attitudes, including the professional plan, is given by using as a theoretical and operational basis the directions of L&R diagnostics, which act simultaneously as “generators” of specific diagnostic tests that allow monitoring, and directions of work during the academic year. Their use determines the general psychological and pedagogical algorithm of the educational process: before learning a new language material, to determine the level of students' training and identify their weak points in both the studied language and in their native language; to create the necessary conditions for correcting the identified gaps by providing the necessary system of knowledge in the field of bi/polylinguistic speech-thinking culture; to ensure the conjugacy of the process of formation of skills in 2–3 languages; to implement current control on a bi/polylinguistic basis.

The implementation of this algorithm takes place with the help of various pedagogical tools, which is based on a combination of research and educational methods (observation, questioning, testing, lectures, clarification, work with a book and text, audiovisual equipment, etc.), teaching aids (modeling of situations of speech interaction), forms of organization (lectures, practical classes, private lessons, independent work), diagnostic complexes of input, current and final character.

To test the effectiveness of the bi/polylinguistic model of preparing students – future foreign language teachers, ensuring a holistic pedagogical process of preparing for professional self-design based on a bi/polylinguistic L&R competence of mixed type, the following criteria are used:

- 1) *The motivational criterion* – the desire for speech self-improvement both in the foreign language and in the Russian language, the need for overcoming and preventing interference (including the reverse) in the formation of balanced knowledge and skills in 2-3 languages;
- 2) *The knowledge criterion* – knowledge of the sources and mechanism of interference and reverse interference; types of bi/polylingualism, methods of translation, etc;
- 3) *The practical criterion* – the formation of the mechanisms of bi/polylingualism, translation techniques and skills in the linguistic, textual and communicative aspects of the integral L&R competence.

The use of these criteria allows us to track the dynamics of the formation of the required readiness in the organic relationship of its components.

The effectiveness of the process of readiness formation for professional self-designing of a foreign language teacher in the bi/polylinguistic aspect is determined by the degree of interdisciplinary coordination of target-functional, substantive, structural-logical, instrumental-technological, organizational and managerial characteristics of the high school educational process in the bi/polylinguistic model of professional training.

Currently, in Sochi State University within the framework of the 44.03.01 “Pedagogical education” bachelor’s program we are developing and testing a polylingual model of L&R training

of a future foreign language teacher. We rely on the existing experience of the full implementation of the bilingual model of such training; the results of the experimental work presented below.

4. Results

Approbation of model constructions based on the English language material demonstrated the optimality of introducing the optional course “Basics of bilingual speech-thinking culture”, performing the functions of a theoretical-operational base for forming the desired readiness of a future linguist-teacher in the second year of study. The course is based on the content of the discipline "Theory and Practice of Translation", significantly modified and augmented. As the results of the study showed, not only expedient, but also necessary is its transfer to the third and fourth semesters and some redistribution of hours of practice of a foreign language in favor of the proposed course, the total duration of which is 130 hours (4 hours per week). This allows us to strengthen the translation component of training, which is used as a means of optimizing the associated process of improving all types of speech-thinking activities in English and Russian. A fundamentally new block of educational material was developed on the basis of anthropocentric linguistics, psycholinguistics, translation theory, achievements of modern linguodidactics and other private philological disciplines, psychology and pedagogy, the data of which are configured in line with the L&R theory of self-designing a professional linguistic personality.

The structural and logical organization of the course included three hierarchically coordinated stages:

I. Propedeutic stage. The first phase of this stage, initial diagnostic, is focused on comprehensive L&R diagnostics, on finding out the level of motivation to increase one's bi/polylinguistic L&R competence and stimulating this motivation in line with the I-concept of a professional linguistic personality.

The second phase, theoretically-oriented, provides for the formation of basic concepts of anthropocentric linguistics, psycholinguistics, linguistic rhetoric, bi/polylingualism, translation theory, knowledge-criteria, etc.

II. Basic stage. At this stage, there is deepening and expansion of the informational and content component of the readiness, students master operational-activity benchmarks and algorithms to carry out effectively speech-thinking activities in its bi/polylinguistic specificity, strengthen the motivational and volitional sphere in the field of self-improvement of bi/polylinguistic L&R competence of mixed type.

III. Generalizing stage. At the last stage, readiness for professional self-designing in the bi/polylinguistic aspect continues to be shaped based on pedagogical rhetoric, analysis of speech patterns of translation; against the background of consolidation of the results of the previous stage, systematization of the knowledge gained, the empirical component of this readiness is formed as intensively as possible, which is ensured by enhanced training in sequential and simultaneous translation, significant increase in the share of oral exercises.

During the final diagnostics, the testing was carried out on three criteria for the formation of readiness for professional self-design based on a mixed-type bilingual L&R competence.

It included specially designed tasks, questions and speech situations similar to those conducted at the beginning of the academic year during the experiment, but covering all the material studied.

The formative experiment conducted for the Russian and English pair of languages made it possible to identify the degree of effectiveness of the developed model for future teachers of a foreign language (see [Table 1](#)).

Table 1. The results of the initial and final diagnostics of the learners' readiness for self-designing in the experimental (EG) and control groups (CG)

Group	persons	Distribution of the EG and CG students								Average score	χ^2_{test}	χ^2_{crit}	
		very low		low		medium		high					
		persons	%	persons	%	persons	%	persons	%				
Initial diagnostics													
Motivational criterion													
CG	31	0	0	0	0	13	41.93	18	58.06	3.58	0.37	7.81	
EG	30	0	0	0	0	11	36.66	19	63.33	3.63			
Knowledge criterion													
CG	31	9	29.03	19	61.29	3	9.67	0	0	1.9	2.24		
EG	30	7	23.33	22	73.33	1	3.33	0	0	1.73			
Practical criterion													
CG	31	4	12.9	13	41.93	11	35.48	3	9.67	2.42	0.98		
EG	30	5	16.66	11	36.66	10	33.33	4	13.33	2.43			
Final diagnostics													
Motivational criterion													
CG	31	0	0	0	0	11	35.49	20	64.51	3.64	16		
EG	30	0	0	0	0	0	0	30	100	4			
Knowledge criterion													
CG	31	24	77.42	7	22.58	0	0	0	0	1.22	394.28		
EG	30	1	3.33	3	10	9	30	17	56.66	3.4			
Practical criterion													
CG	31	2	6.45	13	41.94	13	41.94	3	9.67	2.55	19.61		
EG	30	0	3.33	5	23.33	16	43.33	9	30	3.13			

The table shows that during the initial diagnostics the results of the control group are very close to those of the experimental group for motivational and practical criteria with the control group having just 4 % higher score (1.9 vs. 1,73) than the experimental group in terms of the knowledge criterion. The average score in the final diagnostics test for the experimental group was noticeably higher than that of the control group for every criterion.

The significance of both the initial and final diagnostics results was verified by Pearson's chi-squared test. In both the initial and final experiments for the chosen significance level of 0.05, the number of degrees of freedom being 3, the critical p- value is 7.81. In the initial diagnostics the test values of χ^2 for the motivational, knowledge and practical criteria are 0.37, 2.24 and 0.98 respectively. Since all of the obtained test values of χ^2 are less than the critical p-value, the experimental and control groups are statistically equivalent.

The final diagnostics test values χ^2 for the motivational, knowledge and practical criterions are 16, 394.28 and 19.61 respectively. $\chi^2_{test} > \chi^2_{crit}$ for all of the criteria, therefore the results of the experimental group are statistically different from the control group.

The final diagnostics showed the presence of positive changes in the personal and professional orientation of students, including the level of formation of moral, ethical and social motives. Initially, a fairly high motivation among students of both groups was transformed into one hundred percent among the students of the experimental group and increased somewhat among the students of the control group. We associate such a high result in the experimental group with

the fact that the interrelation between the level of development of the English and Russian elements of their bilingual L&R competence was repeatedly demonstrated to students on their own mistakes. They fully realized the need for purposeful interconnected work on the formation of knowledge, skills, possessions and competencies of the FSES in both languages.

Self-perfection in the Russian language was mostly accounted for the hours of independent work of students; therefore, educational discussions were of paramount importance in the course of experimental work, designed to awaken the desire to self-form bilingual speech-thinking culture as the leading link of professional training. Theoretical knowledge that demonstrates the dependence of the level of development of the English-speaking substructure of the bilingual L&R competence on the “congruent” Russian-speaking substructure, the importance of self-improvement in the latter contributed in no small measure to the achievement of the same goal.

5. Conclusion

The formation of the information society of the globalization era is marked by the gradual unity of mankind as a socio-biological type of *Homo sapiens*, the formation of a “metagalactic nation of earthlings”, in the future acting as a single collective “planetary linguistic personality”. In this regard, bi/polylinguistic modeling of the pedagogical process of both general school and high school professional training, developed by representatives of the Sochi L&R School, is of particular importance. When teaching adults the pedagogical dominant, the “self-concept” that provides the strategic life goal objectively operates. As shown by the results of the research, the decisive role for the effectiveness of the educational process at the high school level is played by the self-designing of the future specialist as a professional linguistic personality from the standpoint of the L&R ideal, in terms of the need to form a bi/polylinguistic speech-thinking culture, which determines the quality of training in any direction and profile. For the modern Russian poly-ethno-socio-cultural and educational space, a special role is played by the high-quality training and education on a mass scale of school teachers and high school professors of foreign languages. The readiness of a future teacher of foreign languages for professional self-designing on the basis of a bi/polylinguistic L&R competence of a mixed type, chosen as the general goal of the approved innovative pedagogical process, is a prerequisite for the formation of his speech-thinking culture as a synergistic neoplasm. Motivational, theoretical and practical criteria for the formation of this readiness are the basis of a bi/polylinguistic diagnosis and monitoring of the educational process. The structural and logical organization of the latter (propedeutic, basic, generalizing stages) consecutively lays the foundation for the future bi/polylinguistic speech-thinking culture of a future teacher of a foreign language (s). The process of formation of this readiness, its instrumental and technological support requires a systematic and coordinated approach within the framework of all the disciplines of the curriculum of the basic professional educational program from the standpoint of the “single linguistic-rhetorical and cultural-speech regime of an educational institution” for the conjugate formation of students’ Russian and foreign language L&R competencies.

The analysis of the experimental work data allowed to conclude that the innovative pedagogical process, built taking into account the principles of designing a bi/polylinguistic model of professional training, effectively and systematically forms the necessary basic elements of speech-thinking culture as an integrative quality of professional linguistic personality in motivational, theoretical, practical aspects.

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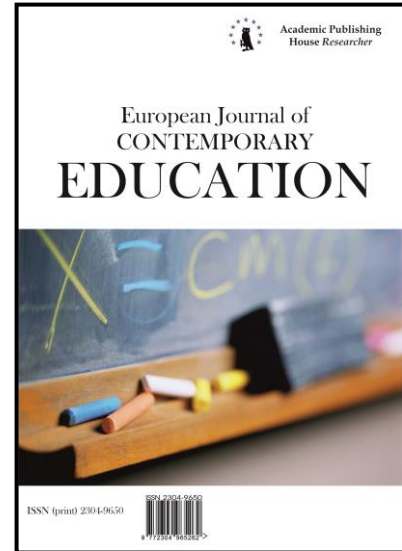
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Extent of Participation by Faculty Members of Educational Sciences Colleges in the Jordanian Universities in Decision Making and Its Relationship with Job Satisfaction

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Abstract

This study aimed at identifying the participation degree of the faculty members of the educational science colleges in the Jordanian universities in decision making and its relationship with the job satisfaction. The study sample consisted of (601) faculty members of the educational science colleges in the Jordanian colleges, who were chosen by the simple random manner. To achieve the study objective, the researchers developed an instrument to measure the participation degree of the faculty members in these colleges in the decision making and its relationship with the job satisfaction. The researchers opted the descriptive method. Following the data analysis, the results showed that the participation degree of the faculty members in the educational science colleges in the Jordanian universities was high. The results further showed statistically significant differences of the estimations of the faculty members about the participation degree in decision making, attributed to the gender and academic degree variables. Furthermore, there were no statistically significant differences ascribed to the years of experience. The results indicated that the level of the job satisfaction of the faculty members, in the educational science colleges in the Jordanian universities, was high. On the other hand, there were no statistically significant differences among the means of the sample participants' responses ascribed to the gender variable. Still, there were statistically significant differences between the means of the sample participants' responses according to the years of experience and academic degree. Finally, the correlation coefficient of the areas of the decision making with the areas of the job satisfaction was statistically significant. The lowest correlation coefficient was 0.420 between the two decision areas concerning the study plans and self-realization. The highest correlation coefficient was 0.562 between the two decision areas concerning the faculty members and belonging to the profession. All these correlations were positive, meaning the increase in the first area is offset with an increase in the second area.

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Keywords: decision making, educational sciences colleges, Jordanian universities, job satisfaction.

1. Introduction

Decision making is an important and fundamental process, and one of the most important activities of the management, if not the most important per se. It is an imperative to achieve the goals for which the institution was established; it is the focus or essence of the managerial process. This is because decision making is not a simple job, since it is the selection from among the best alternatives to achieve a certain objective (Naseef, 2010).

The decision represents the backbone and core of the administrative process, as the success of the institution depends on it, to achieve the aspired and desired objectives. Whereas the administrative process means performing the jobs of planning, organizing, controlling and guiding, each of these processes includes a decision, and every decision includes all the data, search for the alternative, and choosing the best (Mastaghouni, 2015).

Decision making process should be strictly organized, as every decision is the final product of an integrated effort of opinions, thoughts, contacts, arguments and study, which were all carried out at various levels of the institution, under the knowledge of many people. As such, decision taken by the institution is a collective product rather than being the result of a personal idea or view. Kan'an (2002) defined the decision as one of the tools for authority performance, if not the only tool in the hands of the director to practice his/her legal right, through which he/she realizes concrete result for him/her and the workers in the organization. Al-Azzawi (2006) defined it as the perceived choice among the available alternatives in a certain situation, or the comparison process among alternative solutions to face a certain problem and select the optimal solution from among them.

In the daily life, the individual faces dozens of situations and problems that require him/her take many decisions. Some of these decisions take hours or days to determine, meanwhile, some people take only few minutes to make their decisions, which are based on the degree of awareness, perception and feeling of the decision quality by every person.

There are many viewpoints about the administrative decision making process. In this concern, Herbert (cited in Al-Ghazzawi, 2006), referred to three main elements for this process: finding the suitable chances for decision making, finding the feasible ways for work, and selecting the feasible ways for work.

AalNaji (2005) notes that any administrative decision seeking for solving a problem, should have a defined objective or objectives the decision is seeking to achieve. Thus, the decision is not an end, and the decision content depends on the type of the problem to be solved. The more complicated the problem is, the more difficult the decision is. Therefore, the content of the administrative decision depends on the type of the problem or the objective to be achieved. The decision is expressed in more than one form; it may be in the shape of policies, rules, orders, instruction, etc. The decision is a means to achieve a certain objective; accordingly, there must be a suitable way to approach the end easily and smoothly.

Decisions were usually taken by a single person. But, new developments in the administrative thought emerged, as well as a wide use of the modern administrative theories that support applying a democratic style in management. Moreover, the sizes of organizations are more and more increasing, as well as the complexity of their duties and expanding responsibilities. And, due to the inability of the human to know everything at one time and under any condition; it became a commonplace for the leaders and presidents to resort to specialists and technicians to exchange views with them before making their decision.

Hareeri (2002) deems the decision making a reality in any administrative institution, a process faced by the management people at their different administrative levels and functional responsibilities. This is because the decision making is one of the basic functions in the administration, which the leader must skillfully apply; and that he/she should possess knowledge about it, because the structure of the administrative institution is determined by the way the decision is taken.

Roraibullah (2013) emphasized the characteristics of the good decision by: providing confirmed information, clear volume of the desired returns, impartiality to the viewpoints of certain persons at the cost of others, the decision must be factual, and should take into account the

internal and external environmental conditions. Mutaw'i (2003) indicated that participation objectives in decision making are to: increase the production and activity of the workers, raise their morals, stimulate them and provoke their motivation, and increase their job satisfaction.

Job satisfaction is a most important issue that gained the attention and interest of the researchers and specialists in management, organizational behavior, and industrial and organizational psychology. The importance of this issue rests in that it deals in the worker's feelings, whether a manager, employee or simple worker, toward the work effects he/she is performing and the surrounding physical environment. Job satisfaction is the individual's feeling of persuasion, comfort and happiness for satisfying the needs, desires and expectations through the work itself and through its environment, with trust, loyalty and belonging to the work, as well as with other elements and related internal and external environmental influences (Al-Sharaideh, 2008).

Many studies on the job satisfaction showed that the high vocational satisfaction most often increases productivity, reduces the work turnover rates, reduces absenteeism, raises the workers' morals, and makes life meaningful with the individuals (Al-Masha'an, 1999).

Naser and Issam (2014) conducted a study which indicated the importance of the job satisfaction. They defined a number of reasons that call for interest in job satisfaction as follows. The increase of job satisfaction level leads to an increase in the ambition level with the workers in the different institutions. The increase of job satisfaction leads to a decrease in absenteeism in the different professional institutions. The person with more job satisfaction is more satisfied with his/her leisure time, particularly with his/her family, as well as with the life in general. And that the workers with more job satisfaction levels are less exposed to work accidents.

Job satisfaction, as quoted in the study of Ali (2012) is an issue that must remain under research and study processes from time to time, with the leaders, supervisors of the departments, and those interested in the administrative development at work. This is based on many reasons, such as what satisfies the individual at present may not satisfy him/her in future. Furthermore, the individual is affected by the changes in his/her life stages, and what is unsatisfying now may be quite satisfying in future.

Job satisfaction is one of the important elements in achieving security, psychological, intellectual and job stability of the workers of different managerial levels. It pushes them voluntarily to increase production, which is eventually the aspiration of the institution, regardless of the nature of its activity (Al-Aghbari, 2002).

Meeting the functional and personal needs of the faculty members, and providing the general services to them in the educational institution, are highly anticipated to strengthen the ties of intimacy and belonging, and improve the job satisfaction with the faculty members toward their educational institution. This is in consistency and harmony with the basic objective the educational administration was found for, i.e. the teaching process, providing all the services for all the workers, including the faculty members, respond to their material and moral needs, and improving the university organizational climate, to assist them improve their teaching performance. Job satisfaction is one of the most important factors with positive influence toward more efforts to improve the performance of the faculty members (Khlaifat, Al-Malahmeh, 2009).

The recent trend in management called for the participation principle in decision making, with the expansions of the participation circle, as far as possible, and avoiding the concentration of the decisions in the hands of a single person. This trend surfaced as a result of many factors, such as the ever-growing sizes and businesses of the organizations; as one person, whatsoever self-abilities and knowledge he/she may have, cannot encompass everything all the times. Experts concluded that the administrative leadership should employ the consultation principle, which is basically embodied in widening the participation foundation in decision making. Particularly, decisions that affect the participants or their works, and what their participation may realize of many advantages, such as assuring their cooperation and commitment. Employees' participation in the decision-making charges them with good feeling of their importance, which in turn would lead to faithfulness in work and sparing no effort in serving the organization, and working toward realizing its objectives. On the other hand, employees' participation at all levels would lead in bringing-up new cadres of administrative leaders, who gained wide experience in decision making. In addition, such participation would achieve the advantage of the mutual trust between the superiors and subordinates. In this context, Fromm indicated to this trend in the reformation of all the administrative levels, which is built on the extent of the participation need between the leader

and followers in the decision making process. This will be virtually determined according to the situation and its difference variables, which dictate a certain leadership style that may lead to the optimal results.

Depends on the literature, one can connect between decision making and job satisfaction, which generally means the positive relatedness between the employee and the institution or organization he/she works in. In this concern, the objectives of the organization or approaching the general satisfaction could not be achieved without the presence of the positive human element, which accepts work with self-persuasion, and contributes to the success of the organization and achieving its objectives. Despite the difference in the job satisfaction concept with the employee depending on the differences of his/her thoughts and values, yet, it is generally established that job satisfaction is realized through the products of the job, including the salary, promotion chances, and social care systems. It is further affected by the work nature, conditions that arise, extent of the employee's participation in decision making, his/her feeling of justice and care from his superiors. Many previous studies were carried out on this issue, some concerning the decision making, decision participation and job satisfaction.

Study of Kim (2001) concluded that there are differences between the teachers' participation in decision making and job satisfaction, ascribed to gender, educational experience, size of the school and subjects he/she teaches. The perception of the teachers about the job satisfaction did not change based on the demographic variables. Furthermore, the actual levels of participation in decision making positively influenced their perception of the job satisfaction.

Results of Wetherill study (2002) showed that the "Telling" style achieved higher job satisfaction levels for the teachers in the area of supervision, contingent bonuses, work condition, communication and overall satisfaction. The study further showed that factors of age and gender were not statistically significant about their relationship with the job satisfaction.

Al-Aksh and Al-Hasan (2005) conducted a study that did not show differences in the view of the faculty members toward the elements of the study, except for the academic climate and performance evaluation. The study showed that the faculty members' job satisfaction in the private universities was higher than that of the public universities. The study recommended the necessity for setting objective, acceptable methods and procedures in the evaluation process, with focus on the evaluation process only.

Flebman (2006) study found a medium, positive, correlation relationship between job satisfaction with its dimensions, and the organizational commitment. Study of Al-Omari (2007) concluded that there are variables of great effect on the participation in decision making, and that all the faculty members interact in the effective participation in decision making within the academic departments, except for two members who expressed fear in making such decisions.

Study of Chi Keung (2006) concluded that teachers prefer engage them in the decision of the areas of teaching pattern, educational curricula and management. It also indicated that the teachers' participation in decision making has its positive, influential effects on job satisfaction, commitment and perceiving the work burden. Al-Baraheem (2008) made a study which concluded that there is an effect of the personal, organizational, and social factors on the employees' participation in decision making in the Consultative (Shora) Council; and that the most effective factor was the social. He also indicated that the sample participants strongly agreed on the relation between participation in decision making and employees' job performance. Khlaifan and Al-Malahmeh study (2009) showed a relationship between the organization loyalty and job satisfaction dimensions with the faculty members of the private universities. It further showed that there are differences in the organizational loyalty level with the faculty members attributed to the gender, age, years of experience in the university, and college.

Study of Scamble and Stead (2009) did not show a relationship between the age or experience variables with the job satisfaction, but there is a relation between wages and job satisfaction. Mansour's study (2010) showed that the overall satisfaction degree was medium, based on that the response percentage was (61.8 %), and that the lowest satisfaction area was the promotions and incentives (56 %). The results further showed statistically significant differences in the job satisfaction degree by the experience variable, in favor of the highest experience, and the academic degree variable, in favor of the lowest degree. Study of Truell, Price et al (2010) found statistically significant relations between the self-motivations and job satisfaction levels.

Al-Ghazali study (2012) concluded that the transformational leadership level with its dimensions (ideal influence, stimulation, individual entity, intellectual provocation and empowerment) in the Jordanian insurance companies was high; and the level of availing practical effectiveness in decision-making process in the Jordanian insurance companies was also high. Moreover, the study indicated a statistically significant effect of the transformational leadership with its dimensions (ideal influence, stimulation, individual entity, intellectual provocation and empowerment) on the effectiveness of decision making process in the Jordanian insurance companies.

Al-Taher (2012) indicated that the administrative procedures in the public universities, which are directly related to the job satisfaction of the faculty members, need an objective and conscience revision to uncover the reasons for normalization of the job satisfaction of the academic system of these academic institutions. The study also showed that the financial factors concerning the salaries, wages and incentives did not approach the level that gives the faculty member an internal reflection of satisfaction as compared with the volume of the work he/she performs and the wage he/she is paid for. That the psychological factors which prepare the faculty members in the public universities are insufficient and below the desired level, which makes the member willing and adhering to the teaching process. And, that the qualification of the faculty members, in terms of the training aspects, is no longer given the sufficient attention in the public universities, which could have led to that the faculty members did not stay long in his/her job.

Bal-Khairi and Ushait (2012) study found that the human element is the basic cornerstone of all the processes and activities that the organization performs for achieving its objectives. Study of Rareebullah (2013) concluded that the participation level of the faculty members of the Algerian universities was generally low; and that there are no statistically significant differences among the universities ascribed to the variable of faculty members' participation in the decision making. Study of Abu A'ashour and Shatanawi (2014) indicated that the effectiveness degree of the decisions taken in the councils of the academic departments in the Jordanian universities was high, as viewed by the faculty members. However, there were statistically significant differences ascribed to the university variable, in favor of Al-Yarmouk University in terms of the participation area of decision making, and organizational culture area, following the performance of Scheffe test for the post comparisons. Finally, there was a relationship upon comparing between the public and private universities, in favor of the public universities, about the effectiveness of the decisions taken in their department councils.

Naser and Haider (2014) made a study that did not show substantial differences among the faculty members of the public and private universities in terms of (their view about the salary and bonuses, their satisfaction about the relations with their colleagues, their satisfaction about their relation with the management, and their feeling of the occupational empowerment). On the other hand, there were substantial differences in terms of (their satisfaction about their relations with the students, feeling of job security, and feeling of the social status). Finally, the study showed a difference in ranking the reasons causing the job satisfaction, by the difference of the work location (public university – private university).

Study of Masghouni (2015) found a relationship between the decision making mechanisms and job performance satisfaction, and a relation between the availability of the information for decision making and satisfaction of the decision takers. On the other hand, the study did not show a relation between participation in decision making and satisfaction of the decision takers.

Last, but not least, study of Shakhtour, et al (2015) showed a clear feeling with the college employees that they do not spend best of their efforts when there is no exchange of the mutual interests between the college and the employees. This was very clear in the dissatisfaction the employees showed about their pays as compared with the large efforts they spend in favor of the college. Furthermore, the employees have the feeling that the college does not distribute the job duties fairly among them.

Study Problem and Questions

The decision making process is linked with many issues, such as communication, leadership, pressures and job satisfaction. In fact, the job satisfaction is the most important dimension for both the individuals and communities. It is the base that achieves psychological and social harmony of the workers, and improves the good performance, as it is linked with success in work. It is also

considered the objective standard of the individual's success in the various aspects of life, which is reflected on his/her behavior through his/her latent attitudes, and on the strength of his/her feelings and degree of their accumulation. The stronger his dissatisfaction about the work, the more it shows on his/her behavior, so that either he/she leaves the work and seeks for another job, or the absenteeism rate or drop out of work increase.

The importance of the job satisfaction of the workers in any establishment leads to achieve the objectives of the establishment to a high degree of efficiency. As such, job satisfaction is one of the most ambiguous issues, because it is an emotional state concerning the employee, which is difficult to understand.

In the light of the above, the study problem is embodied in answering the following questions:

- 1- What is the participation in decision making degree of the faculty members of the educational sciences colleges in the Jordanian universities?
- 2- Are there statistically significant differences among the responses of the faculty members on the participation in decision making degree attributed to the (gender, years of experience, and academic rank) variables?
- 3- What is the job satisfaction degree of the faculty members of the educational sciences colleges in the Jordanian universities?
- 4- Are there statistically significant differences among the responses of the faculty members on their job satisfaction degree attributed to the (gender, years of experience, and academic rank) variables?
- 5- What is the relationship between the participation in decision making degree of the faculty members of the educational sciences colleges in the Jordanian universities and the job satisfaction?

Study Significance

The study significance originates from the importance of the topic it is exploring, as the decision making issue is one of the important subjects that attracted, and still attracts, wide attention of those who are interested in this field. In this regard, the progress, development and continuity of the organizations basically depend on the administrative leaders, who plan and work toward making suitable decisions for them and the subordinates who share them the decision implementation. The theoretical importance of the study rests in displaying the theoretical framework and the previous study that interpreted the decision making and job satisfaction. The applied importance represents identifying the participation degree of the faculty members in the educational sciences colleges in the Jordanian universities in decision making and its relation with the job satisfaction.

Methods

The study used the descriptive method and some of its tools, to describe and analyze the participation in decision making degree of the faculty members of the educational sciences colleges in the Jordanian universities, and their job satisfaction degree, to clarify the relations between them.

Study Population and Sample

The study population consisted of all the faculty members of the educational sciences colleges in the Jordanian universities (n=518); and the sample consisted of (160) faculty members if the educational sciences colleges in the Jordanian universities. [Table 1](#) shows the characteristics of the faculty members through the study sample.

Table 1. Characteristics of the Faculty Members of the Educational Sciences Colleges in the Jordanian Universities

Variable	Category	Frequencies	Percentage
Gender	Male	120	75 %
	Female	40	25 %
Years of Experience	Less than 10 years	68	43 %
	More than 10 Years	92	57 %
	Professor	40	25 %

Academic rank	Associate Professor	58	36 %
	Assistant Professor	62	39 %
Total		160	100 %

Study Instrument

Based on the nature of the data, and the method applied in the study, the researchers saw that the most suitable instrument to achieve the study objects is the "questionnaire". It was constructed by referring to the related previous literature and studies (Abu Ashour, Shatnawi, 2014; Al-Baraheem, 2008; Al-Ghazali, 2012; AL-Omari, 2007). The instrument, in its final shape, consisted of three parts:

First Part: dealt with the primary data of the study sample participants, such as gender, years of experience and academic rank.

Second Part: the decision making questionnaire, consisted five dimensions as follows:

- Decision concerning the students' affairs.
- Decision concerning the faculty members.
- Decision concerning the study plans.
- Decision concerning the college building and financial issue.
- Decision concerning the local community.

Third Part: the job satisfaction, consisted four dimensions as follows:

- Work nature
- Salaries and bonuses
- Self-realization
- Affiliation to the profession.

Validity and Reliability of the Instruments

Once the researchers completed the construction of the instrument, which deals in the "participation in decision making degree of faculty members of the educational sciences colleges in the Jordanian universities and its relation with job satisfaction", they presented to a number of expertise to seek their opinions. Based on the amendments and suggestions of these expertise, the researchers carried out the required amendments on which most expertise agreed, such as amendment or deletion of certain phrases, until it took its final shape. Following the assurance of the apparent validity of the instrument, the researches applied it in the field. They calculated Pearson correlation coefficient to assure the internal validity of the instrument, and also calculated the correlation coefficient between the degree of every item with the overall degree of the dimension, to which the item belongs, as shown in Table 2.

Table 2. Internal Consistency Coefficient of the Questionnaire Dimensions (Cronbach Alpha)

No	Dimension	Alpha (α) value
Decision Making Dimensions		
1	Decision Concerning Students' Affairs	0.78
2	Decision Concerning Faculty Members	0.87
3	Decision Concerning the Study Plans	0.84
4	Decision concerning the College Building and Financial Issues.	0.81
5	Decision Concerning the Local Community	0.86
Job Satisfaction Dimensions		
1	Work Nature	0.83
2	Salaries and Bonuses	0.81
3	Self- Realization	0.91
4	Affiliation to the Profession	0.87

Reliability coefficients indicate that both instruments generally have high reliability coefficient about the ability of both instruments to realize the study objectives.

Procedures

After the preparation of the study instrument, verifying its validity and reliability, determining the population and sample, the researchers obtained the official approvals to carry out the study. To facilitate the researchers' duty in distributing the questionnaire over the sample participants during two months of the first semester of the academic year 2016/2017, they advised the sample participants about the objective of the study, the way to respond, and the confidentiality of the data they will provide, and that they will be exclusively for the purposes of scientific research; all for achieving objectivity, as far as possible. When the questionnaires were returned, the researchers assorted, posted the responses, entered the data in a computer, analyzed, and obtained the results according to the study questions.

Statistical Procedures:

The researchers utilized frequencies and percentages of the study sample participants' characteristics; means and standard deviations were also used in the statistical processing to extract the study results. Moreover, t- test, ANOVA test and Scheffe test were used for the post comparisons.

2. Results and Discussion

Question One: What is the participation in decision making degree of the faculty members of the educational sciences colleges in the Jordanian universities ?

To identify the participation in decision making degree of the educational sciences colleges faculty members in the Hashemite University, means and standard deviations of the study sample participants' responses were calculated, as shown in [Table 3](#).

Table 3. M's, SD's and Participation in the Decision making degree

Dimensions	M	SD	Rank	Participation Degree
Decision Concerning Students' Affairs	4.44	0.35	1	Very High
Decision Concerning Faculty Members	4.10	0.33	2	Very high
Decision Concerning the Study Plans	3.51	0.56	3	Medium
Decision concerning the College Building and Financial Issues.	3.11	0.62	4	Medium
Decision Concerning the Local Community	2.84	0.72	5	Medium
Overall Degree	3.72	0.31		High

[Table 3](#) shows that the means ranged between (2.84-4.44), and the participation in decision making degree was high as a whole, with (M=3.72). The "Decision Concerning Students' Affairs" dimension came in the first rank with (M=4.44), followed by "Decision Concerning Faculty Members" dimension, which ranked second with (M=4.41). Meanwhile "Decision Concerning the Study Plans" dimension ranked third with (M=3.51), "Decision concerning the College Building and Financial Issues" dimension ranked fourth with (M=3.11). Finally, "Decision Concerning the Local Community" dimension came fifth and last with (M=2.83).

Question Two: Are there statistically significant differences among the responses of the faculty members on the participation in decision making degree attributed to the (gender, years of experience, and academic rank) variables?

1- Gender Variable

Means, standard deviations, and t-test were used to identify the differences among the Sample participants' responses attributed to gender variable.

Table 4. M'S, SD's and t- test to Identify the Differences between the Means of the Sample Participants' Responses attributed to Gender Variable

Dimensions	Gender	No.	M	SD	T Value	Sign. Level
Decision Concerning Students' Affairs	Male	120	4.44	0.31	0.161	0.87
	Female	40	4.43	0.39		
Decision Concerning Faculty Members	Male	120	4.09	0.25	0.226	0.82
	Female	40	4.10	0.38		
Decision Concerning the Study Plans	Male	120	3.60	0.52	1.507	0.13
	Female	40	3.43	0.58		
Decision concerning the College Building and Financial Issues	Male	120	3.35	0.58	3.743	0.00
	Female	40	2.90	0.58		
Decision Concerning the Local Community	Male	120	2.95	0.76	1.464	0.14
	Female	40	2.74	0.67		
Overall Degree	Male	120	3.79	0.27	2.403	0.01
	Female	40	3.64	0.33		

Table 4 shows statistically significant differences at ($\alpha=0.05$) level of the faculty members' participation in decision making degree attributed to the gender variable, in "Decision concerning the College Building and Financial Issues" dimension, and the overall degree of the dimensions, in favor of the male faculty members.

2- Years of Experience Variable

Means, standard deviations, and t-test were used to identify the differences among the Sample participants' responses attributed to years of experience variable.

Table 5. M'S, SD's and t- test to Identify the Differences between the Means of the Sample Participants' Responses attributed to the Years of Experience Variable

Dimensions	Years of Experience	No.	M	SD	T Value	Sign. Level
Decision Concerning Students' Affairs	Less than 10 years	68	4.34	0.34	1.468	0.14
	More than 10 years	92	4.47	0.35		
Decision Concerning Faculty Members	Less than 10 years	68	4.10	0.32	0.012	0.99
	More than 10 years	92	4.10	0.33		
Decision Concerning the Study Plans	Less than 10 years	68	3.92	0.33	4.698	0.00
	More than 10 years	92	3.37	0.55		
Decision concerning the College Building and Financial Issues	Less than 10 years	68	3.07	0.59	0.352	0.72
	More than 10 years	92	3.12	0.63		
Decision Concerning the Local Community	Less than 10 years	68	3.03	0.54	1.543	0.12
	More than 10 years	92	2.77	0.76		
Overall Degree	Less than 10 years	68	3.81	0.30	1.774	0.07
	More than 10 years	92	3.68	0.31		

Table 5 shows statistically significant differences at ($\alpha=0.05$) level of the faculty members' participation in decision making degree attributed to the gender variable, in "Decision Concerning the Study Plans" dimension. Also, Table (5) did not show statistically significant differences at ($\alpha=0.05$) level attributable to the years of experience in other dimensions and the overall degree of the areas. This may be due to the prevalent climate inside the colleges and their orientation, to the extent that there is no room for enhancing the role of the older experiences, or even encourage the new experiences, who are enthusiastic to work.

3- Academic Rank

Table 6. M'S, SD's and Statistical T- Test to Identify the Differences between the Means of the Sample Participants' Responses attributed to the Academic Rank Variable

Area	Academic Degree	No	M	SD
Decision Concerning Students' Affairs	Assistant Professor	40	4.34	0.47
	Associate Professor	58	4.41	0.30
	Professor	62	4.56	0.23
Decision Concerning Faculty Members	Assistant Professor	40	3.93	0.42
	Associate Professor	58	4.09	0.29
	Professor	62	4.26	0.13
Decision Concerning the Study Plans	Assistant Professor	40	3.53	0.58
	Associate Professor	58	3.28	0.50
	Professor	62	3.75	0.49
Decision concerning the College Building and Financial Issues	Assistant Professor	40	2.92	0.40
	Associate Professor	58	2.98	0.68
	Professor	62	3.44	0.61
Decision Concerning the Local Community	Assistant Professor	40	2.75	0.40
	Associate Professor	58	2.59	0.72
	Professor	62	3.19	0.83
Overall Degree	Assistant Professor	40	3.61	0.32
	Associate Professor	58	3.60	0.22
	Professor	62	3.94	0.27

Table 6 indicates apparent differences in the means of the sample participants' responses attributed to the academic rank variable. To determine whether or not these differences are statistically significant, the researchers applied the ANOVA analysis to identify the statistical difference by the academic rank, as shown in Table 7.

Table 7. Results of the ANOVA Analysis of the Academic Rank on the Means of the Sample Participants' Responses

Dimensions	Source of Variance	Total Squares	df	Squares Mean	F Value	Sign. Level
Decision Concerning Students' Affairs	Between groups	0.760	2	0.380	3.215	0.04
	Within groups	10.877	157	0.118		
	Total	11.637	159			
Decision Concerning Faculty Members	Between groups	1.629	2	0.815	8.949	0.00
	Within groups	8.375	157	0.09104		
	Total	10.005	159			
Decision Concerning the Study Plans	Between groups	3.681	2	1.841	6.690	0.00
	Intra-groups Within groups	25.312	157	0.275		
	Total	28.993	159			

Decision concerning the College Building and Financial Issues	Between groups	5.030	2	2.515	7.402	0.00
	Within groups	31.261	157	0.340		
	Total	36.291	159			
Decision Concerning the Local Community	Between groups	6.247	2	3.123	6.785	0.00
	Within groups	42.349	157	0.460		
	Total	48.596	159			
Overall	Between groups	2.296	2	1.148	15.536	0.00
	Within groups	6.798	157	0.07389		
	Total	9.093	159			

Table 7 indicates statistically significant differences in the responses of the sample respondents on all dimensions of participation in decision making degree, and on the overall degree. F calculated values on the study areas and overall degree were: (3.215), (8.949), (6.690), (7,502), (6,785) and (15.536), respectively. These values are statistically significant at ($\alpha=0.05$) level. To identify the significance of these differences, Scheffe Test of the post comparisons was employed, as shown in Table 8.

Table 8. Results of Post Comparisons Scheffe Test for the of the Effect of the Academic Rank to Identify the Differences

Area	Experience	Associate Professor	Professor
Decision Concerning Students' Affairs	Assistant Professor	-0.0676	-0.2185 *
	Associate Professor	-	-0.1508
Decision Concerning Faculty Members	Assistant Professor	-0.01559	-0.3293 *
	Associate Professor	-	-0.1734
Decision Concerning the Study Plans	Assistant Professor	0.2460	-0.2264
	Associate Professor	-	-0.4725 *
Decision concerning the College Building and Financial Issues	Assistant Professor	-0.0622	-0.5218 *
	Associate Professor	-	-0.4596 *
Decision Concerning the Local Community	Assistant Professor	0.1571	-0.4435 *
	Associate Professor	-	-0.6007 *
Overall	Assistant Professor	0.0058	-0.3284 *
	Associate Professor	-	-0.3341 *

Table 8 shows statistically significant differences at($\alpha=0.05$) level between the ranks of assistant professor, associate professor and professor. The differences were in favor of the professor rank, which further indicates that the faculty members of the professor degree in the educational sciences colleges of the Jordanian universities are more aware of the importance of participation in the decision making.

Question Three: What is the job satisfaction degree of the faculty members of the educational sciences colleges in the Jordanian universities?

To identify the job satisfaction degree of the faculty members in the educational sciences colleges of the Jordanian universities, the researchers calculated the M's and SD's of the sample participants' responses, as shown in Table 9.

Table 9. M's, SD's and Degree of the Job Satisfaction

No.	Area	M	SD	Order	Satisfaction Degree
1	Work Nature	3.97	0.62	3	High
2	Salaries and Bonuses	3.93	0.63	4	High
3	Self-Realization	4.07	0.54	2	Very High
4	Affiliation to the profession	4.16	0.63	1	Very High
Overall Degree		4.03	0.53	Very High	

Table 9 shows that the responses level of the sample participants on the job satisfaction dimensions was high. The overall mean was (4.03) with (0.53) standard deviation, and the degree of the dimensions were high, as the M's ranged between (3.93 – 4.16). Job affiliation dimension ranked first with (4.16) mean and (0.63) SD. Meanwhile, the salaries and bonuses area ranked fourth and last with (3.93) mean and (0.63) SD.

Question Four: Are there statistically significant differences among the responses of the faculty members on their job satisfaction degree attributed to the (gender, years of experience, and academic rank) variables?

Gender Variable

The researchers calculated the M's, SD's and t-test, to identify the differences between the responses means of the sample participants, attributable to the gender variable, as shown in Table 10.

Table 10. M'S, SD's and T Statistical Test to Identify the Differences in the Responses Means of the Sample Participants Attributable to the Gender Variable

Dimensions	Gender	No.	M	SD	t Value	Sig. Level
Work Nature	Male	120	3.93	0.63	0.94	0.10
	Female	40	3.86	0.63		
Salaries and Bonuses	Male	120	4.06	0.52	0.24	0.80
	Female	40	4.09	0.57		
Self-Realization	Male	120	4.21	0.59	1.01	0.21
	Female	40	4.10	0.68		
Affiliation to the profession	Male	120	3.97	0.60	0.10	0.91
	Female	40	3.96	0.65		
Overall Degree	Male	120	4.05	0.51	0.54	0.58
	Female	40	4.00	0.56		

Results of Table 10 did not show statistically significant differences at ($\alpha=0.05$) level, between sample participants' responses means on the job satisfaction measure, attributable to gender variable. This is based on T calculated value which was (0.54) with (0.585) significance level for the overall degree, as this value is not statistically significant. T calculated values were as follows: work nature area (0.94) and (0.108) significance level; salaries and bonuses (0.24) and (0.806) significance level; self-realization (1.01) and (0.212) significance level; and, affiliation to profession (0.10) and (0.915) significance level.

1- Years of Experience Variable

The researchers calculated the M's, SD's and T statistical test, to identify the differences between the responses means of the sample participants, attributable to the years of experience variable, as shown in Table 11.

Table 11. M'S, SD's and T Statistical Test to Identify the Differences in the Responses Means of the Sample Participants Attributable to the Years of Experience Variable

Dimensions	Years of Experience	No.	M	SD	T Value	Sig. Level
Work Nature	Less than 10 Years	68	3.81	0.61	1.61	0.10
	More than 10 Years	92	4.00	0.63		
Salaries and Bonuses	Less than 10 Years	68	3.95	0.55	1.88	0.62
	More than 10 Years	92	4.14	0.52		
Self-Realization	Less than 10 Years	68	3.91	0.66	3.59	0.00
	More than 10 Years	92	4.31	0.56		
Affiliation to the profession	Less than 10 Years	68	3.88	0.60	1.27	0.20
	More than 10 Years	92	4.02	0.63		
Overall Degree	Less than 10 Years	68	3.89	0.53	2.37	0.01
	More than 10 Years	92	4.12	0.51		

The results in Table 10 indicate statistically significant differences at ($\alpha=0.05$) level between the responses of the sample participant on the job-satisfaction measure as a whole, attributed to the years of experience, based on T calculated value. It amounted (2.237) with (1.61) significance level for the overall degree, and this value is statistically significant. However, the significance of these differences was in favor of the females, by calculating the higher mean value. T calculated value amounted (1.61) with (1.109) significance level for the work nature area; (1.88) with (0.062) significance level for the salaries and bonuses area; and (1.27) with (0.205) significance level for the affiliation to the profession area. These values are not statistically significant, because the significance level is higher than (0.05), except for the area of self-realization, which T calculated value amounted (3.59) with (0.000) significant level, which is considered statistically significant as the level is below (0.05). however, these differences were in favor of those who have more than 10 years' experience, as compared with those of less than 10 years of experience, as clearly shown in the Table. This may be ascribable to that those who spent more than 10 years at work are more satisfied with their jobs than others, because they feel more job security and permanent service, as well as suitable income, all of which reflect job satisfaction level better than the others in the study sample.

2- Academic Rank Variable:

The researchers calculated the M's, SD's and T statistical test, to identify the differences between the responses means of the sample participants, attributable to the academic rank variable, as shown in Table 12.

Table 12. M'S, SD's and T Statistical Test to Identify the Differences in the Responses Means of the Sample Participants Attributable to the Academic Rank Variable

Dimensions	Academic Rank	No.	M	SD
Work Nature	Associate Professor	40	3.94	0.66
	Assistant Professor	58	4.02	0.57
	Professor	62	3.78	0.65
Salaries and Bonuses	Associate Professor	40	4.06	0.59
	Assistant Professor	58	4.20	0.47
	Professor	62	3.91	0.52
Self-Realization	Associate Professor	40	4.24	0.65
	Assistant Professor	58	4.22	0.56
	Professor	62	3.97	0.66
Affiliation to the profession	Associate Professor	40	4.01	0.67
	Assistant Professor	58	4.05	0.51
	Professor	62	3.81	0.67

Overall Degree	Associate Professor	40	4.06	0.58
	Assistant Professor	58	4.12	0.46
	Professor	62	3.87	0.53

Table 12 shows apparent differences between the means of the sample participants' responses attributable to the academic rank variable. To identify whether such differences were statistically significant, the researchers applied the One-Way Variance Analysis (ANOVA) ascribable to the academic rank, as shown in Table 13.

Table 13. Results of the ANOVA Analysis of the Academic Rank Variable on the Means of the Responses of the Sample Participants

Dimensions	Source of Variance	Total Squares	Freedom Degree	Squares Average	F Value	Sign. Level
Work Nature	Between groups	1.09	40	0.55	1.40	0.25
	Within groups	47.40	58	0.39		
	Total	48.11	62			
Salaries and Bonuses	Between groups	1.56	40	0.83	2.97	0.05
	Within groups	33.67	58	0.28		
	Total	35.32	62			
Self-Realization	Between groups	1.70	40	0.85	2.22	0.11
	Within groups	46.40	58	0.38		
	Total	48.11	62			
Affiliation to the profession	Between groups	1.22	40	0.62	1.62	0.20
	Within groups	45.87	58	0.38		
	Total	47.87	62			
Overall Degree	Between groups	1.34	40	0.67	2.44	0.09
	Within groups	33.17	58	0.27		
	Total	34.50	62			

Results of Table 13 did not show statistically significant differences at ($\alpha=0.05$) level between the means of sample participants' responses on the job satisfaction measure, attributable to the academic rank. This is based on F calculated value, which amounted (2.44) and (0.092) significance level for the overall degree, and this value is not statistically significant. Furthermore. F value was (1.40) with (0.251) significance level for the work nature area; (2.97) with (0.55) significance level for the salaries and bonuses area; (2.22) with (0.113) significance level for self-realization area; and (1.62) with (0.201) significance level for the affiliation to the profession area. These values are not statistically significant because the significant level is higher than (0.05).

Question Five: What is the relationship between the participation in decision making degree of the faculty members of the educational sciences colleges in the Jordanian universities and the job satisfaction?

For answering this question, the researchers calculated the correlation coefficients between the participation degree of the faculty members of the educational sciences colleges in the Jordanian universities in decision making with the job satisfaction, as viewed by them, as shown in Table 14.

Table 14. Correlation Coefficients between the Participation in decision making Degree of the Faculty Members in the Educational Sciences Colleges of the Jordanian, with the Job Satisfaction

Dimensions	Work Nature	Salaries and Bonuses	Self-Realization	Affiliation to the Profession
Decision Concerning Students' Affairs	0.438 *	0.402*	0.480*	0.502 *
Decision Concerning Faculty Members	0.495 *	0.496 *	0.466*	0.562 *
Decision Concerning the Study Plans	0.520 *	0.447 *	0.420 *	0.484 *
Decision concerning the College Building and Financial Issues.	0.560 *	0.494 *	0.467 *	0.520 *
Decision Concerning the Local Community	0.486 *	0.467 *	0.472 *	0.552 *

Statistically significant at ($\alpha=0.05$) level

Table 14 shows that the correlation coefficients of the decision making dimensions with the job satisfaction dimensions ranged between (0.420-0.562), all of which are statistically significant at ($\alpha=0.05$) level. The lowest correlation coefficient was (0.402) between the decision concerning the students' affairs and the salaries and bonuses area. On the other hand, the highest correlation was (0.562) between the concerning the faculty members and the affiliation to the profession area. All these correlations were positive, indicating that the increase in the first dimension area is offset by an increase in the second dimension.

3. Conclusion

This study aimed at identifying the participation in decision making degree of the faculty members of the educational sciences colleges in the Jordanian universities, and its relationship to the job satisfaction. The results of the study showed that this participation in the decision making came with high degree, and the overall degree of the job satisfaction with the faculty members was very high.

This result could be interpreted by that the vast majority of the faculty members of these colleges possess wide practical and scientific experiences, and became reference houses of experience and references. They share the administrative decisions at the levels of the departments, colleges and university. In addition, certain institutions of the civil community seek these experiences, especially in the educational and academic aspects. They are referred to as consultants and experts, whose opinions are respected in many life areas. Therefore, the managements of the Jordanian universities extend to them all respect and appreciation, and let them share in making certain administrative decisions. In addition, they enjoy high positive participation in decision making in the educational sciences colleges. These colleges provide a climate of participation and cooperation in decision making; and the deans of the colleges deeply understand the importance of the faculty members' participation in the decision making. The reason may be the comfortable climate of the colleges, which is characterized by collective work and the existence of a culture emphasizing the importance of participation in the decision making.

The second variable is closely related to the first variable according to the results of the study, which showed that the faculty member shares in decision making and making. He/she is respected and valued, and is an effective member in his/her community, and is resorted to as a "school" of experience and knowledge. This reflects a high degree of job satisfaction, and provides the member feelings of respect, appreciation and happiness within his/her community. Furthermore, this reflects a distinguished social status connected with the current situation, with a somewhat high income as compared with the other work sectors. This is quite clear after the amendment of the salary scales and incentives in the universities as well as the recent quasi programs incentives, which improved the income of the faculty members of the Jordanian universities. Therefore, he/she feels a high job satisfaction level.

In this concern, the universities make periodical studies of the salary scale to keep up with the developments, life difficulties, expensive living expenses which we daily live. This is a step for retaining the efficiencies of the faculty members, and minimize, as far as possible, the rate of "brain and scientific minds immigrations", so that it will reflect a high level of teaching quality, improve the academic reputation of the university, through the presence of these efficiencies of the faculty members. In this case, the university will retain them and invest them actually based on their high academic reputation, particularly as the Jordanian universities are competing in the teaching scales at the local, Arab and Regional levels. They improve the quality and outcomes of teaching to keep up with the developments in the field, as an attempt to gain an international classification among the world universities. Among other aims, they seek for increasing the student numbers who are willing to study in these universities in the different educational programs, particularly, the quasi and international programs. Therefore, the universities are highly interested to make good use of the faculty members experiences and efficiencies, especially in the educational field, as they have successful dealing with students, attracting and recruiting them, refining their personalities, enhance its growth educationally, to prepare them for the practical life, as successful and positive influencing members in their communities. As a result, the outcomes of the university will be improved, to reflect a bright image and positive reputation of the university at all levels.

This study is in agreement with that of Masghouni (2015) which showed a positive relationship between the participation of the faculty members in the decision making and their job satisfaction level. This study is also in line with the study of A'ashour and Shatnawi (2014) in the effectiveness of the decision making in the insurance company, which was in high level. This study is also in agreement with the study of Al-Ghazali (2012) in that the effectiveness of the decision making was high with the sample participants; with the study of Bal-Khairi and Ushait in the importance of the human element in achieving the objectives of the organization; and with Flebmann (2006) in the existence of a positive relation between participation in decision making and job satisfaction degree.

On the other hand, the results of study were not in agreement with that of Rareebullah (2013), which concluded that the participation of the faculty members in the Algerian universities in decision making was generally low.

The results of this study indicated statistically significant differences at ($\alpha=0.05$) level for the estimations of the faculty members of the participation degree in decision making, attributable to the gender in the overall degree of the domains, in favor of the male faculty members. This result may be ascribable to that the numbers of the male faculty members are more than the females, and the majority of the votes in the department and the college in decision making are of the males; and, females do not show any interest in the decision. In addition, their participation in the managerial jobs is almost low; and the heavy burdens and responsibilities of the female faculty member, as a mother, wife, housewife, employee, lessens her interest in the managerial decision. An explanation that is in line with the results.

There were statistically significant differences at ($\alpha=0.05$) level between assistant professor and professor; and between associate professor and professor rank, which were in favor of the professor rank. This indicates that the faculty members of the professor academic rank in the educational sciences colleges in the Jordanian universities are more aware of the importance of participation in decision making. This may be ascribed to that those of the professor rank had an administrative maturity, and are of experience, consultancy, and right opinions, which made their participation higher than others'.

Finally, there were statistically significant differences at ($\alpha=0.05$) level between the responses means of the sample participants on the job satisfaction measure as a whole according to the years of experience variable. The researcher ascribes this to that faculty members of more than 10 years of experience are more job satisfied than others, because they feel the occupational security and stability in permanent service and good financial income, which reflects more job satisfaction than others in the study sample.

The study provided the following recommendations:

- Work to reward the hardworking and faithful responsible at work, and raise the efficiency of the lower experience employees, control and keep them accountable, if they show any shortcoming at work.

- Setting a remuneration and incentives system for the faculty members in the Jordanian universities, so that the university will not search for alternatives from outside the country.
- The strategic decision center must perceive the importance of the modern technologies in supporting the strategic decision and placing more importance to what it achieves of optimal utilization of its resources.
- Official and decision takers in the universities must join training courses specialized in management and its skills, to raise the university level according to their administrative needs.
- An objective revision is required for the administrative procedures in the universities, for change or amendment, as may be required, in a manner that achieves the work objectives and job satisfaction.
- Placing attention to the psychological aspects and preparing the suitable climate, so that the faculty member will carry out the work (art) of teaching.
- Providing information in all cases and emergency cases as well, to support the administrative decision making by the academic leaders, as may be needed. In other words, connecting the administrative information systems with the crises management.

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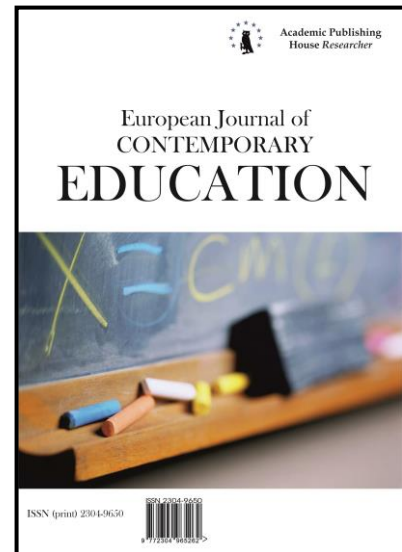
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The History of Education

On the Establishment of the Ruthenian (Ukrainian) University in Austria-Hungary and Its Coverage in “Kievskaya Starina” Journal

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Abstract

The article is devoted to the attempts of Rusyns-Ukrainians living in the Galician lands of the Austro-Hungarian Empire to obtain the right to open their own university in Lviv. The main sources for this article were materials of historical, ethnographic and literary journal “Kiyevskaya starina”.

The idea of establishing a Rusyn university in Lviv appeared in the middle of the XIX century. The authors focused on the events that unfolded around this project at the end of the XIX and the beginning of the XX centuries. Rusyns-Ukrainians were unable to defend their idea of establishing a university. The main reasons for the failure were the complex social and political situation in the multinational Austro-Hungarian Empire and the oppression of the Ruthenians by the representatives of the Polish nationals in Galicia.

Keywords: “Kievskaya starina” journal, Rusyns-Ukrainians, university, Austro-Hungarian Empire.

1. Introduction

The study of issues related to the development of higher education, including the nationally oriented ones, is a promising trend in historical and pedagogical researches. Analysis of the historical experience of higher education in difficult social and political conditions, accompanied by manifestations of national intolerance, allows modern states to avoid errors and mistakes in

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educational policy, helps the education system to adapt to the needs of society, to make it oriented to all categories of the population, including different nationalities.

In this article, the author covers the attempt of Rusyns-Ukrainians (who were mostly residing in the territory of Galicia, which was part of the Austro-Hungarian Empire) to achieve the right to open their own university in Lviv. Although the idea of establishing a separate Ruthenian-Ukrainian university in Austria-Hungary dates back to the mid-XIX century (after the revolutionary events of 1848), it became popular among the Ukrainian population only in 1895 (according to M. Grushevsky) after the opening of the Ukrainian history department in 1894 ([Grushevskiy, 1910: 7](#)).

2. Materials and methods

The materials taken from the historical, ethnographic and literary journal “Kievskaya starina”, published in Kiev in 1882-1906 were used as the main source for this article. The journal highlighted some aspects of the educational policy of the Austro-Hungarian government regarding Rusyn-Ukrainians, as well as their struggle for the right to establish a national university in Lviv.

In this article, the author applied the principles of objectivity and historical anthropologism. In particular, the principle of objectivity involves the study of the historical process, taking into account the objective laws that determine the processes of state and socio-political development in this historical phase, the use of real facts, etc. Therefore, the author took into account both the policy of the Austro-Hungarian government in the educational sphere and the internal social processes, especially those in the midst of certain national minorities of Austria-Hungary. The principle of historical anthropologism allowed the author to focus on the humanistic essence of the research. This principle became one of the key ones, since the central orientation of the article is a certain human community (Ruthenian-Ukrainian), which acted as the bearer of specific values and traditions.

The nature of this research also required a critical approach. Considering the “Kievskaya starina” as a historical source, we used the works of other authors, (including modern ones), to clarify the information in the journal. Comparative-historical, problem-chronological and retrospective methods were also applied in the research.

The use of certain terms in this research is due to the specifics of the terminology on the pages of “Kievskaya starina”. The authors of the notes used as our main source, referring to the Ukrainian population of Austria-Hungary, call them the Rusins, the Ukrainians, the Russians, the Galician Little Russians, the Rusins of Galicia or Bukovina. The Ruthenian students of Lviv University used both the terms “Ukrainian” and “Rusyn” in relation to themselves. In the article, published in the Czech newspaper “Golos naroda”, as well as in the “Sankt Petersburgskie Vedomosti” Ruthenian students wrote: “... we are the Ukrainian (Rusyn) youth, a part of a thirty-million people living in Russia and in Austria-Hungary” ([K voprosu o studentakh-rusinakh, 1902: 116](#)). The language spoken by the representatives of this ethnic group was also referred to as Russian, Ruthenian, Galician Russian, Galician Ruthenian or Ukrainian. In this research, the author mainly used such terms as “Rusyns”, “Rusyns-Ukrainians”, “Russian-Ukrainian” and “Rusyn-Ukrainian” to avoid confusion.

3. Discussion

Due to the high level of information content, “Kievskaya starina” has been actively used as a source for studying history problems, literary criticism and etc. The social significance and informational potential of this monthly publication was studied in detail by the Ukrainian scientist M. Palienko ([Paliienko, 2005a](#); [Paliienko, 2005b](#)).

A lot of materials on various issues of the history of education in the Ukrainian ethnic lands were published on the pages of “Kievskaya starina” at various times. Attention was paid in particular to the policy of the government of the Austro-Hungarian Empire in their offer of higher education to representatives of Ukrainian nationality, who were very numerous in the Bukovinian and Galician lands of the empire. Various problems related to the organization of the educational process for students of Ruthenian-Ukrainian origin were highlighted, as well as attempts to solve them. The publications paid special attention to the status of Ruthenian students at the University of Lviv and their movement in favor of establishing a separate Ruthenian-Ukrainian university in Lviv. “Kievskaya starina” covered all these events on its pages for several years ([Veche studentov,](#)

1902; Zayavlenie studentov, 1904; K istorii voprosa, 1902; K voprosu o studentakh-rusinakh, 1902; K voprosu o universitete, 1904; Pol'skaya gazeta, 1903; Proekty novogo universiteta, 1901; Ukrainsko-ruskyi universytet, 1899).

Issues related to the establishment and functioning of the Ruthenian-Ukrainian primary and secondary educational institutions in the Galician and Bukovinian regions of Austria-Hungary, the situation of the youth studying in them and problems of using Ruthenian/Ukrainian language in schools and gymnasiums (*K goneuiyam na rusinskiy yazyk, 1903; Pol'skiy i rusinskiy yazyk, 1904*) were also discussed on the pages of "Kievskaya starina" (*Galitskie gimnazii, 1902; Narodno-prosvetitel'naya deyatel'nost', 1902; Narodnye shkoly, 1903; Otkrytie novoy gimnazii, 1900; Polozhenie rusinskih shkol, 1904; Razvitie rusinskoj shkoly, 1905; Rusiny v srednikh shkolakh, 1905*).

The indicated problems were covered on the pages of other periodicals of that time, in particular in the journal "Slavyanskiy vek", published in Austria-Hungary (*Slavyanskiy vek 1; Slavyanskiy vek 2*).

The contemporaries, participants or witnesses of the events devoted their works to various aspects of the activity of Lviv University in the second half of XIX - early XX, its students of Ruthenian-Ukrainian origin and their role in the university and society. This was mainly journalism. In most cases, the problem of establishment a separate university occupied a prominent place in their works (*Grushevskiy, 1910; O.N., 1910; Ukrainsko-ruskiy universitet, 1899*).

Modern researchers such as B. Yakimovich (*Yakymovych, 2014: 45-46*), S. Fominykh, A. Stepnov (*Fominykh, Stepnov, 2016*) and others studied these problems or mentioned them in their researches on the cultural or social and political life of the Galician region of Austria-Hungary.

4. Results

On the pages of "Kievskaya starina" it was indicated that the Ruthenian population of Galicia was largely assimilated with representatives of other nationalities, especially with the Poles. Nevertheless, a large number of Rusyns-Ukrainians and a significant number of representatives of "intelligentsia and semi-intelligentsia" had the right to "seek recognition of the rights of their language in government and school", and it was also necessary "to take measures to remove these people from national slumber and death" (*Rusiny v zapadnoy Galitsii, 1903: 47-48*).

In the end of the XVIII century, Austrian emperor Joseph II allowed lectures in the Ruthenian language at the University of Lviv. But in 1808 language of these lectures was replaced by Latin, and later by German and Polish. This made it difficult for representatives of Ruthenian-Ukrainian nationality to receive education.

Two Rusyn departments "with lectures in Russian" - civil procedure and criminal law were established at the University of Lviv by the Imperial decree of 1862, but they functioned with long breaks. The department of civil procedure operated until 1873 (taught by Professor Lopushansky), after which the professor post remained vacant for more than 30 years. The criminal law was very briefly taught by Professor Srokovsky, and then it also remained vacant until 1892, until it was replaced by Professor Stebelsky (*K voprosu o universitete, 1904: 35*).

A decree that recognized at the University of Lviv Polish and Ruthenian-Ukrainian languages as equal as local languages was issued in 1871. In fact, this university became Russian-Polish. But this fact almost did not affect the problems associated with the education of the Ruthenian youth; it did not activate the Ruthenian departments. The reason for this was, first and foremost, discrimination of the Ruthenian students and teachers in the university, which was represented mainly by Polish professors. In particular, professors of Ruthenian origin were never elected rectors, various obstacles to obtaining doctoral degrees were created for them, etc. (*K voprosu o universitete, 1904: 35; Ukrainsko-ruskyi universytet, 1899: 112*). The de facto Polish element turned out to be dominant. The Ruthenian-Ukrainians continued to experience great oppression on the basis of their language. This situation was precisely commented by researchers S. Fominykh and A. Stepnov: "School and university education was fundamental in consolidating and relaying cultural identity to future generations at all times". This led to the fact that the problem of a dominant language often became a cause for conflict at universities (*Fominykh, Stepnov, 2016: 143*).

A group of students of theological faculty of the University of Lviv was forced to continue their studies at the University of Vienna. It was a reaction to the harassment to which they were subjected, in the first place, by the administration of Lviv University. In general, as a result of these oppressions, about 680 Ruthenian students left the university (K istorii voprosa, 1902: 185). By the end of the XIX and the beginning of the XX century, students of Ruthenian origin studied at various universities in Austria-Hungary. It is known that in Krakow and Prague universities they were welcomed very warmly by the student community (K voprosu o studentakh-rusinakh, 1902: 115).

The Greek Catholic metropolitan Andrei Sheptytsky, during his stay in Vienna, attempted to negotiate with the Ruthenian students and return them to Lviv. Students put a number of conditions under which they could return in a special note, which was later presented even to the Minister of Education. This note allows us to reconstruct some events in the life of the students of Lviv University:

- "The rector of Lviv University should take back his abusive expressions about Ruthenian students voiced in the review of the university senate about the unrest" - there were probably some students speaking in defense of their rights, and it was perceived as unrest (led by the students) by the university. Perhaps the Polish leadership of the university, often known for its national intolerance, was offended / outraged by the activity of the Ruthenian students. This assumption is confirmed by B. Yakimovich, who mentioned the clash between Ukrainian and Polish students on November 19, 1901 (Yakymovych, 2014: 46);

- "Ruthenian students should be relieved of the obligation to attend lectures by professors Fialka and Tvardovsky" - apparently, these teachers were the most biased and intolerant towards students of Ruthenian origin;

- "Ruthenian students have the right to use the Ruthenian language in all relations with the university authorities" - hence it follows that the right to use their native language, which was legally assigned to the students, was not implemented (K voprosu o studentakh-rusinakh, 1902: 115).

All these conflicts in the university environment between different nationalities prevented the normal functioning of the university, creating difficulties for students-Rusyns during exams or during courses. This caused dissatisfaction with the Ruthenian students (Fominykh, Stepnov, 2016: 143-148). As a result, on July 1, 1899, a meeting of about 500 students of Lviv University and representatives of a number of other cities and corporations (associations) took place in Lviv, at which the issue of creating a separate Russian-Ukrainian university in Lviv was again raised. According to the Ukrainian researcher B. Yakimovich, there were 450 participants. Based on the discussion of this issue, a relevant resolution was prepared and sent to the Ministry of Religions and Public Education for consideration (Ukrainsko-russkiy universitet, 1899: 112-113; Yakymovych, 2014: 46).

From the various strata of the Ruthenian population of Austria-Hungary, and the organizations representing them (clubs, reading rooms, etc.), the decision of the student meeting was taken very positively. At the same time, the idea of establishment of a Russian-Ukrainian university provoked a wave of criticism from a part of the Polish public. Polish periodicals ("Daily Polish", "Time") called the demand of Ruthenian students a "ridiculous and wild claim" (Ukrainsko-russkiy universitet, 1899: 113).

The struggle for the establishment of Russian-Ukrainian educational institutions reached a political level to a certain extent. Galician Sejm deputies Olesnitsky (a member of the Russian-Ukrainian Radical Party) and Barvinsky made a proposal to open a Ukrainian university in Lviv and the Ukrainian gymnasium in Stanislavov. The proposals were ignored in the Sejm, which became, according to the Polish newspaper "Warsaw Courier", the reason for "the withdrawal of Russian deputies from the Sejm" (Proekty novogo universiteta, 1901: 26).

The Czech and Ukrainian deputies in the Austrian parliament proposed an alternative to the Ruthenian university in Lviv. They submitted a draft, according to which the German university in Chernivtsi should be transferred to the Czech city of Brno, and in Chernivtsi it was proposed to establish a university for Ruthenian youth from Galicia and Bukovina. It was assumed that this project would not be popular in the Rusyn-Ukrainian circles in Chernivtsi (K istorii voprosa, 1902: 186). At the same time, the Polish newspaper "Poland daily" (in which the idea of creating a Rusyn-Ukrainian university in Lviv was actively criticized) reacted very positively to the project of Czech and Ukrainian deputies. In one of the articles on this issue, it was stated that 42% of the population

of Bukovina are Ruthenians (probably here – both the Ruthenian and Ukrainian population). In addition, some counties of Galicia are adjacent to Bukovina. For this reason, the establishment of this university would be more logical in Chernivtsi. The article voiced a direct appeal to the fact that “the Ruthenians must demand the transformation of Chernivtsi University into a Rusyn university” (*Pol'skaya gazeta, 1903: 193*). Apparently, the authors of this article tried to influence the shift of the center of public and possibly political activity of the Ruthenians, which was to arise along with the establishment of such a university in the lands of Galicia, where the Poles tried to maintain their maximum influence, including assimilation policy. The desire of the Ruthenians to have their own university in Lviv was supported by the Taras Shevchenko Scientific Society, which turned to the Austrian parliament with a request to support this project. In general, the idea of establishing this university had a great resonance in the international university community and among the intelligentsia. In particular, it was supported by the students of the Russian Higher School of Social Sciences in Paris and other Parisian higher educational institutions, artists of the Warsaw Opera - Rusyn-Ukrainians by origin S. Krushelnitskaya, K. Blonskaya, A. Myshuga and 34 other representatives of the Ruthenian intelligentsia in Warsaw (*K voprosu o studentakh-rusinakh, 1902: 116; K istorii voprosa, 1902: 184-185*).

The question of the establishment of a Ruthenian university was also discussed at the University of Prague in the presence of the rector, deans and a large number of students in the first half of 1902. The resolution of this meeting expressed the need to establish such an institution (*K istorii voprosa, 1902: 186*). This idea was also supported by the Polish students from the University of Leipzig (*K istorii voprosa, 1902: 186*).

Probably, the opposition to the idea of creating a university in Lviv of a part of the Polish society was quite strong, and the efforts of the Ruthenian deputies in parliament in this direction were relatively unsuccessful. There were also disappointments in the circles of supporters. Attempts to change the tactics of upholding this project were made. To a certain extent, this is confirmed by the speech of student Kosevich at a meeting of Ruthenian youth, which took place in the second half of July 1902 in Lviv. After analyzing the situation, he said that “the struggle for the Rusyn university should be replaced by the struggle against the strength and influence of the Polish gentry” (*Veche studentov, 1902: 144*).

The Rusyns in Lviv University continued to be harassed. It was often initiated by the university administration, on behalf of which representatives of the highest officials acted. The Minister of Public Education even issued a rescript, according to which the students of Ruthenian/Ukrainian nationality did not have the right to read the oath (the student vow). For this reason, many students even refused to register for the new semester at the end of 1903 (*Zayavlenie studentov, 1904: 24-25*).

In the first half of 1904, the question of establishment of a university was raised again. The impetus for this was the discussion in the Austrian parliament on the issue of opening a law faculty in Rovereto for Italians, of whom there were about 800 thousand people in the Austro-Hungarian Empire, which is almost 4.5 times less than the Ruthenian Ukrainians. In addition, the Minister-President Dr. Kerber announced the establishment of the university for Slovenes (*K voprosu o universitete, 1904: 33-34*).

The Rusyn-Ukrainians hoped that the issue of the Ruthenian university would also be considered in parliament, since their population in the empire was quite numerous. In 1890 and 1900 censuses were conducted in Austria-Hungary and the most numerous ethnic groups there were the Germans, the Czechs and the Poles. The Ruthenians were the fourth largest group – in 1890 there were 3,105,221 people, and in 1900 – 3,375,576 people (*Statistika ukrainskogo naseleniya v Galichine, 1903: 96*). The representatives of several ethnographic groups, primarily the Ukrainians, were assigned to Rusyns at that time.

But their hopes for establishing of the university were not meant to be realised. As a result, the most active were not the parliamentarians, but the Ukrainian and Ruthenian students and professors of Lviv University. Not abandoning the idea of a separate university, they began to pursue the creation of Ruthenian departments. In particular, the meeting of law students and a number of professors decided to demand the establishment of a legal department with lectures in Ruthenian. In addition to the already existing, but not functioning Ruthenian department of civil procedure, it was proposed to establish departments of political economy, trade and exchange law. The students also wanted the examination committee to use the Ruthenian language during the

tests. All these wishes were planned to be spelled out in a special resolution, which, after consideration by the university senate, should have been passed to the Ministry of Public Education ([K voprosu o universitete, 1904, 1904: 34-35](#)).

One of the justifications of the Ruthenians for their right to their own university was the number of Ruthenian students at universities in Austria-Hungary. In 1904, in one of the editions of "Kievskaya starina" the average number of Rusyn students (per 10 semesters, prior to 1901) is said to be 618 people. And in the spring semester of 1904, there were about 800 Ruthenian students at Lviv University alone. At the same time, injustice on the part of the government in relation to the Ruthenians was aggravated by the fact that less numerous nationalities nevertheless received the promise of the authorities to open separate higher educational institutions for them. For example, such promises were made to Italians and Slovenes ([K voprosu o universitete, 1904: 35-36](#)).

The struggle for the right of Rusyn-Ukrainians to have their own university in Lviv continued further, especially escalating in 1906-1907 and 1910. In 1912, the Austrian government agreed to establish the university and it was scheduled for 1916. But this was not meant to happen due to the outbreak of World War I. In general, in 1914, only 8 Ruthenian-Ukrainian departments out of 80 existing functioned in Lviv with 4 associate professors ([Yakymovych, 2014: 46](#)).

5. Conclusion

The Ruthenian-Ukrainians could not defend their idea of a university in Galicia, which was meant to be nationally oriented to the representatives of this ethnic group. There were several reasons for the failure of this project – and first of all, it was due to the complex social and political situation in the multinational Austro-Hungarian Empire. The growing popularity of ideas of socialism among the Ukrainian youth distracted them from the struggle for the university. In addition, various national movements, which often competed with each other, became increasingly active, and it led to the oppression of representatives of certain ethnic groups. In the case of the Galician Rusyns-Ukrainians, the Polish nationals were the antagonistic force in that region, as they were "attacking" the cultural life of the Ukrainians.

All steps of the Ruthenian-Ukrainian students' struggle for their rights, for the Ruthenian university in Lviv were regularly covered in the press of that time. It should be noted that "Kievskaya starina" journal was one of the print media that most quickly and objectively covered the problems of the Ukrainian population living in Austria-Hungary, including issues related to the development of higher, secondary and primary education of this ethnic group in Austro-Hungarian lands. The editorial staff of "Kievskaya starina" also paid attention to various aspects of the university life of Ruthenian students as well as the struggle of the Ruthenian-Ukrainians to establish a separate university. They were covered in a number of small publications, which described events and sometimes conflict situations objectively and tolerantly. The authors' notes mostly avoided emotional assessments. Though such materials were not devoid of factual inaccuracies.

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Apprenticeship in Secondary Vocational Schools During the Economic Modernization in Late Imperial Russia. Part 1

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Abstract

In his study of the formation of apprenticeship system and analyzing its content, methods and forms in the Russian secondary vocational school described in the materials of the Kazan school district of the late XIX – early XX century, the author relies on the theory of Western modernization and positive bureaucracy, attracting regulatory and educational documentation, scientifically and publicly pedagogical journalism as well as ego documents.

Practical methods of knowledge application were planned in the pre-revolutionary schools in the logical-pedagogical relationship, but their implementation left much to be desired. In the organization of production practice, this was due to the lack of permanent bases and practical managers from the educational institutions, a certain attitude towards the trainee at enterprises as auxiliary personnel engaged in versatile non-system work, as it was openly declared by the advanced pedagogical press and even by the administrative and training personnel in schools.

The article also reveals positive aspects in the organization of practical training, which are still relevant today. These include the introduction of active learning methods, improved reporting documentation, payment for the students, preparing them for the future profession and management.

The rapid development of practical training was due to the need of a qualified young specialist who was prepared for independent production activity in the new conditions of accelerated modernization of the country's economy.

Keywords: Russian Empire, the history of education, training, practice, internship.

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1. Introduction

The specialist training process in secondary vocational schools included, in addition to the theoretical course, a variety of forms and types of practical training. The internship (which purpose historically was to prepare students for the upcoming independent professional activity) plays the most important role in this. The organization of the practice still has a number of problems, as it is under attention of the bodies carrying out accreditation and supervision of educational organizations. Many of these problems are rooted in the pre-revolutionary period, when practical training was at its formation. The transition from the traditional system of apprenticeship to a complex theoretical and practical training for the modernizing country went through a complex path of transformations, marked by the interaction of the authorities, the public and the teaching community aimed at improving this system. In this regard, the study of the formation of practical training in secondary vocational schools in Russia in the late XIX – early XX century will allow us to understand the transformation mechanisms and the resulting system, with its advantages and disadvantages, characteristic of modern times.

2. Materials and Methods

2.1. The formation of the apprenticeship system as a structural part of the learning process in secondary vocational schools drew attention to its regulations, as well as to the documents reflecting various aspects of the historical dynamics of changing the emphasis on educational policy. They are accompanied by curricula and programs that reveal the amounts, types and, in part, the specific content of the practice. Materials of collective discussions on the reform of certain types of schools, reports of leaders of the social-pedagogical movement and teachers-practitioners who summarized the existing experience and suggested solid measures to improve current problems help us to recreate a dynamic picture of transformations in the organization of practical training. Materials on practical training in the works of high-ranking officials and administrators of the educational sphere became the core of our source base. Taking a more conservative position than representatives of the pedagogical cohort, they also noted the encountered difficulties and made their suggestions for reforming the practical training. Educational office work (correspondence of educational institutions with databases of practices, annual reports of schools and commemorative essays, as well as reporting documentation of the students) allows us to get a more detailed picture of practical training and relate it to the current regulatory framework. Memories of students personalize the study (Litvinova et al., 2017: 176), allowing us to consider the practice in the case of a specific situation and from a perspective of the student.

2.2. The formation of practical training as an element of educational process unit is considered from the standpoint of the modernization theory as it is the most updated process in the educational system. The need of its adequate alignment with the actual practices of production activities is due to the country's economic objectives. This aspect of analytics includes M. Weber's bureaucratic theory. The positive attitude of the higher educational bureaucracy regarding changes in practical training, its interest in achieving this goal and responsible attitude led to the adoption of timely and qualified decisions based on a variety of information, including the proposals of the social-pedagogical movement. The subject of the article allowed the author to combine macro and micro-techniques. Periodic concentration on individual schools and interns in the micro-perspective made it possible to understand the features of the implementation of the educational policy in real practice.

3. Discussion

Discussions about the organization of practical training in the Russian Empire gave rise to a significant amount of scientific and pedagogical literature on this topic. The works of I.A. Stebut, I.I. Meshchersky, I.M. Maxin and V.V. Vinogradov are characterized by a desire for an objective assessment of the existing realities and rational proposals for correcting the existing shortcomings of practical training. Soviet historiography focused on the shortcomings in the pre-revolutionary school, but nevertheless highlighted the most successful local examples of practical training. Modern Russian historiography repeats studies of previous periods, not making the organization of practical training a subject of independent research, but considering it in the context of general issues of the history of vocational education.

4. Results

4.1. Bases, types and amounts of practices: history inspired by modern times

The initial task in the organization of production practice is the selection of bases for its implementation. In most cases, state educational institutions conducted internships on their own base, with planning and building future schools equipped with its necessary areas, facilities and equipment, as well as staff of managers. The non-state school organized the practice at relevant enterprises and institutions of its region. Such a distribution of bases of practice depended not on the organizational and legal form of the educational institution, as it may seem, but on the economic sphere for which the school prepared its specialists. For some professions, on-the-job training was the only possible and adequate organizational form of practical training. This concerned pupils of commercial schools and schools of sea and river transport, i.e. students of those professions for which it was quite difficult to reproduce work processes and working conditions in the structural units of the organization. However, the lack of funds from a non-state school to create its own practice base still played a significant role in this. "River sailing schools", for example, did not have the funds to purchase their own training vessels, and students of the Astrakhan Naval School shared a training vessel with other "sailor" students.

Under these conditions, these schools established active relations with the bases of practice, largely contributed by the members of their boards of trustees, who were often representatives of certain bourgeois circles. "River sailing schools", for example, the Kazan River School sent letters to ship owners with a request to accept students for practical sailing. The whole situation in nautical education can be assessed by such an activity. The Ministry of Commerce and Industry had only three training vessels, designed primarily for the students of the maritime schools. Number of students in nautical schools for the period 1900-1908 ranged from 2 thousand to 1.1 thousand people, while the number of vacancies for them on all three vessels was only 230 people. Therefore, the majority of students looked for places to practice on private ships, despite the fact that shipowners did not willingly accept inexperienced personnel (Vinogradov, 1908: 33, 58, 60). Therefore, sending out papers with a request for cooperation could help find a base of practice and at the same time at least somehow present the student to the possible head of the practice base.

Trying to generalize the types of practices in the pre-revolutionary vocational school, we must recognize that it is quite difficult to carry out a clear, unified and, most importantly, detailed gradation of types of practical training, due to the heterogeneity of definitions and normative acts in this area even for certain types of schools. Nevertheless, two large forms (in the source – "categories") of classes can be distinguished, as it is done, for example, in the "Rules on the practical training of students of agricultural schools" of 1888:

"a) some serve to master the material better and, along with teachers' presentations, are a part of the theoretical course; b) others aim to give students the opportunity to acquire sufficient skills for the production of agricultural work and then, as far as possible, practically familiarize them with the design of estates and the process of management" (Sbornik svedenii, 1911: 232).

The importance of practical training in the structure of training in pre-revolutionary vocational school is emphasized by the amount of practice. The largest amount of practical training was in agricultural education. The Charter of Secondary Agricultural Schools of 1912, after long and urgent demands for the reorganization of the practice, for the first time in the history of agricultural education, introduced approximate standards of time not only in theoretical but also in practical training: at least 25 weeks a year for a theoretical course and "for practical classes in the summer period, approximately 15 weeks are allotted (from 10 to 20 weeks in different classes)". At the same time, the distribution of lessons, practical exercises and work remained under the jurisdiction of the pedagogical councils, but "with the guidance" of the latter, with a requirement to attach the curricula and table of summer practice to the reports (Ustav, 1912: 9). Judging by the Kazan Secondary Agricultural School, the pedagogical councils did not go beyond the recommended amounts (Tanev, 1915: 40).

The Charter of 1912 specified the rationing of all forms of practical training. The curriculum for the winter period assumed 153 weekly hours of theory and 55 practices (envisaged in all subjects, with the exception of the Law of God and history) for the entire course of study, to which the "Table of the number of hours of practical training in the summer period" added 91 more weeks of practice in special subjects. Additionally, the time spent on agricultural work, duties and excursions was normalized: in the winter period it was 18 hours and 176 in the summer period.

These three activities were classified as practical exercises by the Charter (Ustav, 1912: 8, 20-21). Therefore, 153 hours were allocated for 6 years of theoretical training (approx. 25.5 hours in each class), 146 hours for practical exercises in subjects (approx. 24.3 hours in each class) and 194 hours for other forms of practical training during the entire course of study (32.3 hours in each class). According to the Charter of 1912, the amount of practical courses turned out to be slightly less than the amount of the theoretical ones. Taking into account other forms of practice, practical training in secondary agricultural schools in terms of the amount of allocated hours exceeded the theoretical one twice.

On the other hand, such a significant amount of work for the student (82.1 hours per week or 13.68 hours per day during the six-day week) was excessive, and therefore the actual application of such amounts of work is doubtful, despite the reports. Historical essay of the Kazan Agricultural School described a similar situation in the 1880's: "winter agriculture classes are performed only by students of the sixth class". This was explained by the lack of time, because "before the school was transformed there were fewer subjects and therefore fewer daily lessons ... and we could devote from 2 to 5 hours a day for practice in various subjects" (Beletskii, 1889: 108-109).

The significance of the amount of practice in the pre-revolutionary school stands out against the amount of practices of the modern school. Comparison of the current state standard in the specialty "18.02.03 Chemical technology of inorganic substances" and the "Table of the number of hours of studies at an average chemical engineering college" shows a clear prevalence of practice hours in the latter (FGOS, 2014b; Uchebnye plany, 1891: 62). Basic training for modern chemical technologists is 147 weeks, including: 27 – practices, 86 – training in educational cycles, 23 – holidays and 11 – intermediate (5) and final (6) exams. In the pre-revolutionary secondary school of chemistry and technology, the number of weekly hours was 156, as it included: practical classes – 65, graphic classes – 22 and 69 for the training sessions. We see that practice in a modern school takes 21.7 % of weeks (without holidays), and in pre-revolutionary school – 41.6 % (including graphic classes – 55.7 %) of weekly hours. A smaller difference is observed in the practical training of modern technicians in the specialty "15.02.08 Mechanical Engineering Technology" and pre-revolutionary technicians graduating from secondary engineering schools – respectively 20.1 % and 26 % (52.7 % with graphic classes) (FGOS, 2014: 29).

4.2. "Those who graduate from the course have a rather wide range of activities...": practical training in a secondary agricultural school

The significance of the role and the amount of practical training in the course of secondary agricultural schools was determined by their very purpose: "to deliver practical, scientifically based education in agriculture and to prepare the students for agricultural activity" (Sbornik svedenii, 1909: 302). The head of the educational department of the Department of Agriculture, I.I. Meshchersky, explaining this regulatory goal, pointed out that: "practice in agricultural educational institutions should be of paramount importance", specifying that "the higher the level of the institution is, the stronger the scientific part of teaching should be, compared to practical exercises" (Meshchersky, 1911: 3). That was the real embodiment of the idea: if, according to the data for 1909, in secondary agricultural educational institutions of the country practical classes took up to 88.5 days in an academic year, then in lower agricultural schools of the first category – 123 days (Sbornik svedenii, 1911: XXV).

The practice in agricultural schools was divided into winter and summer one, due to the specifics of agricultural education. The normative "to the number of practical classes" (i.e., to the forms of practice) were: "practical and demonstrative classes in educational and auxiliary institutions, agricultural work, duties in practical educational institutions and excursions" (Ustav, 1912: 8).

The program of winter classes included courses in all general education subjects and in those sections of special subjects where it was possible to conduct practice in the winter, namely in animal keeping, agricultural mechanics, agricultural economy and bookkeeping. Due to the distance from the nearest town and the closed nature of agricultural schools, such as the Saratov (Mariinsky) Agricultural School, winter practical classes were held in the evenings "under the direct supervision and guidance of teachers" (Iz vlechenie iz Otcheta, 1894: 13).

Summer practical classes for pupils of the first five classes of the institution were as follows:

1) in agricultural mechanics, the practice consisted of assembling, disassembling and repairing

agricultural machines, mechanisms and tools, studying their details, and also getting acquainted with the methods of their testing; 2) in botany – the study of morphology, the definition of plants, their collection and the compilation of herbaria; 3) in surveying, most of the classes were devoted to working with a theodolite and drawing up plans; 4) in the courses of construction – the preparation of plans and estimates of buildings; 5) on crop production - the performance of all the work necessary for the cultivation of various plants (fertilizing and tillage, planting, caring for plants, cleaning, threshing, sorting and seeds drying, as well as determining the quantity and quality of the crops); 6) in courses of animal keeping, students performed animal care work, took milk, received cream, churned butter, did cheese-making and beekeeping; 7) in courses of geodesy they were engaged in various types of surveying, leveling and drawing up plans (NART. F. 345. Op. 1. D. 1307. L. 33-48).

The initial goal of the general agricultural training was realized in this variety of labor activities during practice. This drew sharp criticism from teachers and educators who sought to streamline and organize this work (Vitezova, 2015: 50). I. A. Stebut repeatedly stated that students should be engaged in all types of agricultural work, “but it is completely aimless to engage students in such a work for a longer time, even with the goal of acquiring the proper skills. Such practical exercises in a useless manner take away the time the student needs to acquire what he can at the educational institution, depriving him of the energy that is necessary for mental work at school; force the student to stay longer at school and in this it way increases the cost of education of the student, and it is all in vain” (Stebut, 1909: 5).

The position of I.A. Stebut was first widely voiced in 1895 (Balashev, 1966: 139). In the practice of secondary agricultural education the same idea was proposed by I.I. Meshchersky, who, by distributing agricultural training to three levels (knowledge (“familiarization”), ability and skill), believed that the first two levels were sufficient for the students who were preparing to become “managers of estates”, since they were unlikely to have to compete with agricultural workers. Though, in order to prepare for public agronomy, they must possess skills in their specialty, otherwise they would not be able to gain the peasants’ trust (Meshchersky, 1911: 36). Thus, the educational authorities only partially transformed their views on the diverse nature of practical work and the degree of their learning. With a clear concentration of secondary agricultural schools as general agricultural schools in the Chernozemye region and rapid development of special agricultural educational institutions, such a long deep agronomic training could not but seem to the government a logical and optimal solution for agricultural regions in the context of agrarian modernization.

At the same time, there were other equally important problems in organizing the practice of students, not only for agricultural, but also for other schools that trained personnel. Among them were the following: lack of consistency of the theoretical course with practical exercises; a large number of students in one classroom, some of whom had no interest in classes; the mismatch of the amount of practical training in different schools and even in each individual school in different years (in relation to each student); the use of students’ labor in additional school-related activities (Maksin, 1909: 113; Stebut, 1906: 65).

The summer agricultural practice at the Vyatka Secondary Agricultural and Technical School was significantly smaller in comparison with the average agricultural schools due to the more technical nature of the school itself (it was an industrial school). The second-year students practiced on the school educational farm up to 60 working days. The limited farm space and the duration of the practice resulted in the students doing shift work (five hours each) and assigning several people to one type of work. However, the latter made it possible for the teacher to increase the time for consultations and detailed explanations. In addition, students performed individual research assignments, and talks on agricultural topics were held in the evening (Kosarev, 1911: 77-78).

Practical work in agricultural schools gave the students the necessary skills and a general idea of the order and content of agricultural work, but it was not enough to form a specialist who could run a successful farm after the graduation. A long-term, off-the-job, practical training was carried out to accomplish this task. Students of the last (sixth) year who passed the final examinations finished practical classes at the school or were assigned to practice outside the school approximately from February to the end of field work.

Referring to the objectives of this type of practice, the farm manager of the Kazan Agricultural School N.V. Utekhin, who had more than 20 years of experience in agricultural

schools, in a report at a meeting at the Department of Agriculture in August 1905, said that a secondary agricultural educational institution “*should have as its goal the ability to train people capable of arranging and running a commercial enterprise, in general and principal terms*” (Utekhin, 1906: 1). For this, the student had to have sufficient theoretical training, technical awareness and practical skills in organizing the economy and its administrative management. The speaker emphasized that secondary agricultural schools should train good organizers and administrators, and not farm laborers and workers – this was the job of lower agricultural schools.

The distribution of students to practice was carried out by the principal of the school by mutual agreement with the owners of the estates to which the trainees were sent. Students of the Kazan Agricultural School did not receive money for their work, but the owners of the estates paid the travelling fares and took the students under their care (provided them with a place to stay and meals) (Beletskii, 1889: 136).

The situation with payment and the practice itself changed dramatically with the beginning of the agrarian reforms of P. A. Stolypin. The demand of zemstvos for the students from agricultural schools increased sharply. Thus, the correspondence on the national Agricultural Technical University for 1907 showed that students were invited to practice (mainly – assistants to agronomists), and were provided not only with money for travelling in both directions, but also with a reward for their work (12-30 rubles per month), although there were also applications for students without payment for their labor “due to lack of funds”. Some zemstvos, at the end of the official terms of the practice, requested from the school administration the possibility of extending it to complete the agricultural work with preservation of their payment (GAKO. F. 219. Op. 1d. D. 4. L. 1, 5-5ob., 7-8, 11-13, 44). It seems that this demand was due to the increased amount of work with a personnel shortage, although it is impossible to deny the possibility of a good quality of work for trainees, especially since at first the schools had to send their best graduates to practice without any payment for their work.

With the assistance of the Samara provincial zemstvo, since 1908, students of the fifth class of the Samara (Alekseevsky) Agricultural School were invited by assistants of local agronomists as leaders of improved farming techniques in peasant farms. In this regard, the school paid special attention to field crop practice in the fourth year: the students “carried out the entire cycle of work from spring to sowing time” (Plodovskii, 1911: 11-12). The reason for this is, in our opinion, in the wide variety of possible labor functions of the students in agronomic sites. For the same reason, the practice was not regulated, and its methodology was not developed. It was carried out for 1.5-2 months in spring and in another 2-3 weeks during the harvest. By 1910 its territorial base spread to 11 provinces and regions of the empire (Plodovskii, 1911: 13). We believe that the value of agronomical practice consisted of the preparation for practical training in the 6th year. But it was the introduction of two industrial practices implemented outside the school and the actual conditions of future work that improved the quality of training for professional labor.

In order to streamline the organization of the practice in vocational schools, some of its aspects were given regulatory standards at national level by the orders of State Property and Education Ministers, respectively, for agricultural and industrial schools (Srednie tekhnicheskie uchilishcha, 1909: 265-271; Sbornik svedenii, 1911: 232-250). The educational institutions published parts of these documents in brochures (NART. F. 121. Op. 1. D. 166. L. 1-2). The information in them was usually concentrated on two aspects: 1) deciphering the goals of the practices and the scope of work, and 2) the system of relationships and behavior. For example, the “Instruction for trainees of agricultural schools going to private estates”, consisting of 13 points, was represented by four points on the first aspect, and by nine points on the second. The disciplinary nature of the document cannot be regarded only as an expression of the official educational doctrine, although it had relevant materials, for example, prohibiting the student from leaving the farm without the prior permission of the principal of the school. However, the educational goal itself – the training of managers – assumed the formation of relevant qualities, including professional communication. Therefore, we can understand the need for the “instructions” on following the order established in the household, pedantically precise fulfillment of the instructions of the owners of estates and, most importantly, being modest and providing a good treatment to the workers, as well as the requirement to execute reasonable orders from subordinates, relying on the reasonableness of the orders or on higher competence and the competence of the student. Finally, recommendations to students to temper their excessive pride

when dealing with the owner of the estate, the need to refrain from criticizing the methods adopted in the household and expressing their opinions when clarifying the motives of the orders or plans of the owner of the estate, emphasized the familiarity of the authors of the document with the realities of industrial training and were aimed at preventing conflict situations with the inexperienced trainees. Rules for trainees of agricultural schools were subsequently supplemented by the Department of Agriculture. There were no particular innovations and the emphasis for the trainees was put on three points:

“Trainee students should: 1) take a personal part in all agricultural activities, performing them in good faith and carefully ...; 2) the constant questioning of people experienced in the management, to enrich themselves with information on the management of a particular sector of the economy; 3) after the expiration of the term, the trainee must provide a report on his classes, with a description of the whole estate or one of its most developed parts” (*Sbornik svedenii, 1911: 414*).

At the end of their graduation practice, the student was obliged to submit to the pedagogical council of the school a report on his work, which was compiled under a special program. In the Kazan Agricultural School, for example, this report included a topographical description of the district where the student had his practice, soil characteristics, descriptions of districts, economic systems, land tenure and land use in the district, disclosure of techniques for grain culture, state of cattle breeding and district occupation. A description of the activities of the student was the half of the report. Theoretically, the absence of a diary (journal) of practice could lead to an irregular and inferior collection of materials. The practice took about seven months, and for this reason the reports were large in amount and quite thorough. For example, the report of a student of N. Kudryavtsev, who was an intern at the agricultural warehouse of the small loan office of the Ekaterinburg district zemstvo in 1910, amounted to 19 bilateral sheets typed on a typewriter (*NART. F. 345. Op. 1. D. 1260. L. 57-75*).

Those students who did their internship outside the school were required to provide, in addition to the report, a feedback on their activities from landowners or their managers, attested by the local district council (the leader of the nobility, the district police officer). The reviews we studied were compiled in an arbitrary form and testified, as a rule, about diligence, conscientiousness, love for the cause and impeccable behavior of the student (*NART. F. 345. Op. 1. D. 659. L. 4, 6, 14, 20, 26*). Only after consideration of the report and its review by the pedagogical council the student could receive a graduation certificate.

It should be noted that the reviews did not correlate with the structure and most of the content of the “Instruction for trainees of agricultural schools ...”, which is often inherent in modern times. There may be various explanations for this. However, the inconsistency of the document on the results (review) with the document on the requirements and content (manuals, rules, etc.) of practice may indicate not just the fact that managers did not know the goals of the practice and the need to form certain competences and / or labor functions, but the absence of knowledge of practical activity.

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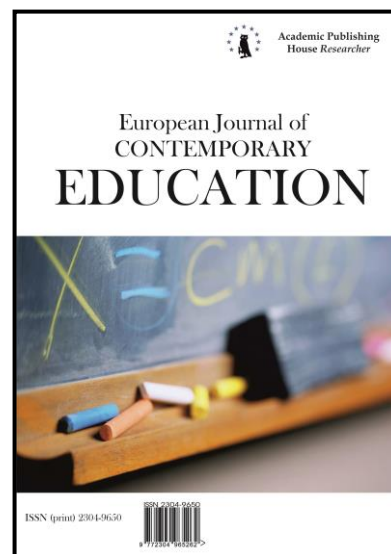
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Development of the Secondary-Level Education in Serbia from 1808 to the 1870s

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Abstract

The article describes the secondary education system in Serbia from 1808 to the 1870s. It focuses on the secondary education development, and the difficulties that were arising during the organization of the educational process.

Scientific and reference literature on the research topic were used as materials. The methodology used a set of scientific methods: multi-factor and integration methods, periodization, typology, comparison, etc., which in unity, ensure the reliability of the results on the studied problem. This is interdisciplinary research, based on the comparativist principle, which allows various informative sources to be revealed. Ultimately, application of these methods made it possible to create a coherent picture of the secondary education in Serbia.

In the conclusion the authors note that by the 1870s an extensive network of secondary schools were developed in Serbia. These schools were represented by the Lyceum (the Great School), gymnasiums, semi-gymnasiums, non-classical secondary schools, and an all-girls school. These educational institutions were focused on training professionals for the public service, including teachers. Thanks to the work of the secondary schools in Serbia it became possible to dramatically increase the number of people with secondary and secondary professional education. This ultimately allowed for the opening of the first higher educational institution in the beginning of the 20th century, the University of Belgrade.

Keywords: secondary-level education, Serbia, gymnasium, development, historic experience, 19th century.

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1. Introduction

In the 19th century it was fairly obvious to the leading European states that not even the most enlightened government could undertake efficient reforms without a significant number of educated people. In other words, without a bureaucratic apparatus who would follow the government's policies? One should understand that in the middle of the 19th century the majority of educated people were graduates of secondary level schools. So, for example, in Prussia, only 10 per cent of the apparatus were people with a university education, and 90 per cent were graduates of secondary educational institutions, gymnasiums, non-classical schools, and higher public schools.

Importance of secondary educational institutions was growing even more because their graduates specifically were enlightening the masses and creating a favorable environment for the sustainable development of education in the country.

2. Materials and methods

Scientific and reference literature on the research topic were used as materials. The methodology used a set of scientific methods: multi-factor and integration methods, periodization, typology, comparison, etc., which in unity, ensure the reliability of the results on the studied problem. This is interdisciplinary research, based on the comparativist principle, which allows various informative sources to be revealed. Ultimately, application of these methods made it possible to create a coherent picture of the secondary education in Serbia.

3. Discussion

Various aspects of the history of the system of primary and secondary education in Serbia in the period of the XIX century began to be considered since the 1870's. One of the first publications on this topic were the works of Rozen-Chudnovskii ([Rozen-Chudnovskii, 1870](#); [Rozen-Chudnovskii, 1870a](#)). The author analyzed the system of primary and secondary education in Serbia in 1830-1860. L. Trgovčević studied women's education in Serbia ([Trgovčević, 2011](#)). It is important to note that, along with women's education, the researchers turned to the topic of academic and intellectual exchanges of Serbs with the representatives of the other peoples of Europe ([Stoianovich, 1959](#)). The pedagogical problems of Serbian innovators, published in the XIX century ([Bakic, 1878](#); [Bakic, 1897](#)), researches in the field of school education ([Cunkovic, 2016](#); [Nikolova, 2017](#)), as well as works on the formation of the Serbian intelligentsia ([Karanovich, 1998](#); [Paunic, 1998](#)) can be mentioned among other problems covered within the research.

4. Results

The system of secondary education in Serbia was represented by the following types of educational institutions: the Lyceum, gymnasiums and pro-gymnasiums, non-classical schools and an all-girls school. Let us consider these institutions one by one.

4.1. The Lyceum.

The Lyceum in Serbia was called the Great School, since it was the highest educational institution of the Principality. The first Serbian Great School was founded in 1808, during the Serbian national liberation uprising. However, due to the small number of taught disciplines it resembled the elementary (primary) school with the three years' training more. The reason for this was the complete absence of other schools in the Principality. The Great School existed until 1813, when Turkey, taking advantage of the fact that Russia was busy with the war against France, attacked its breakaway territory and annexed it to the Ottoman Empire yet again. Despite the continuation of the national liberation struggle against the Turks until 1838, there was no idea of establishing the Great School, which was due to the fact that the Serbian Government has fully engaged in establishing a broad network of primary schools ([Rajović et al., 2018](#)) and gymnasiums.

Reconstructed in 1838, the Great School as well as many other similar projects, began its work in the harsh conditions of understaffing. The School only had a Philosophy Department, but in 1841 the Lyceum acquired a Legal Department and in 1853, the Department of Natural Sciences. It is important to note that it was the Lyceum that gave start to the University of Belgrade in 1905.

In 1863, the life of the Lyceum was radically changed. According to new law, the Great School was divided into three departments: philosophical, technical, and legal. Each of the taught disciplines were assigned to a certain department. The teachers were broken down into levels:

Professor and Assistant Professor. The Lyceum academic year was divided into two semesters, July and August were appointed for holidays.

4.2. Gymnasiums and pro-gymnasiums.

It is important to understand that the European enlightenment trends were well realized in the Serbian Principality. Yet in 1830, the first gymnasium was open in Serbia, and towards the end of 1833 it already had three grades. One would like to point out that Prince Miloš*, unable to neither write nor to read, was pro-actively advocating the idea that the gymnasium had to meet its intended purpose. In December 1835, he personally participated in the exam of the senior grades and praised the students' achievements.

By 1838 Serbia already had 4 gymnasiums. Apart from the first gymnasium in Kragujevac, educational establishments were also open in Šabac, Čačak and Zaječar (Rozen-Chudnovskii, 1870b: 241). The Šabac and Čačak gymnasiums had two grades each, and the Zaječar gymnasium had one grade. The reason for such an imbalance in the composition of the gymnasium grades was a common problem of misunderstanding. Parents of the students did not understand the importance of education. The Serbs felt it more useful to give their children a plough and a scythe, than a book. It is important to note that this opinion was wide-spread not only in Serbia, but also in many areas of the European part of the Russian Empire and the Caucasus (Shevchenko, 2016).

In 1839, a new gymnasium was founded in Belgrade. It was continuously evolving and by 1845 already had 6 grades (Rozen-Chudnovskii, 1870b: 242). Thus, by 1841 Serbia already had 5 gymnasiums. It is important to note that there were no institutions of secondary education in Turkey until the 1860s. (Rozen-Chudnovskii, 1870b: 242)

In 1842, the Obrenović Princes dynasty was overthrown, and this had an immediate impact on the secondary education. The Kragujevac gymnasium was closed in the same year. After the situation stabilized, it became apparent that the center of the country absolutely required a gymnasium. In this regard, the government of Alexander Karadjordjevic ordered the Chagan semi-gymnasium to be transferred to the capital of the Principality in 1845. In 1861, this semi-gymnasium was reorganized into a 6-grade gymnasium.

As for the gymnasium course subjects, the disciplines continued to teach until 1844 and their scope was approved by the Prince's order dated September 26, 1838:

The 1st grade:

- 1) The Slavic history;
- 2) The world ancient history;
- 3) Mathematical geography and political geography of Serbia;
- 4) Natural history (animal kingdom);
- 5) Arithmetic (to fractions);
- 6) Exercises in the Slavic language;
- 7) The German language.

The 2nd grade:

- 1) Serbian grammar;
- 2) Reading with etymologic study and grammar exercises;
- 3) The world average history;
- 4) General geography and political geography of Europe;
- 5) Natural history (the kingdoms of plants and minerals);
- 6) Arithmetic (to the rule of three);
- 7) The German language.

The 3rd grade:

- 1) Serbian syntax;
- 2) Reading of authors;
- 3) The new world history;
- 4) Geography (Asia, Africa, America and Australia);

* The second leader of Serbia, Prince of Serbia in 1817-1839 and 1858-1860, founder of the Obrenović dynasty. Participated in the first Serbian Uprising, earned the title of Duke after the battle of Užice.

- 5) Anthropology;
- 6) Arithmetic;
- 7) The German language.

The 4th grade:

- 1) Rhetoric;
- 2) Reading of authors;
- 3) The Greek Antiquity;
- 4) The history of the Slavic peoples;
- 5) Arithmetic;
- 6) Rhetorical exercises;
- 7) The German language.

The 5th grade:

- 1) Poetry;
- 2) Reading of authors;
- 3) The Roman antiquity;
- 4) All Serbian history;
- 5) All arithmetic;
- 6) Exercises in poetic compositions (Rozen-Chudnovskii, 1870b: 242-243).

In addition to the above mentioned subjects, Catechism was taught in all grades, and the Greek language was taught in grades 4 and 5. It is obvious that the Serbian gymnasium did not reach the level of the European schools, because the Latin language had not been taught whatsoever. Therefore, the Serbian youth could not acquire serious scientific training at home and had to make up for deficiencies of the domestic schools in the foreign universities of the west. At that time, the lack of Latin literature was particularly felt. Medicine, law, engineering, and natural sciences were exclusively taught in Vienna and Pest through the Latin language at the time. Students were also weak in real sciences, not to mention physics and chemistry. In other words, the newly established gymnasiums were far from the European standards, and the main reason for that was the shortage of trained personnel, rather than the Government's unwillingness.

Also an important cause of the secondary education unsuccessfulness at that time was the teaching system and multidisciplinary approach. Together with that, the curriculum also included the subjects that should not have been included in the gymnasium course. Thus, such subjects as anthropology, the Greek and Roman antiquity were to be taught in the University course. It seems to us that the introduction of these disciplines to the gymnasium course was due to the presence of specialists and the desire to bring special features into the weak Serbian education methodology.

It is also clear that the gymnasiums teaching staff was not particularly talented in what refers to teachers' training. Thus, the majority of the gymnasium teachers were undereducated people, never especially engaged in pedagogy.

These were the conditions under which the Serbian schools celebrated the year of 1844, when a new Education Act was announced. The new law established the Latin language as the most important subject among others subjects. Paragraph 8 defined the purpose of gymnasiums. It was to introduce the Serbian youth to the higher science and prepare them for the Lyceum and other higher institutions.

Gymnasiums were divided into six grades, and semi-gymnasiums were divided into four. Gymnasiums had seven teachers, semi-gymnasiums had four, apart from the Head Master, of course.

Curriculum per grades was as follows:

The 1st grade:

- 1) Catechism;
- 2) Serbian grammar;
- 3) Geography;
- 4) Natural history (Zoology);
- 5) Arithmetic;
- 6) Calligraphy.

The 2nd grade:

- 1) Catechism;
 - 2) Serbian grammar (syntax);
 - 3) Latin grammar;
 - 4) German grammar;
 - 5) Geography (Serbia, Montenegro and Austria);
 - 6) The history of the Serb people;
 - 7) Arithmetic;
 - 8) Calligraphy.
- The 3rd grade:
- 1) The Scripture history;
 - 2) Latin grammar;
 - 3) German grammar;
 - 4) Geography (Serbia, Montenegro and Austria);
 - 5) The history of the Serb people;
 - 6) Arithmetic;
 - 7) Calligraphy.
- The 4th grade:
- 1) History of the Christian Church;
 - 2) Latin syntax;
 - 3) German syntax;
 - 4) Geography (Russia and Greece);
 - 5) Arithmetic;
 - 6) History of the Russian, Polish, and Greek peoples;
 - 7) Drawing.
- The 5th grade:
- 1) Catechism;
 - 2) Rhetoric;
 - 3) The Latin classic writers;
 - 4) The German classic writers;
 - 5) Mythology (Greek and Roman);
 - 6) Geography;
 - 7) The history of Rome;
 - 8) The Greek Antiquity;
 - 9) Mathematics;
 - 10) Drawing.
- The 6th grade:
- 1) Catechism (On love and hope);
 - 2) Poetry and the Serbian classic writers;
 - 3) The Latin classic writers;
 - 4) The German classic writers;
 - 5) Antiquity (Roman and Slavic, with mythology);
 - 6) Geography (Australia and America);
 - 7) History (France);
 - 8) Mathematics;
 - 9) Anthropology;
 - 10) Moral sciences;
 - 11) Drawing (Rozen-Chudnovskii, 1870b: 244-245).

The new law gave a positive impetus to the secondary education development in Serbia. In addition, teaching staff improved significantly. Requirements to the teachers were also tightened. From 1844, the right to teach was attributed only to those people who completed a course of philosophy and mastered at least one foreign language, apart from Serbian. Salaries of the teachers were also increased in connection with the specified requirements. Thus, a gymnasium teacher began earning up to 350 Thalers, and semi-gymnasium teacher earned up to 250 Thalers*.

* Cost of 1 Thaler was 1.25 Rubles in silver.

To address the shortage of textbooks, a School Board was established. It was dealing with compiling the textbooks and was rewarding the authors of the best books.

Since then, the main supervision over schools was concentrated in the hands of the Minister of National Education, who would annually send his auditors to inspect the activities and successes of the gymnasiums on site.

In 1853 the system of secondary education was improved. Thus, instead of a 6-grade education, a 7-grade education was introduced in gymnasiums. Apart from the Latin and German languages, Greek, Old Church Slavonic, and French were introduced. Mathematics was expanded by trigonometry and geometry, and physics became a compulsory subject for all students.

However, in September 1863, a new law on the gymnasiums structure was adopted, and according to it the 7-grade gymnasiums were reorganized into 6-grade gymnasiums yet again. But the main purpose of the new Act was to give young people a classical education. Along with the Latin language, history, and theory of poetry, there was physics, botany, zoology, mineralogy with geognosy. Theory of prose and history of literature were next to calligraphy and drawing.

In 1863, music was introduced to gymnasiums. It was very willingly approached by the Serbian youth.

By the end of 1867 Serbia had six gymnasiums and two pro-gymnasiums. Penetration rate of the gymnasium education is presented in the following chart (Table 1).

Table 1. The number of teachers and students in the gymnasiums of Serbia by 1867.

Gymnasium	Professors	Teachers	Students
Belgrade	12	4	571
Kragujevac	9	2	294
Belgrade	6	-	185
Šabac	5	-	106
Negotin	5	-	80
Požarevac	5	-	199
Total	42	6	1375

4.3. Non-classical secondary schools.

The secondary education system also included non-classical schools. So, in 1865 four non-classical schools were established in Serbia. The main purpose of these schools were to teach young people 'useful skills for civilian life' and prepare these young people for studying higher technical sciences. Apprenticeship in non-classical schools lasted six years. The subjects were: Christian Science; Serbian grammar; arithmetic; mathematical, physical and political geography; natural sciences; history of the Serb people; accounting; the German and French language; the basic experimental physics; elementary chemistry; familiarization with ordinary materials of manufacturing and trade; algebra; geometry; mechanics; explanation of machines; a popular presentation of the national economy; the science of agriculture, forestry and animal husbandry; architecture; the science of trade; common history with an overview of geography; history of trade and various professions, calligraphy, geographical and free drawing; topographical and perspective drawing; modeling. As well as, singing, music, and gymnastics were taught as special subjects.

4.4. All-girls school.

In addition to non-classical schools, there was also a Serbian all-girls school. The aim of this school was to equip the girls with higher education and train the teachers for the elementary all-girls schools. The all-girls school had four grades and taught the following subjects:

The 1st grade:

- 1) The Scripture history;
- 2) Serbian grammar;
- 3) Mathematical and physical geography;
- 4) Natural history (Minerology);
- 5) Arithmetic;
- 6) Calligraphy;

- 7) Drawing;
 - 8) Gymnastics and dance.
- The 2nd grade:
- 1) Catechism;
 - 2) Serbian syntax;
 - 3) Universal geography;
 - 4) Zoology;
 - 5) Arithmetic;
 - 6) The world ancient history;
 - 7) Calligraphy;
 - 8) Drawing;
 - 9) Gymnastics and dance.
- The 3rd grade:
- 1) Catechism;
 - 2) The Serbian language;
 - 3) Political geography of Europe;
 - 4) Arithmetic;
 - 5) Popular physics (with experiments);
 - 6) Universal history;
 - 7) Dietetics;
 - 8) Calligraphy;
 - 9) Drawing;
 - 10) Dancing and gymnastics.
- The 4th grade:
- 1) Moral theology;
 - 2) The Serbian language;
 - 3) Political geography;
 - 4) The basics of algebra;
 - 5) Universal history;
 - 6) Popular chemistry (with experiments);
 - 7) Pedagogy;
 - 8) The Serbian and general literature;
 - 9) The history of the Serb people;
 - 10) Economic technology;
 - 11) Methodology;
 - 12) Drawing;
 - 13) Dancing and gymnastics ([Rozen-Chudnovskii, 1870a: 251-252](#)).

In addition to these compulsory subjects, those wishing to, could also study piano and singing lessons, German and French, for a special fee.

5. Conclusion

Thus, by the 1870s Serbia had an extensive network of secondary educational institutions which was represented by the Lyceum (the Great School), gymnasiums, semi-gymnasiums, non-classical schools and an all-girls school. These educational institutions were focused on training professionals for the public service, including teachers. Thanks to the work of the secondary schools in Serbia it became possible to dramatically increase the number of people with secondary and secondary professional education. This ultimately allowed for opening the first higher educational institution in the beginning of the 20th century, the University of Belgrade.

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