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**The Problems of Contemporary Education**

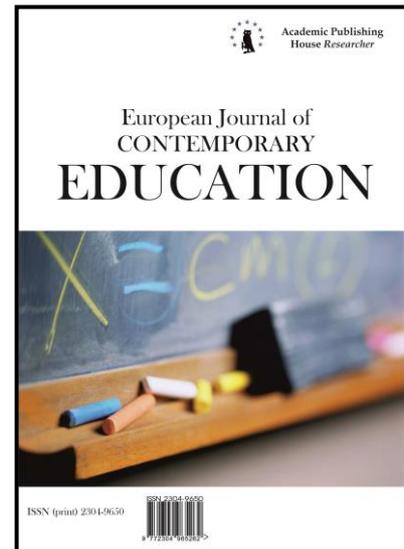
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## The Problems of Contemporary Education

### Evaluation of the System of Methodical Training of a Physics Teacher in the Conditions of Modernization of Education

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#### Abstract

Training of Physics teachers remains still a quite big challenge in the context of developing secondary education system. Taking into account new objectives in teaching Physics of pupils and students within the emerging philosophy of education and the objective difficulties of mastering the content, the training of a Physics teacher should be identified as a separate problem not only in practical but also in theoretical terms. In this regard, this study considers methodological training of a future Physics teacher at the University as an element of new educational system of higher pedagogical education.

This study is the first in the above direction, the level of expected results can be characterized as methodological one. The study is aimed at the development of improved methodological training of future Physics teachers at the university in the context of high education modernization. Methodological training system of a Physics teacher has been developed that ensure better training of future teachers in Kazakhstan. Various methodological tools are applied in educational process to form scientific methodological thinking and methodological competences of students.

**Keywords:** methodological training system, future physics teacher, higher education system, competence approach, methodological competence, molecular physics.

#### 1. Introduction

Professional competence of a teacher becomes more spacious in view of new educational approaches. Global status and prestige of being teacher goes up drastically owing to the management and monitoring of a methodological system. By the way, approaches of a teacher's

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professional development (Petrescu et al., 2015) are gradually updated and varied in the amount, frequency, scope and level of centralization. Labor standards for school teachers reflect quality criteria of achievements in professional competence of pedagogical education. The national educational development program for 2011–2020 addresses actual educational standards. Updating the content of education makes teachers apply new modern forms of work (<http://kz.government.kz>).

A number of studies performed worldwide is cutting across several aspects of a didactic nature including features of didactic teacher's training to collective cognitive activity of students (Ibrahim et al., 2016; Kintz et al., 2015), teacher's readiness to the organization of creative interaction with students (Ramankulov et al., 2016), impact of didactic teacher's readiness to pedagogical students' guidance (Shektibayev et al., 2018) and teacher's readiness to manage the learning process in small schools (Mujtaba, Reiss, 2014), etc.

However, it must be admitted that despite some successes achieved in various areas, the vast majority of research work in one way or another affects, first of all, the sphere of educational activities. Theoretical analysis of the research allowed us to determine that many questions of methodological work are still insufficiently disclosed, and most importantly – we need a holistic view for the educational process as a system of interaction of content, methods and forms of education aimed at the formation of student's personality. Although some issues were considered related to the study of certain mechanisms of methodological work as such, so far methodological work has not received proper coverage both in common pedagogical literature and in scientific research, where in particular, these issues have not been subjected to special analysis in recent years.

Practical needs of school gave rise to objective necessity of methodological teachers training for the implementation of students' mentoring and schooling. Revision of educational curricula and programs, updating textbooks and introducing active methods and forms of education were stand-alone of the methodological system as a whole, without a deep analysis how it will be implemented in a school. The development of any educational process can be predicted by analyzing contradictions associated with the structure of methodological system. Difficulties in its organization arise from the mismatch of the purpose and content of activities; specific tasks and means of achieving them, the content of activities and forms of organization; goals and results of training and development of students' abilities. Knowledge of these contradictions directly influences practical actions of the teacher, literacy of the organization of pedagogical and methodological interaction. The resolution of contradictions in teacher's activity is directly dependent on his/her understanding regulatory function of the methodological educational systems. From the definition of methodological work it follows that its immediate goal is to increase the level of pedagogical skills of teachers and teaching staff. The question of the goals and objectives of methodological work should be considered on the basis of level relationships, i.e. should determine the main directions that are common, necessary and typical for all schools in modern conditions, on the basis of common tasks that are rightly called the functions of methodological work.

In papers devoted to common issues of professional training of teachers, most authors consider methodological training of teachers as part of professional training (Knewstubb, Bond, 2009), where methodological knowledge is formed in an integral and inseparable connection with general, psychological, pedagogical and special (subject) knowledge and skills (Jauhiainen et al., 2002).

In connection with the development of new standards of higher pedagogical education, the transition to a multi-level higher education in the theory and practice of pedagogical activity (MacPhail et al., 2013), more and more research is devoted to the development and implementation of innovative forms of educational process in higher education, including methodological training of a teacher.

Much attention is paid to the problem of methodological training of students in methodological research, and authors raise the question of improving the quality of methodological training of teachers (Cofré et al., 2019).

Since the concepts of methodical thinking and professional thinking are specific with regards to generic concept of thinking, we can start with its explanation. After we have analyzed lots of definitions of "thinking", we came to the conclusion no one of them can be fully satisfied. Moreover, such a definition may not be possible in principle, given the complexity of the object. The main thing, however, is that for our purposes it is more useful to exercise all the variety of

definitions to understand characteristics that seem most important to researchers. It is no coincidence that epistemologists state “knowledge of the subject is in knowledge of its features.”

First of all, it should be noted (Henriksen, 2014) abovementioned definitions consider “thinking” from different positions: as a socio-historical phenomenon, as a philosophical phenomenon, as a physiological phenomenon and as an epistemological phenomenon. This is understandable, because only a comprehensive approach to the phenomenon ensures deeper understanding. And if we set a goal to develop thinking, we will not be able to achieve it without understanding the relationship of subjective and objective in thinking, empirical and creative, rational and sensual (epistemological aspect), without understanding it as a motivated and purposeful activity that has personal significance (psychological aspect), without understanding the forms and rules of thinking (logical aspect), etc.

The efforts investigating thinking (Chen, Lo, 2019) highlight the idea of the origin of mental processes from external activities. According to this idea, a mediated structure of mental process is initially generated under conditions where a mediating link has the form of an external stimulus. When mastering this mediating link, it passes into the inner plan through the interiorization. In his and his followers’ research papers Chen established a close relationship between the development of thinking and speech.

R.A. Beghetto (2007) colligating psychological mechanisms of thinking with its indicative function, believed that psychological mechanisms are revealed in the process of building a mental image that focuses on solving problems (both practical and theoretical). However, there is a certain discrepancy when classifying the types of mental operations and their interpretations. Some classifications call the types of mental operations that are not in others, although they are no less important.

The thinking takes on the role (Hernán et al., 2019) of personality (especially motivation) when the reasons are pointedly studied and in general, person’s attitude to mental problems he decides. If the first of these two aspects characterizes thinking as a process, the second one distinguishes it as an activity in the course of which a person is shaping certain attitude towards the surrounding world, to other people, to emerging problems, etc.

So, all of the above identifies the following methodical thinking features of a Physics teacher: Methodical thinking is a kind of professional pedagogical thinking having dual character in connection with special subject (physical) determination. Reflexivity and responsiveness are its features associated to professional activity. Methodical thinking corresponds to the level of development of methodical science in each individual historical period, so its features are historicity and scientificity.

A functioning level of methodical thinking indicates how stable a Physics teacher engrained his methodical skills (Ozgelen et al., 2013). Thus, intelligent methodical thinking acts as the most important indicator of a teacher’s *methodical readiness* to his future professional activity. Under the conditions of today when transiting to new updated standards and when school physics education is focused on the implementation of a personal-activity approach, the development of cognitive and creative abilities of students, an adequate level of development of methodical skill is the level of methodical competence, which is provided by productive and creative levels of development of methodical thinking.

Based on research studies we’ve analyzed our study views to the definition for professional competency of a Physics teacher as a synonym for teacher’s readiness to carry out professional activity. Teaching and learning competence of a Physics teacher as a category of lower taxonomic rank in relation to the category of professional competence of a Physics teacher can be considered as a result of his methodical training, expressed in his ability and readiness (functional and personal) to effectively perform all kinds of professional activities determined by the functional structure of methodological thinking.

Teaching and learning competence of a Physics teacher is defined as a set of knowledge, skills and personality traits facilitating successfully solve methodological issues.

In the course of the study the following tasks of scientific research were solved, to take into account specifics of circumstances, level of development of teaching staff, progress and results of educational activity. That makes it possible to formulate a set of specific tasks for the organization of methodological work on the basis of an innovative approach as follows:

- formation of innovative orientation in the activities of teaching staff in school, manifested in the systematic study, generalization and dissemination of pedagogical experience, in the implementation of achievements of pedagogical science;

- improving the level of theoretical (subject) as well as psychological and pedagogical training of teachers, time management of new educational programs, curricula of national educational standards;

- gaining new pedagogical technologies, forms and methods of training and education, time management in study new norms of effective documents, provision of scientific and methodological assistance to teachers on a diagnostic individualized and differentiated basis: young teachers; subject teachers; class teachers and educators; teachers experiencing some difficulties in teaching; teachers with little pedagogical experience to teachers who do not have pedagogical education;

- consulting teachers in self-education;

- rise of professional level and pedagogical culture.

The idea beyond the scientific approach to definition of tasks of methodological work is that the purpose and objectives can be understood as the quality of student's knowledge and model of desired future result in innovative activity of school.

## 2. Materials and methods

300 (Three hundred) third-and-fourth-year students took part in a survey to make clear current situation with physics teaching in general education institutions of Kazakhstan and analyze prospects of its development and level of methodological training of graduates from the Faculty of Natural Sciences of the International Kazakh-Turkish University named after Akhmed Yassawi; Faculty of Physics and Mathematics of South Kazakhstan University named after M. Auezov and Kyzylorda State University named after Korkyt Ata.

The survey showed that students suffer from not so much a lack of knowledge as low intellectual culture, stiffness of thinking, lack of self-educational skills. Most youth Physics teachers undergo difficulties when they have interned or at the beginning of their teaching career. Below are the most frequently called difficulties:

- psychological and pedagogical (inability to master classroom discipline, individual approach, psychology and age peculiarities of students)

- classroom time management (slight practical experience, large teaching load, difficulties in classroom time management)

- communication (students, students' parents and colleagues interaction)

- methodology (lack of knowledge for scientific analysis of programs and textbooks, inability to select programs and textbooks, fully apply technologies, methods and means of training).

To determine these difficulties, a survey of young teachers and students was conducted, as well as testing of students. [Table 1](#) illustrates various difficulties experienced by specialists with a wide range of education.

**Table 1.** Difficulties commonly found in survey returns by students and graduates

Level of education	Difficulties			
	Psychological and pedagogical	Organizational	Communicative	Methodological
Third-year students	24 %	34 %	26 %	16 %
Fourth-year students	14 %	32 %	20 %	34 %
Youth teachers	10 %	16 %	10 %	64 %

Psychological and pedagogical aspects cause the least difficulties. Organizational difficulties are most experienced by those who have less teaching experience. Methodological problems are forged as work experience grows. Theoretical analysis and results of the survey they allowed us to identify the existing contradiction and thus justify it relevance of our research.

While studying chosen discipline of general physics course “Molecular physics”, it was clear that students change their attitudes to the main components of physics teaching with growing of work experience (Table 2).

**Table 2.** Students’ attitude to the individual components of professional training

Components of professional training	Third-year students	Fourth-year students	Graduates, youth teachers
Subject knowledge	55 %	50 %	25 %
Knowledge of psychological and pedagogical principles of education	20 %	20 %	5 %
Teacher’s personal skills	20 %	10 %	20 %
Knowledge of training methods in molecular physics	5 %	20 %	50 %

Those students, who have just started learning methods of teaching physics, tend to exaggerate the importance of subject training and underestimate methodological training. Graduates and first-year young teachers already understand that the main thing in professional training of the teacher must be methodical preparation (50 %).

During the study, senior students were asked to evaluate the quality of their methodological training (Table 3). As can be seen from presented results, the degree of satisfaction with the results of methodical training of students is different, but among third-year students it is higher than among graduates. The students significantly increase requirements for their training after training internship (at the fourth year of higher education), when they are able to apply obtained subject and methodological knowledge under real conditions of the forthcoming practical pedagogical activity.

**Table 3.** Students from Akhmet Yassawi International Kazakh-Turkish University evaluated their methodological readiness

Specialty, Educational level	Excellent	Good	Satisfactory	Unsatisfactory
<b>5B011000-Physics</b>				
Third-year of education	12	28	10	2
Fourth-year of education	8	20	26	4
<b>5B060400-Physics Physics in English</b>				
Third-year of education	20	25	15	—
Fourth-year of education	14	27	21	2

The readiness of graduates for independent acquisition of knowledge, development of skills of intellectual work and skills to perform individual mental operations is shown in Table 4.

**Table 4.** Readiness of graduates for self-education, development of intellectual work and abilities to separate mental operations

Surveyed abilities	Positive take (in %)
choose the most important from educational material	88
plan an answer	89
make an abstract	95
use reference books and dictionaries	95
prepare a report, abstract	88
use common approaches to solving professional problems	53
analyze the content of physical concepts	46
perform logical operations	
• analysis and synthesis	51
• generalization and systematization	60
• comparison and contrast	62
• establishing causal relationships	41

Analysis of the results shows (Sarybayeva et al., 2018) only 50 % of graduates possess skills characterizing a sufficient level of intellectual development. This suggests that in the course of training the University teachers do not pay necessary attention to developing training, building of personal qualities needed to perform cognitive functions in the subsequent professional activities, primarily methodical thinking.

A survey conducted among students of the third and fourth years of the faculty of Natural history of the ICTU named after Akhmet Yassawi, showed that the desire to enter physics course is subjected by different reasons: most of the students are interested in the disciplines of subject training (Physics, English) and only a half wanted to be a teacher.

Among the factors causing difficulties in mastering academic subjects during the training, the majority of fourth-year students named lack of personal interest (43 %), unwillingness to work systematically (52 %). Many students noted the unequal ratio of disciplines in general subject and vocational training, the factor of too little time allocated to pedagogical practice. Pointing to the poor organization of the educational process (12 %), students noted the following (see Table 5):

**Table 5.** Comparative data of students and teachers about the causes of poor organization of the educational process

#	Causes	Students	Teachers
1	Poor quality of lectures	54 %	32 %
2	Teacher's incompetency	52 %	30 %
3	Complicated explanation in textbooks	38 %	32 %
4	Gaps in knowledge	34 %	80 %
5	Teacher's personal negative features	31 %	11 %
6	Overloading of textbooks and lectures	31 %	61 %
7	Irrational time management between disciplines of general subject and professional internship	42 %	73 %

According to the majority of students, the development of their cognitive interests in the studied subjects is determined primarily by the following factors: teaching skills (58 %), life plans (52 %), degree of awareness of the importance of the subject in the training system (34 %). For weak and average students the level of pedagogical skills of the teacher is the most important factor (over 70 % of affirmative answers). In most cases, there is a relationship between the interest in the subject and the pedagogical skills of the teacher leading this discipline. Noting the skill of teaching as the most important factor affecting the interest in the subject (58 %), students pointed out a number of conditions that determine this skill. First of all, it is the use of interesting practical

material in lectures (68 %); problematic construction of lectures, discussions in practical classes (54 %) and widespread use of visual AIDS, including e-presentations (65 %). In our opinion, the answer to the question is indicative only 12.2 % of graduates associate the results of their studies at the University with the position of “learned to solve professional problems”, which indicates a low professional orientation of training. At the same time, the importance of the element of creativity in the professional activity of the teacher, students evaluate low, considering that due to the high workload in the school there is no time to do this.

### **3. Results**

The purpose of methodological training identified by the environment of functioning and normative model of a teacher suggests a subsystem of methodical tools. Successful methodological training depends on right choice of the tools. Achieved result of methodological training can be correlated with assuming outcomes (the purpose of methodological training) and evaluated by special criteria. It provides insight into methodical readiness of a Physics teacher.

Functioning of methodological training is described by sequence of diagnostics (the primary analysis of level of methodical readiness), forecasting, programming, planning and of student’s educational and methodological activity teacher’s classroom management, monitoring (choice of effective technologies), control over the quality of methodical training, examining and analysis of methodical readiness, correction of educational and methodical student’s activity as well as inspiration of creative educational and methodical student’s activity.

Block with results in a system of methodological training includes the following sections: components of the result and diagnostic procedures. According to the principles of a system professional and activity and professional-personal approaches, the components of the result correspond to the overall goal of the system and include the following blocks: theoretical (knowledge), practical (skills and experience), motivational and value (personality qualities).

The basis for the development of procedures for identifying and assessing the results achieved in the theoretical and practical blocks are methods of element-by-element, postoperative and level analysis. Identification and evaluation of changes in the motivational value block is carried out on the basis of psychological approaches based on the methods of self-assessment (self-analysis), objective evaluation in the activity. The efficiency of the developed by the author competence-oriented system of methodical training of the future teacher of Physics was determined in the course of the experimental transforming stage of the experiment.

Experiment procedure provided methodological readiness of among physics learners from targeted groups on the basis of a model of a graduate designed by a defender of a thesis, complex of teaching and learning issues (TLI), recommendations in teaching and classroom management, methodological support to foreseen the level of methodological readiness.

The idea of the experiment was in a choice of a model of a test object. In our case, an approach for structuring methodological readiness acts as the main factor controlled by its two options: traditional and adjusted techniques. Dependent variable or response will be student’s learning skills that make up operational and activity part of the competencies (a qualitative indicator of successful training). In this approach, the model of the study object acts as a single-factor. In order to evaluate how control factor (TLI complex) impacts the formation of methodological skills, it is necessary to choose methods for measuring response values. These were the assessment of methodological skills at four levels: optimal, acceptable, critical and unacceptable.

The TLI solving skills were evaluated at lectures, workshops and during laboratory lessons on molecular physics. A number of TLI and their types distinguished depending on the content of theme and forms of teaching and learning activity of the learners. Overall assessment of the TLI solving provided step-by-step assessment of such skills as:

- 1) analyze condition of TLI on molecular physics and set goals;
- 2) separate theoretical knowledge on molecular physics needed for TLI solving (identify subject area, requirements and TLI operator);
- 3) interpret theoretical knowledge on molecular physics provided by the problem situation (methodological, methodical, physical, psychological and pedagogical);
- 4) choose the tools for TLI solution on molecular physics (methods, tools and organizational forms);

- 5) perform desired goals on molecular physics (problem requirements);
- 6) analyze and assess results of TLI solution on molecular physics.

Within the framework of our study, variability of the content of methodological training and variability of methods, forms and means of formation of methodological competencies in an open educational space is of particular importance. This variability is particularly relevant in the system of multi-level pedagogical education. Moreover, different options to meet personal needs of future specialist can be selected depending on status of the university and its location. In accordance with identified requirements for definition of target element in a system of methodological training of a Physics teacher, the goals of lower taxonomic rank can be specified through the components of methodological readiness of future teacher for professional activity.

As for discipline Molecular physics the goals can be formulated through the development of students' competencies corresponding to the main types of methodological activities of a Physics teacher in a school which are highlighted in our study (practical aspect of methodological readiness) and through the level of development of his methodological thinking (theoretical aspect of methodological readiness). So, as an important tool for the development of learners' methodological thinking we consider the content of educational methodology disciplines, primarily the discipline Molecular physics. The content of the discipline Molecular physics should be structured in an understandable way (Roundy et al., 2013) for learners, not as a list of theoretical provisions or scientific knowledge but as a tool for identifying and solving professional issues and problems.

The discipline Molecular physics is of great ideological importance.

Its worldview sense is confirmed by the fact that:

1. while studying the discipline the learners have the opportunity to observe the development of energy representations in the introduction of the first law of thermodynamics and its extension to specific processes
2. students keep on getting acquainted with theoretical and experimental methods by the example of fundamental experiments and experiments illustrating gas laws.
3. molecular physics ensures to deepen the concept of matter (molecules, atoms) and present a new statistical way of its describing
4. use of deductive method of studying the phenomena contributes to the development of students' theoretical thinking
5. studied aggregate transformations illustrate dialectical law of quality – quantity interconversion
6. molecular physics build up students' knowledge about the structure and properties of a substance in various aggregate states based on two theories: molecular-kinetic theory (MKT) and thermodynamics. These theories form the basis of the content of this discipline.

Among the variety of the TLI used in Molecular physics, a significant place should be given to the issues at the lecture sessions, involving the implementation of possible educational situations. This training form, based on the game modeling of professional activity, makes it possible to bring the training as close as possible to the real conditions, provides the formation of initial methodological competencies, creates a basis for the development of independence, initiative, creativity and promotes the development of internal positive motivation of creativity in professional activity. The most common form of such issues is the presentation of a fragment of the lesson, during which a learner acts as a teacher, and other learners represent the pupils. Then, it takes from 5 to 10 minutes to simulate the situation. After the presentation it is analyzed and a teacher and pupils roles are discussed and evaluated with correction of shortcomings. Some game elements are adopted in the learning process gradually starting with simpler forms to more complicated. At the first stage, for example various situational tasks are applied, namely: to explain a way of formation of a separate fact, representation, present a new means of training, show a way for learning motivation, etc. This activity is followed by simulation exercises where a learner has to prepare by himself a stage of a lesson and, acting as teacher to formulate tasks for flashcard activity and to explain his choice and justify the use of certain means of training when studying any physical object.

Simulation tasks become more and more complicated at the following stages of training. At earlier stages a learner was tasked to do only separate teacher's responsibilities (select teaching tools, demonstrate them and explain), so next he must illustrate each lesson stage from design, training and evaluation activities, that is, to prepare a fragment of the lesson, conduct it with pupils

and evaluate results of his activities. Today's teaching techniques suggest various types and forms of classroom activities (Light, 2008) such as round table, debate, discussion, workshops, and seminars on lessons learned, games, etc. However, the way of lesson conduction in most cases depends on a teacher, his desire and creativity, level of training, etc. It seems, however, that this choice should be dictated by:

- 1) objectives faced by a teacher in terms of methodological thinking formation
- 2) methodological skills as a part of the methodological competence which is to be mastered by a learner in the course of the learning process
- 3) educational recourses on Molecular physics
- 4) need to simulate professional activity.

Focusing on these provisions, we have made an attempt to develop a number of forms of practical training or their fragments, if TLI implementation takes only a part of the practical training. Let's present this in a folded form, noting that the objectives of the practical training are highlighted in terms of *the development of methodological thinking and methodological competencies* that is the purpose of our study. Purpose: revise and review learners' knowledge about isoprocesses as a model of the processes occurring in gases; the conditions of their occurrence, relationship of system parameters and graphical display of processes. An important role in the formation of a worldview competence by future teacher, and therefore the possibility of formation of learners' personal abilities plays Molecular physics of a natural science cycle. Laboratory lessons on Physics are favorable to effectively shape the scientific worldview, because laboratory activities develop experimental skills, practical skills, cognitive ability and independence. For successful formation of worldview competence by future teachers at a workshop it is necessary to widen standard procedure. In particular, students perform individual tasks described in the questionnaire. It is given about 10-15 minutes to perform these tasks. Next, students work in small groups (two or three), checking each other's tasks, complement, correct errors, and then collectively discuss the findings of the laboratory work, and they report to the teacher. The formation of worldview competence is a complex, multifaceted task, the implementation of which is difficult to assess unambiguously. It is in this case that the use of competence tasks and assignments can be an effective method. Such tasks contribute to the formation of professional competence of the teacher, which is reflected in the individual approach in the educational process, in the knowledge of textbooks and leading authors in studied discipline, in the ability to conduct an independent search for different types of information, in the continuity of new knowledge.

Below are some examples of competence tasks performed by future teachers while laboratory workshops in order to develop professional competence. We have performed laboratory works on the following scheme: determination of the size of molecules, determination of the surface tension of the liquid by the drop method, phase transitions, etc. You need to build a hierarchy of the following concepts, based on your proposed feature (principle, function): physical phenomenon, physical experience, physical quantity, physical law, and physical theory. Focus on the topic of laboratory work. Present the information you received in various forms (text, table, picture, and graph). Why do your results contradict the expected ones? (You can especially in laboratory works and practical training to lay the erroneous data.) Rethink the results, clarify simplifying assumptions. Turn this task into a personally significant, but with the same parameters. Make coarser assumptions in theory (concerning the topic of the work performed) and predict the results of the experiment. Explain them, stating the reason. Imagine the laboratory work as a scientific study, highlighting all the stages of scientific knowledge (observation, systematization of facts, hypotheses, theory, and experimental confirmation of the theory).

When evaluating each of these seven operations, it is understood that their performance at the optimal level is estimated at 3 scores, permissible – 2 points, critical – 1 point, unacceptable – 0 points. As a result, a learner can get up to 21 scores for TLI solving (Table 6).

**Table 6.** Effective solving teaching and learning issues while studying the theme Kinetics model of ideal gas

#	Student's name	No. of procedure							Total score	Skill level to solve TLI
		1	2	3	4	5	6	7		
1.	Respondent 1	2	3	2	1	1	2	2	13	II
2.	Respondent 2	1	0	1	1	1	0	0	4	I
3.	Respondent 3	1	2	1	2	2	1	1	10	I
4.	Respondent 4	1	1	1	1	1	0	0	5	I
5.	Respondent 5	2	3	2	2	2	2	2	15	III
6.	Respondent 6	2	3	2	2	2	2	2	15	III
7.	Respondent 7	1	1	1	1	1	1	0	6	I
8.	Respondent 8	2	3	3	2	2	2	2	16	III
Average score		1,5	1,9	1,5	1,4	1,4	1,3	1,4	10,7	

When making analysis of students' answers we considered them as integrative quality criteria and evaluate them on a scale from 0 to 10 scores where zero scores means that there is no any component and 10 scores means fully presented component. Each competence included 10 elements and fully formed competence was estimated in 100 scores. The element of the competence was considered to be mastered if the student scored 5 or more points (Table 6). The results of completed tasks were processed by mathematical statistics method. Statistical test with diverse options confirmed reliable initial data.

Efficient experimental methodological training of a Physics teacher was evaluated with the help of complete coefficient of single activities ensuring mastering of methodological competences. Perfect mastering of the competences was verified by the number of learned elements of competence (a number of activities realized). At the same time, the element of the competence was considered to be mastered if the student received at least 5 of 10 possible scores.

Fullness coefficient of single activities made by students for one of the competences was defined by the formula:

$$K_f = \frac{\sum_{i=1}^n M_i}{MN} * 100\% \tag{1}$$

where  $N_i$  is total elements made by the student and  $N$  is the maximum number of elements in the competence.

$$K_f^{e.g} = \frac{\sum_{i=1}^n M_i}{MN} * 100\% = 73\% \tag{2}$$

$$K_f^{k.g} = \frac{\sum_{i=1}^n M_i}{MN} * 100\% = 56\% \tag{3}$$

Here  $M_i$  is the students in total who have mastered key features of the topic;  $M$  is a number of marks that the student has to learn on the topic;  $N$  is a number of students mastering methodological competence in a target group. Thus, the target group exceeded 17 %.

Successful ratio of development of methodological competence was determined after each experimental-transforming stage of the experiment by the formula

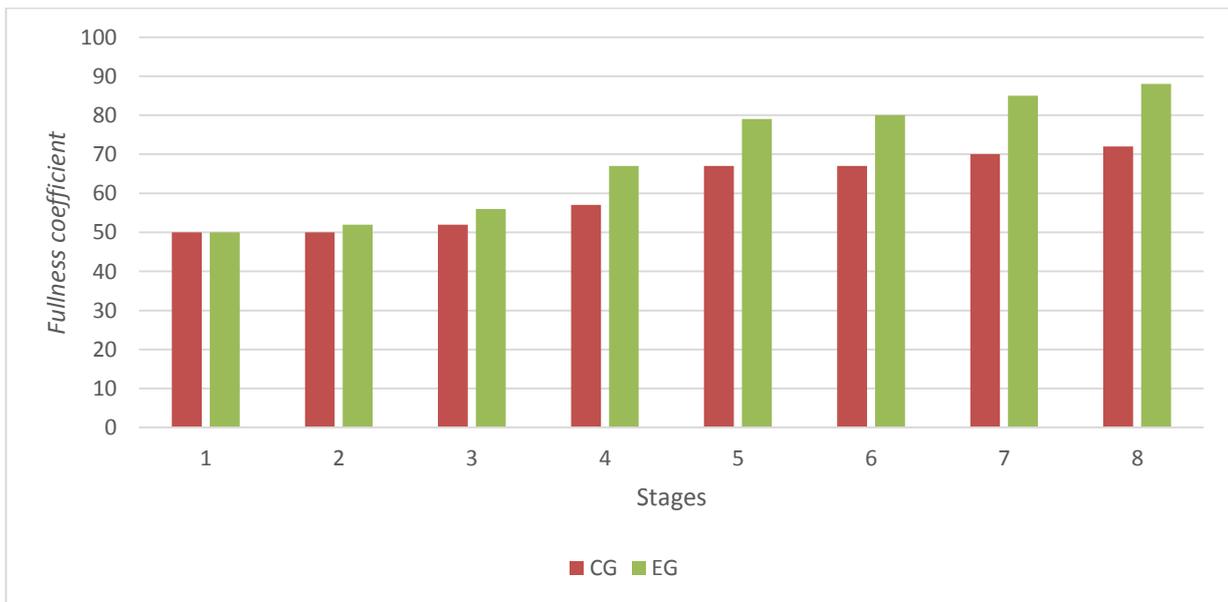
$$K_s^{e.g} = \frac{\sum_{i=1}^n L_i}{LN} = \frac{148 * 6}{190 * 7} = \frac{888}{1330} = 0,67$$

$$K_s^{e.g} = \frac{\sum_{i=1}^n L_i}{LN} = \frac{198 * 6}{215 * 7} = \frac{1188}{1505} = 0,79$$
(4)

The number of the students having identified practical value  $L_i$  in this formula (using seven symbols only);  $L$  – the number of symbols the students should understand (in our experience it is equal to seven);  $N$  – the number of the students in target group. Based on these formulas, the coefficients of target and control groups were  $0.79 \pm 0.67 = 0.12$ . It means that this ratio shows mathematical and statistical significance of our experimental results.

the Coefficient of effectiveness of methodological training was determined by the formula:  $P = K_s$ , the experimental group /  $K_s$ , control group \* 100 %.

Confirmation of the effectiveness of experimental training is to compare the dynamics of changes in the coefficient of completeness of the development of methodological competencies, which shows an increase in the rate of formation of methodological competencies in the conditions of use of the complex (Figure 1).



**Fig. 1.** Dynamics of changes in the Fullness coefficient of development of methodical competencies

The reliability of the above results and conclusions was also verified by us using the Kramer-Welch test. Checking the statistical hypothesis for a qualitatively determined the test was performed at the level of significance  $\alpha = 0.05$ , the critical value of the Kramer-Welch test  $T_{crit} = 1.96$ . We had two independent samples: the control group, which included all control classes, and the experimental group – experimental classes. We compared the number of correctly solved tasks of students in the control and experimental groups when performing these tests and based on this assessed their level of competence. We have formulated two statistical hypotheses:

$H_0$ : no difference between the numbers of correctly solved problems in the control and experimental groups.

$H_1$ : there is a significant difference between the numbers of correctly solved problems in the control and experimental groups.

As a result, it turned out that:

Before the start of the training experiment, the empirical value of Temp is  $00.7 \ll T_{crit}$ . Therefore, the  $H_0$  hypothesis is accepted at a significance level of 0.05;

After the end of the training experiment,  $Temp = 5.7 \gg T_{crit}$ , so the hypothesis  $H_0$  is accepted with a 95 % confidence difference.

Analysis of the results shows slightly higher rate of formation of methodological competencies while applying experimental technologies that confirms feasibility of their use in a system of methodological training of a Physics teacher. Some specific hypotheses were put forward to see how the TLI techniques impact the teaching and learning proves of a student:

- there is a relationship between the ability of students to solve the TLIs and their skills use methodological and methodical categories, actualize mental activities and find the ways to solve management problems;

- level of development of methodological reflection and subject-reflective relations in a teaching and learning process is associated with the ability to solve the TLIs;

- ambition and independent behavior of students in a teaching and learning process and to what extent he is satisfied to it is raised as higher the ability to solve the TLIs.

The choice of listed dependencies is subjected to their significance in the structure of the methodological readiness of a Physics teacher to perform his basic functions. Confirmation of the hypotheses served as proof to the effectiveness of the methodological training system.

The relationship between the ability to solve the TLIs and degree of development of *methodological reflection* of students was determined in several ways:

- paired comparison of students' reflection level (objectivity was checked by comparing students' characteristics given by different experts)

- through observing the students during their practical work while their self-assessment and peer assessment of the TLIs

- comparative analysis of the grades for different methodological students' skills posted by a lecturer, teacher and student during the internship, verifying the adequacy of self-assessment and assessment of experts.

Methodological reflection was evaluated at three levels according to the criteria presented in [Table 7](#).

**Table 7.** Methodological reflection

Level of methodological reflection	Criteria for assessment
High	Understand importance to develop methodological reflection; know requirements for methodological activity, analyze and assess performed actions adequately to the requirements; able to identify the main drawbacks in a teaching and learning process, find out own difficulties in its implementation; ready to find the way to overcome difficulties; able to analyze learning activity of other students and express an interest to their opinion about his/her own activity
Average	realize the need for the development of methodical reflection; know requirements of methodological activity; analyze and evaluate their actions are not always adequate to the requirements; do not always notice the main shortcomings of a teaching and learning process; have difficulties to formulate their fails in own learning process; identify the ways to eliminate the difficulties with the help of a teacher or other students
Low	Have no idea about the value of methodological reflection or virtually do not think about; have difficulties in characterizing the requirements to fulfill a teaching and learning process; do not evaluate their actions adequately to the requirements; cannot explain the difficulties in methodological activity; unable to identify the ways to address their difficulties in a teaching and learning process

Let's focus on the procedure of assessing the level of development of students' methodological reflection. As it was shown, solving TLIs at the workshops is analyzed by the student, and then it is evaluated by the team of students (a method of discussion). At the end of the classroom activity, a teacher characterizes the TLI's solution, team's assessment and self-assessment of the student. The results of student's reflection activity along with the grades for the TLI solving are recorded in a school register. When we looked after the students we drew attention that a great part of students embarrassed during their self-analysis and mutual analysis of the TLI at the initial stage. Meanwhile, the level of students' methodological reflection has increased significantly in the course of methodical organization of students' involving in reflection activity. We have identified the dependence of the level of development of methodological reflection on the level of development of skills to solve the TLI at the end of the pedagogical experiment (VIII session). Satisfaction index is one of the indicators that show effective methodological training. In the course of the experiment, we repeatedly found out the ratio of students' satisfaction with their methodological training. The satisfaction ration was evaluated on a scale where quite satisfied (+1), mostly satisfied (+0.5), I can't say (0), not very happy (-0.5), dissatisfied (-1).

To evaluate this we applied the formula:

$$S_{index} = \frac{a(+1) + b(+0,5) + c(0) + d(-0,5) + e(-1)}{N} \quad (5)$$

where a, b, c, d, e are the number of answers in order of a scale and N is total students involved.

The study showed that in the experimental groups the indicator of the ratio to the quality of methodological training is quite high and averages 0.83, while in the control groups it is lower about 0.54. It should be emphasized that the index of satisfaction has been intensively increased in response to inclusion of students in the teaching activities associated with the solution of the TLI. Thus, indicators +1 and +0.5 in the VI session evaluated 48.6 % of students, and in the VIII session already 87.5 %, Thus, it can be concluded the technologies of formation of methodological readiness positively affect the attitude to the methodical activity of future Physics teachers.

The analysis of the obtained data shows that the most influential are such types of educational and methodical activities of students, which are associated with organized independent work on the systematization of knowledge, planning of their activities, regulation and active implementation of TLI solution. These results once again emphasize the effectiveness of the developed technology for the implementation of the competence-oriented system of methodological training of future Physics teachers.

The study performed is of theoretical and experimental nature. In the course of experimental activity we've done the following:

- 1) confirmed theoretical provisions justifying the need and the possibility of implementing a competence-oriented system of methodological training that best meets today's requirements for a Physics teacher
- 2) proved pedagogical expediency of building logic of a Physics teacher's methodological training according to structure of methodological thinking and types of methodological competences
- 3) established interrelation between the methodological competence and methodological thinking
- 4) revealed the adequacy of methodological tools of realization of the developed system and its goals consisting in the formation of methodological competence of a Physics teacher
- 5) found out dependences between the student's ability to solve the TLIs and his skills to operate methodological and methodical categories, update mental operations, find the ways to solve management problems; the level of development of methodological reflection of students; students' satisfaction ratio with the results of their educational and methodical activities and the development of students' creative potential.

The research program is fully completed within the set tasks. However, the results of the study do not exhaust all aspects of the problem under consideration. As promising directions of

research we can identify specifying the content and means of methodological training of a Physics teacher; investigate interdisciplinary links in the methodological training of a Physics teacher; further improvement as teaching methodological disciplines focused on the development of methodological competence of future Physics teacher.

### 5. Conclusion

Representative results of our empirical study are as follows:

- 1) studied and characterized methodological training of modern physics teacher and revealed relevant shortcomings in the formation of methodological competence of learners in the process of higher education
- 2) pedagogical experiment confirmed the effectiveness of developed methodological tools for the implementation of competence-oriented system of the methodological training with educational tasks as a core element
- 3) applying of TLI confirmed the effectiveness of the developed by the author of educational and methodical tasks in the formation of methodological thinking and methodological competencies
- 4) in the experiment we established relation of formation between the methodological thinking and competence that confirmed theory about the unity of theoretical and practical aspects in the methodological competence
- 5) established dependences between the students' abilities to solve the TLI and:
  - skills to operate with methodological and methodical categories, actualize mental operations and find the ways to solve management problems
  - level of development of methodological reflection of students
  - student's index of satisfaction with the results of their educational and methodological activities
  - development of students' creative potential.
- 6) established slightly higher rate of formation of methodological competences in the conditions of application of experimental technologies that confirms the expediency of their use in the system of methodological training of a Physics teacher
- 7) in the course of experimental work we've proved pedagogical expedience of logic the methodological training of a Physics teacher in accordance with the structure of methodological thinking and types of his methodical activity.

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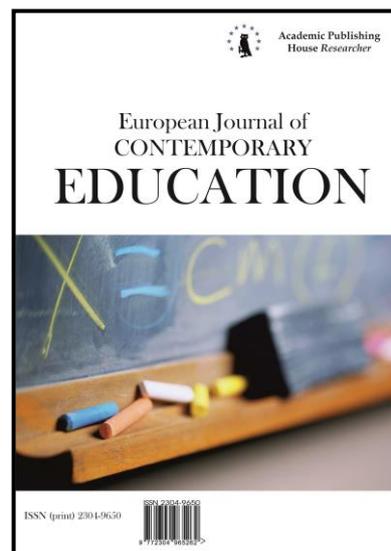
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## Components of Modern Students' Intercultural Competence: Comparative Analysis

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### Abstract

The final results of the research which was held in the Republic of Buryatia, Mongolia and China are represented in the article. Russia is represented by the Republic of Buryatia, one of the multicultural regions of our country, where representatives of more than a hundred native people coexist peacefully with people of other nationalities, mostly from neighboring countries. Globalization also affected this region, which is clearly reflected in the heterogeneity of the student youth of the Republic. The largest groups of foreign students studying at universities in Buryatia are representatives of neighboring regions of China and Mongolia.

For such a multicultural and educational region as the Republic of Buryatia, it is very important to form tolerance and develop the skills of competent intercultural dialogue among young people, along with the preservation of the cultural and ethnic component. This article is an analysis of the results of the research for identifying the level of intercultural competence formation of Russian, Chinese and Mongolian students. Arriving in the Republic for the learning with Russian educational programs, foreign students often face difficulties of intercultural interaction, not to mention the language barrier. In this regard, it is important to clarify at the initial stage the difficulties arising in terms of intercultural dialogue among the main participants of the educational process in the universities of our city.

The article reveals three of the six main parameters on the basis of which this study was conducted, which, in our opinion, represent most clearly the entire procedure of the study and the results obtained.

**Keywords:** intercultural communication, intercultural competence, components of intercultural competence, intercultural interaction, communication, social interaction, personal management.

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## **1. Introduction**

In the modern world, when international relations in the field of higher education are increasingly intensified, the problem of development of students' intercultural competence becomes particularly relevant.

Integration processes in the education of the Russian Federation put forward the formation of a personality capable of intercultural interaction, respectful attitude to another culture and ready to preserve their own one as one of the most important tasks. For universities in the Eastern regions of Russia, the issues of cooperation with universities and students of China and Mongolia, as important strategic partners of our country, come to the fore (Dagbaeva, 2018).

In this article the components of the formation of intercultural competence (IC) of Russian, Chinese and Mongolian students are analyzed. It is important to highlight that the Russian respondents were represented by students of three universities in Ulan-Ude. Taking into account the cross-border location of the Republic of Buryatia, which has been the "gateway of Russia to Asia" for many centuries and the current geopolitical situation, we consider it extremely relevant to study comparatively the students of neighboring countries in the East of Russia –Mongolian and Chinese ones.

Intercultural competence of a person characterizes the diversity of human relations with society, with himself, with another and his own culture, it is complex in composition, contains diverse components: from knowledge about their own and other people's culture to the manifestation of tolerance. In research studies of IC components, models are proposed that emphasize certain concepts (Byram, 2013; Precht, 2007), context (Kim, 2003) or process (Hajek, Giles, 2003). Some tools evaluate knowledge and skills (Grice, 1975); others supplement them with an affective component (Deadorff, 2004). Models have also been developed that represent intercultural competence as a set of other competencies, for example, professional and general competencies (Paige, 2004).

Having analyzed foreign and Russian methods in the field of assessment of intercultural competence, we can conclude that there is a huge variety of tools. For example, M. Paige identifies 35 different instruments (Paige, 2004), but not all of them are available for Russian teachers.

Traditional self-assessment questionnaires include Pierre Cass's Four Value Orientations Questionnaire (FVOSAI) (1982, 1999), Michael Tucker's Intercultural Readiness to Work abroad Questionnaire (OAI) (1999), Colleen Kelly and Judith Meyers' Cross-cultural Adaptability Questionnaire (CCAI) (1999), Mitchell Hammer's Intercultural Development Questionnaire (IDI), and others.

In Russian science, the issues of measuring the parameters of intercultural communication are also actively discussed; new methods have been developed and adapted: N.P. Fetiskin, V.V. Kozlov, G.M. Manuylov – test "Diagnostics of communicative social competence" (CSC); adaptation of Yu.B. Gippenreiter, A.A. Rukavishnikov of three variants of Russian MBTI (M. Briggs' typology); INTOL technique of L.A. Pochebut, "Scale of intercultural sensitivity" of O.E. Khukhlaeva, M.Yu. Chibisova, etc.

It follows from the above that, on the one hand, most often the measuring material is based on only one or two parameters that evaluate the components of the IC, which do not give an objective assessment of the level of intercultural competence. On the other hand, if the measuring material contains the evaluation of several parameters, it does not take into account the complex nature of the IC. For its objective assessment it is necessary to include tasks based on active methods of teaching (trainings, discussions, games, situation analysis). These methods, according to A.P. Sadokhin, allow immersing in the situation of intercultural communication, thereby form effectively skills to overcome barriers in the situation of intercultural interaction.

## **2. Materials and methods**

To measure the level of intercultural competence, we turned to the questionnaire of the German researcher Deborah Schnabel "Test for measuring intercultural competence" (Vrublevskaya, 2006), which combines both test tasks and analysis of the situation of intercultural communication, which allows making the most accurate description of the level of intercultural competence. Intercultural competence is understood as a global orientation of behavior, which has a multidimensional structure. Based on this understanding, she developed the test for measuring

intercultural competence (TMIK), which allows making a differentiated measurement of intercultural competence through self-assessment and situation assessment.

Her model measures nineteen parameters of intercultural competence related to six different areas: *communication* (flexibility, empathy, accuracy, change of perspective), *learning* (willingness to learn, purposeful information gathering, handling criticism, willingness to use a foreign language), *social interaction* (creating trust, integration in groups, creating a professional network, the ability to make and maintain acquaintances), *cultural self-knowledge* (awareness of one’s own cultural identity, reflection of one’s own culture), *creation of synergy* (mediation between different interests, ability to productive cooperation), *personal management* (strategic problem solving, target orientation, stress management).

This type of questionnaire is a unique opportunity to combine different methods of measuring intercultural competence, predict most accurately deviations and correct existing shortcomings in the formation of specific skills.

It is necessary to note that the TMIK Test was tested in different cultures, translated into Portuguese and English, and conducted a sample international survey, including in Brazil. The overall scale of the Brazilian survey shows very high reliability on the Cronbach scale  $\alpha = 95$ . Individual scales range from 61 to 82. No significant differences were identified between these questionnaires, and we believe it can be applied to other cultures as well.

To adapt Deborah Schnabel’s questionnaire on measuring the components of intercultural competence by philologists of our University, it was translated into Russian, Chinese and Mongolian. Translations into languages were carried out by professional translators (S.N. Darmaeva – into Russian, S.G. Tsybenova – into Chinese, I.G. Aktamov – into Mongolian). Then native speakers, translators checked the correctness of the translation from their native language into Russian, that is, the method of “reverse translation” was used, and was again rechecked by native speakers (Nasledov, 2012).

The Kolmogorov-Smirnov’s normality distribution criterion and the Spearman rank correlation were used for statistical processing of the obtained data. The study involved 150 Russian, 150 Mongolian and 130 Chinese students studying at 1-2 courses of higher education institutions in Ulan-Ude, Ulan Bator, and Manchuria.

On the Figure 1 the arithmetic mean values of the IC measurement of Russian, Mongolian and Chinese students in seventeen blocks and their percentage distribution are presented.

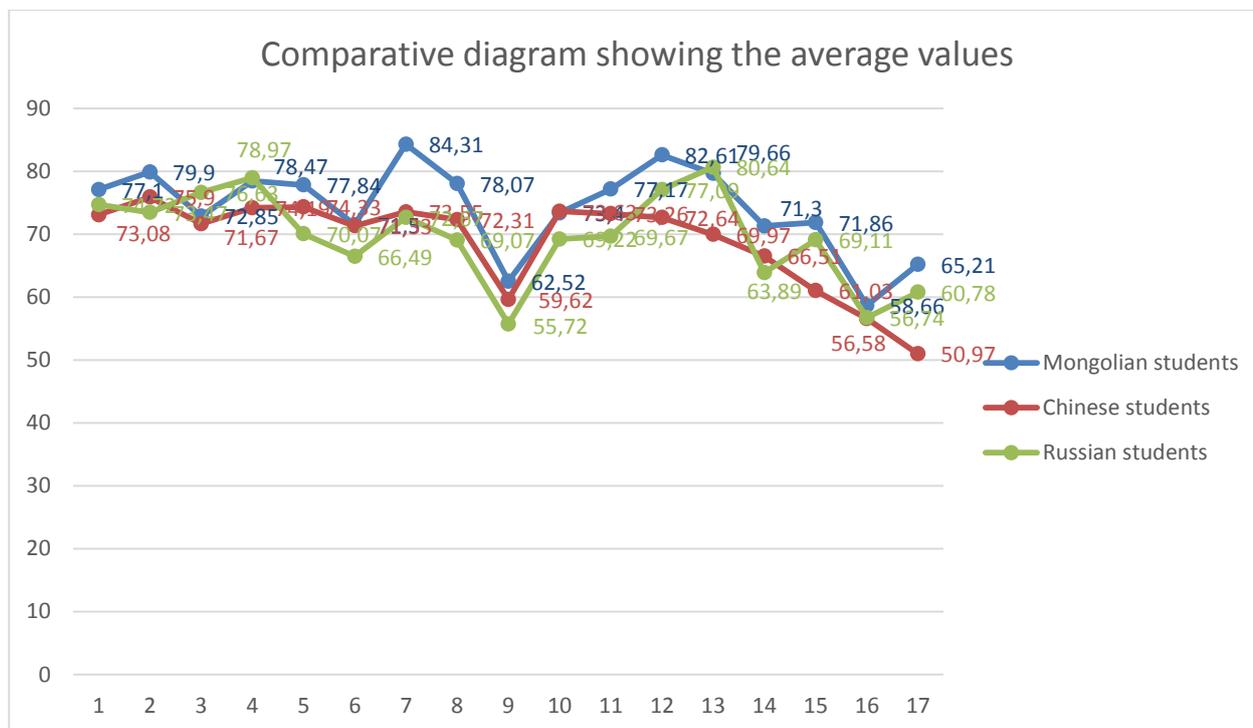


Fig. 1. Comparative chart of average values

Note (in small letters): 1-4 – communication; 5-6 – creating synergy; 7-9 – learning; 10-11 – self-knowledge; 12-13 – personal management; 14-17 – social interaction.

Analysis of this graph shows that respondents do not have a spread of responses in the indicators. IC levels are divided into basic – 0-24 %, average – 25-49 %, advanced – 50-74 %, excellent – 75-100 %).

To identify the relationships of respondents' answers in each tested block, we conducted a correlation analysis, testing hypotheses about the relationships between variables using correlation coefficients (Nasledov, 2012). The conditions for choosing the coefficient were based on two criteria: the *distribution normality* (in our case, the distribution of data is abnormal when  $p$  is asymptomatic  $\leq 0.05$ , in this regard, it was decided to use the Spearman coefficient. The nature of the distribution was tested using the Kolmogorov-Smirnov test using the SPSS program) and the *sample size* (in this study,  $n = 450$ , that is,  $n \leq 30$ , but the distribution of values is not normal ( $p$  asymptomatic  $\leq 0.05$ ), so the decision is made to choose the rank correlation coefficient  $r$ -Spearman) (Slepko, 2013).

According to Yu.N. Slepko, it makes no sense to look for strict functional, cause-and-effect relationships between variables, as the subject of psychology is almost impossible to be explained unambiguously, it is complicated and not unambiguous. If one dependent variable (for example, mood) is statistically significantly strongly correlated with another independent variable (for example, self-acceptance), then it is mandatory that both the dependent and independent variables will be affected by other independent variables (for example, mood can be affected by temperament type, self-acceptance – by self-esteem). Therefore, there is no unambiguous, direct influence of the level of self-acceptance on mood (Slepko, 2013).

In connection with the above, when interpreting, we will not talk about the influence of variables on each other, but about the degree of relationships between variables, that is, whether there are similarities and differences in the responses of respondents (Russian, Mongolian and Chinese students) in each block.

We analyzed the strength of the relationship, which reaches a maximum under the condition of mutual unambiguous correspondence: when each value of one variable corresponds to only one value of another variable (and vice versa), the empirical relationship coincides with the functional linear relationship (Nasledov, 2012).

In our case, there is a situation of no statistical relationship for independent random variables, as these variables are not interdependent. Students answered in different countries, at different universities, in different languages, that is, the answers of Russian students do not affect the answers of Mongolian and Chinese ones.

The correlation coefficient is interpreted based on the level of the correlation strength:

$r > 0.01 \leq 0.29$  – a weak positive correlation,

$r > 0.30 \leq 0.69$  – a moderate positive correlation,

$r > 0.70 \leq 1.00$  – a strong positive correlation,

$r > -0.01 \leq -0.29$  – a weak negative correlation,

$r > -0.30 \leq -0.69$  – a moderate negative correlation,

$r > -0.70 \leq -1.00$  – a strong negative correlation (Slepko, Ledovskaya, 2013: 92).

When interpreting the results, the following designations are used: R. – Russian students, Ch. – Chinese, M. – Mongolian, as well as taking into account the national psychological and national-cultural characteristics of students (this criterion was taken into account when analyzing the sphere of social interaction). “The knowledge of mental differences that determine emotional reactions, way of thinking and features of the national mentality, allows organizing the learning strategy methodically competent and effective” (Shanturova, 2015).

In this article, we do not aim to analyze the formation of the IC of students of the three countries in all blocks. For this article, we selected the results in three areas, which to some extent are indicative of the assessment of intercultural competence of students, and reflect the behavioral aspect.

### 3. Results and discussion

If we take the unit, reflecting the skills of *strategic problem solving*, i.e. the ability to recognize the problem and find a structured approach to its solution in the field of “Personal

management”, we observe the following indicators of Spearman’s correlation coefficient: the responses of the Russian students towards the answers of Chinese students ( $r = -0.36$ ) and the answers of Mongolian students ( $r = -0.53$ ) with a weak negative correlation.

**Table 1.** Correlation in the block “Strategic problem solving”  
**Correlations**

			bloc13_RUS	bloc13_China	bloc13_Mon
Po Spearman	bloc13_RUS	Correlation coefficient	1,000	-,036	-,053
		Value (two-side)	.	,709	,522
		N	150	110	148
	bloc13_China	Correlation coefficient	-,036	1,000	,065
		Value (two-side)	,709	.	,498
		N	110	110	110
	bloc13_Mon	Correlation coefficient	-,053	,065	1,000
		Value (two-side)	,522	,498	.
		N	148	110	148

As we can see, the responses of Chinese students in relation to Russian were ( $r = -0.36$ ) with a weak negative relationship, in relation to Mongolian ( $r = 0.065$ ) with a weak positive relationship. Answers of Mongolian students in relation to Russian were with a weak negative relationship ( $r = -0.53$ ), with Chinese students ( $r = 0.065$ ).

With an average level of IC formation of Russian students in 80.64 % different responses from Mongolian and Chinese students were observed. Despite the fact that the lowest rate of IC in this component in Chinese students (69.97 %), the quality of it is closer to the answers of Mongolian students.

In our opinion, it is necessary to take into account the diversity of results in the development of materials in the formation of intercultural competence. The results in the “Personal management” block suggest that the answers of Mongolian and Chinese students are more similar. If we consider personal management as a way of self-presentation and management of their goals in communication, we can refer to the description of the characteristic properties of communication in cultures. American Manager P. Drucker in his work stressed that management comes from the culture of society, values, traditions, customs, religion, government and regime. The more the management of the organization is based on social traditions, values and faith, the more obvious its success is (Dugarova, 2017).

The student is a full-fledged part of the educational process, which absorbs the main culturally determined ways of communication. V.V. Malyavin in the book “China managed. Good old management” highlights the following features of Chinese communication: they are not accustomed to put their “Self” in the first place, and declare openly their personal interests and desires. They give great, even exceptional, importance to symbolic forms of communication — all kinds of emblems, formulas of politeness, normative gestures and other ways of expression that indicate the nameless and inexplicable in naming and explaining, emphasize the importance of silence in speech, symbols are important in communication. Knowledge in Chinese is survival, “bodily assimilation” (ti Hui) of the very quality of the present situation. Hence the inability of the Chinese to open discussion and to substantiate consistently or develop the point of view he has adopted. The clash of arguments is replaced in China by the exchange of the same private and aesthetically significant formulas, quotations, hints (Malyavin, 2019).

Symbolic thinking is also present in Mongolian culture. Its strength and power is closely related to the views of the Mongols about the unity of objects and phenomena of the world and their external and internal relations (Popkov, 2010).

As for the peculiarities of Russian communicative behavior, it is characterized by self-presentation, in the process of which communication is focused on self-affirmation (Morozova, 2019).

In this setting, the person dominates the interlocutor, does not take into account his opinion, statements and replicas. As a consequence, the interlocutor does not have the opportunity to speak.

This style of communication implies the predominance of the dominant side in the dialogue (Balakay, 2001). The communicants in Russia are characterized by egocentrism, that is, most often they do not know how or do not want to listen to the interlocutor, tend to switch attention exclusively to themselves. In communication of Russian people their communicative reactions are reflected. For example, during a conversation, they lose interest in the interlocutor and, accordingly, to the information that the speaker broadcasts. A distinctive feature of communicative behavior of Russians is manifested in pointing to human speech errors, which is a deviation from the ethical norms of behavior in communication (Tan, 2017).

We can assume that the ability of Mongolian and Chinese students to perceive information figuratively through symbols may be a different way of formulating the goal, less openly and more attentively than in Russian students.

If we consider the sphere of “Social interaction”, then in the block “building professional networks” (the ability to build a network of people consciously in order to meet emerging needs and achieve goals), we can see a correlation with all groups of respondents, but it describes different relationships: Russian students’ responses to Chinese have a weak negative correlation ( $r = -0.050$ ) and a weak positive correlation to Mongolian ones ( $r = 0.109$ ). The responses of Chinese students have a weak negative correlation with Russian students ( $r = -0.050$ ) and with Mongolian students ( $r = -0.044$ ). The responses of Mongolian students showed a weak positive correlation with Russian young people ( $r = 0.109$ ), and the responses of Mongolian students showed a weak negative correlation with Chinese students ( $r = -0.44$ ).

Social interaction is an important part of communication, including intercultural, in which society evaluates human actions in a certain way and reflects the value component of interaction. Marinov M.B. gives one of the definitions of social interaction: “Interaction – dynamic interaction and the relationship between two or more variables, when the value of one variable affects the value of other variables. Social interaction is a process in which individuals and groups in the course of communication influence other individuals and other groups by their behavior, causing responses (Vrublevskaya, 2006). It is important to clarify in the course of the study whether students of different cultures experience difficulties in interaction, whether they are ready to build contacts actively, what answers have one vector of decision-making.

**Table 2.** Correlation in the block “Building professional networks”

**Correlations**

			bloc14_RUS	bloc14_China	bloc14_Mon
Po Spearman	bloc14_RUS	Correlation coefficient	1,000	-,050	,109
		Value (two-side)	.	,606	,188
		N	150	110	148
	bloc14_China	Correlation coefficient	-,050	1,000	-,044
		Value (two-side)	,606	.	,648
		N	110	110	110
	bloc14_Mon	Correlation coefficient	,109	-,044	1,000
		Value (two-side)	,188	,648	.
		N	148	110	148

This component of IC is formed in Mongolian students by 70.58 %, almost by 5 %, compared to Mongolian students, the level of IC is lower in Chinese students, the lowest is observed in Russian students. The correlation matrix shows that the choice of components of Chinese students’ answers differs from Russian and Mongolian ones. Despite the fact that the level of IC of Chinese students is above average, it is necessary to pay attention to the allocation of other accents in the construction of professional connections. It is necessary to look for a slightly different approach to build professional connections in teaching or working with Chinese students.

Let us consider another important sphere “Communication”. Communication is understood as the most important factor of human activity, which has its own special characteristics, system, internal processes, social interaction, and interaction of individuals. As an object of research,

communication is studied by different scientists from different points of view. Thus, the most interesting from a practical point of view is the analysis of the so-called intercultural communication, when there is communication between representatives of different cultures. The extent to which communication will be successful depends on a number of factors: the level of foreign language proficiency, knowledge and understanding of the cultural background, sex and age characteristics, the level of tolerance of both communicants, as well as an important characteristic of successful intercultural communication is the simplicity, clarity and plainness of the statement (Grice, 1975). Communication can be considered successful if statements are formulated in such a way that they are clear and understandable to the recipient.

**Table 3.** Correlation in the block “Communication”

			<b>Correlations</b>		
			b1_RUS	b1_China	b1_Mon
Po Spearman	b1_RUS	Correlation coefficient	1,000	,114	,060
		Value (two-side)	.	,237	,467
		N	150	110	148
	b1_China	Correlation coefficient	,114	1,000	,195*
		Value (two-side)	,237	.	,041
		N	110	110	110
	b1_Mon	Correlation coefficient	,060	,195*	1,000
		Value (two-side)	,467	,041	.
		N	148	110	148

\*. The correlation is significant at 0.05 (two-side).

In the process of correlation analysis of variables in the block “Clarity of communication” it was revealed: the answers of Russian students in relation to Chinese students show a weak positive correlation ( $r = 0.114$ ), as well as to the answers of Mongolian ones ( $r = 0.060$ ). Mongolian and Chinese students have more similar answers to questions about clarity and plainness in communication.

The results of Chinese students in the block on the clarity of communication in relation to the answers of both Russian ( $r = 0.114$ ) and Mongolian ( $r = 0.195$ ) are characterized by a weak positive correlation. Mongolian and Chinese students have the closest understanding and attitude to communication.

As for the degree of communication of the answers in the block on the clarity of communication of Mongolian students, we can distinguish a weak positive correlation with the answers of Russian students at  $r\text{-Spearman} = 0.060$ .

Thus, the Spearman correlation coefficient in the block “Clarity in communication” is characterized by a weak positive correlation and shows that students from Mongolia, China and Russia responded relatively equally to the test tasks. However, it should be noted that Mongolian and Chinese students have a more similar understanding of the clarity of communication than Russian students.

#### 4. Conclusion

A comparison of the responses of students from the three countries shows that the components of IC in young people of Russia and Mongolia are closer than in Chinese. In other components, Mongolian and Chinese students often differ from Russians in their answers.

The reflection of ethnic and psychological features is certainly the system of higher education of the country, which broadcast the values of the state and proven methods of teaching of the native country. At the same time, the university is an important component in the formation of social interaction.

Through the method of observation, it was revealed that when Chinese students come to Russia and are in a language environment, they do not seek to communicate with native speakers. The researchers highlight the peculiarity of the psychology of the Chinese, which consists

in their isolation and restraint. For example, it is difficult for them to decide to initiate communication with strangers. Traditional teaching methods and the Chinese educational system also have a huge impact on the ways of communication. The main goal for a student in China is to memorize a large amount of information and reproduce it. This method of training does not provide for the analysis and expression of their opinions to the received material. Students do not form the skill of predicting the content of the text by its name, by keywords, by the beginning of a sentence or word. When learning foreign languages, including Russian, most Chinese have a non-communicative style of learning other languages, wildcard exercises are performed easily by them, but they hardly master speech skills. Even if they successfully master the rules of the Russian language for a long time, they feel uncertainty in the use of lexical and grammatical forms; it is difficult for them to overcome the psychological barrier in the communication process.

From a psychological point of view, we believe that this is a consequence of one of the features of the Chinese mentality, more focused on internal mental and intellectual activity. M.T. Fakhruddinova believes that “the Chinese have a concept of honor, literally translated into Russian as “face”: this category involves the fear of making a mistake and losing their “face” in society” (Fakhruddinova, 2016).

In communication, it is unacceptable for the Chinese to lose respect; this explains the reluctance of the Chinese to share their opinions in public. For this reason, the teacher should correct errors correctly, exercise restraint when analyzing incorrect answers. For effective social integration of Chinese students, this is an important factor of successful communication. Most likely, active methods of training should be applied carefully, gradually and constantly increasing the degree of dynamism in dialogues and team games (Tan, 2017).

As for the interaction of Mongolian students with Chinese and Russian ones, a more positive correlation is observed in the construction of social ties between Russian and Mongolian students.

On the one hand, we can talk about already existing methods of communication between the Mongols and the Russians: the Mongols for a long period, cooperated with the Russian, for example, the Soviet period is characterized by the knowledge of the Russian language and Russian culture in Mongolia. In the blocks on building professional networks, creating trust, creating and maintaining contacts, there are similarities in the answers.

On the other hand, mentality, culture is different: the results, for example, in the block “Integration in the group” suggest that Mongolian students choose other answers in achieving interaction.

Based on the findings of the study “Cultural value orientations of Russian and Mongolian students” conclusions are made that Russian students focused more on traditional (focus on traditions, the past, the nature is mysterious, decision-making happens more collectively) and dynamically developing culture (future orientation, independence from society, the goal is to achieve success and material wealth is on the 1<sup>st</sup> place) and less focused on contemporary culture (emphasis on the present, interested in environmental issues, important rights and human values etc.); Mongols are more oriented to dynamically developing culture and less oriented to traditional culture (Dugarova, 2017).

In this case, Mongolian students’ individual values prevail and it is important to show the priority of their values.

Thus, in general, we can talk about the stability of the test, as the correlation can be traced in all blocks, which indicates the relationship of the responses of the subjects with the content of the test and the fact that the respondents were dealing with one phenomenon. The correlation analysis revealed different degrees of connection between the respondents’ answers, which indicates the difference in perception and behavior, the students’ assessment of the phenomena of intercultural communication. This allowed us to determine the vector in which components of the IC have the same understanding, and where to look for radically new approaches.

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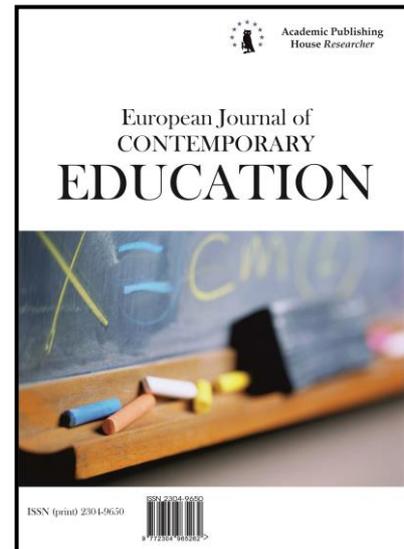
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## Model of Universal Competence Development Intercultural Interaction of Bachelors by Means of Fine Arts

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### Abstract

In this article the authors present the developed pedagogical model of universal competence development intercultural interaction of bachelors by means of fine arts. The development of this pedagogical model is the most important pedagogical task. This task requires an urgent solution. Since 2019, the Federal state educational standards of the new generation 3++ have been introduced into the educational process of Russian universities. This highlights the relevance of this study. The pedagogical model of universal competence of formation and development of intercultural interaction is an integral pedagogical system. It consists of the following complementary and interrelated clusters: system-forming, motivational-holistic, organizational-content, diagnostic-effective. Each cluster is treated as a system that consists of certain Bullitts'. In this article the results of the effectiveness of the pedagogical model proposed by the authors and the need for its inclusion in the educational process of Russian and foreign universities are proved experimentally and presented in this article.

**Keywords:** pedagogical model, universal competence, intercultural interaction, fine arts, students, university.

### 1. Introduction

The learning process in the field of Russian education implies specific achievements of students focused on the result, which is measured not only by knowledge, skills, but also determined by the possession of abilities and level of competence.

Universal competence of modern educational standards of higher education aimed at personal growth of students in their intercultural interaction with the surrounding world by means of fine arts. Modern educational standards in Russia targeted at the formation and development of

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professional growth and personal improvement of competitive, competent professionals in popular areas of activity. The main criterion for the quality of higher education is the formation of student competencies that characterize his personality, that is, the formation of universal competencies.

In higher school, the transition to competence education makes it possible to concretize the integral characteristic of the personality of the graduate, containing the necessary level of motivation, development of intelligence, personal qualities and practical experience in the mastering of universal abilities. The authors rely on the teachings of T.Yu. Bazarov, A.K. Erofeev, A.G. Shmelev ([Bazarov et al., 2014](#)). They presented a collective definition of the concept of competence as a combination of knowledge, skills, motivational factors, personal qualities and situational intentions, which provides an effective solution to the tasks of a certain class.

The term competence, in this case, is perceived as a definition of learning outcomes. And the quality of preparedness of the graduate proves the level of formation of the designated competencies.

The competence of intercultural interaction is based on the analysis of universal requirements that determine their priority, necessary in a wide sphere of professional activity. In this aspect of the study, the term "universal competence" is understood as a definition of the results of intercultural interaction. The level of formation of this competence by means of fine art is expressed by the qualitative characteristic of universal preparedness of the graduate of the higher school. This allows us to reorient the assessment of the quality of education from the concept of preparedness's to the modern concept of competence in higher education.

A competent graduate of the University has a certain baggage of knowledge, skills and abilities of intercultural interaction by means of fine arts in the professional sphere. Universal competencies determine the personal qualities of a University graduate, such as motivation, character, abilities, important for quality and effective activities.

In the context of this study, the authors propose to interpret the knowledge of the universal competence of intercultural interaction as a category according to Dorota Klus-Stanska, as a spiritual and social heritage of culture and art, as a cultural Canon, as the basis of fundamental knowledge ([Dorota Klus-Stanska, 2018](#)).

This allows us to identify the actual task of higher education in the context of the competence approach, which is to develop a pedagogical model of formation of universal competence of intercultural interaction by means of fine arts of University students for successful activities in their professional sphere.

The study of A.N. Ksenofontova, L.O. Babeshko is also relevant for the authors. The analysis of the work allows us to reveal the features of the innovative model of learning in the personal educational environment. This confirms that pedagogical modeling is a generally accepted method of theoretical understanding of the problem of research in the field of education. The pedagogical model is used to determine the nature of the dependence of the structural elements of the studied phenomenon ([Ksenofontova, Babeshko, 2016](#)).

The pedagogical model of formation of universal competence of intercultural interaction is a structure of the pedagogical system. It consists of certain clusters of performance indicators that are united by a single goal of interrelated structural components. The development of the above-mentioned pedagogical model is the most important pedagogical task. This requires an urgent solution. Since 2019, the Federal state educational standards of the new generation 3++ have been introduced into the educational process of Russian universities. This highlights the relevance of this study.

It should be noted that the cluster, by definition A.V. Kupavtseva is the Union of some homogeneous elements, which are an independent unit with certain properties ([Kupavtseva, 2018](#)).

The authors propose to define an independent cluster unit with certain properties as a Bullitt's. The Bullitt's in English "bullet" means a marker that highlights certain elements. So Bullitt is an element of the cluster model of the formation of universal competence of intercultural interaction, that is, the knowledge, skills, possession of certain skills, those actions that are necessary to obtain a qualitative result of the implementation of this model in the educational process of the University.

Thus, the cluster consists of certain Bullitt. If the student effectively performs all the shootouts of this model of formation of universal competence of intercultural interaction, then, accordingly, he becomes competent. We emphasize the fact that intercultural interaction allows you to see and

realize the uniqueness of your own culture and respect the culture and traditions of another people. We present intercultural interaction by means of fine arts as a system of codes of different cultures. These code systems of different cultures are not fully comparable among themselves.

In this regard, in the process of intercultural interaction, special importance is given to the problem of encoding and reading visual information. In General, fine art serves as a panorama of the diversity of the surrounding world.

Fine art is considered by the authors as self-consciousness of culture. Intercultural interaction is reflected in the visual arts as in a mirror.

The emotional function of art reveals the directions and attitudes contained in culture. Various hidden elements, processes and tendencies for understanding contained in interethnic culture are revealed and made available by means of fine arts in intercultural interaction.

By means of communicative features of fine art, by means of its artistic images features of interethnic cultures are revealed. The best means of knowledge of international culture is acquaintance of students with national art, studying of folk art creativity. The formation of students' skills of independent cognitive and creative activity in the future profession, based on cultural positions and the organization of intercultural interaction, are universal. The purpose of this article is the need to solve a major pedagogical problem of development, creation and inclusion in the educational process of universities pedagogical model of formation of universal competence of intercultural interaction of bachelors by means of fine arts to improve the quality of training of graduates of higher educational institutions both in Russia and abroad.

The hypothesis of the study is as follows. The process of forming a universal competence of intercultural interaction of University students by means of fine arts will be effective in the development pedagogical model and of its implementation. It should be presented as a system of interrelated structural clusters that function in a holistic pedagogical process. They are united by a common goal of forming intercultural interaction between students by means of fine arts. This model requires implementation in the educational process of higher education institutions.

## 2. Materials and methods

The modern educational space of Russia was created based on the principle of building a professional learning model. An algorithm for solving the set goals and tasks was developed. This algorithm is based on actions that are aimed at organizing: educational space, scientific approach to the organization of the educational process, and an integrated scheme of interaction between educational structures. The main method of modeling learning outcomes is the competence approach. It is the competence approach in the learning process that sets the standards for ensuring the quality of higher education.

Russian scientists such as Y.D. Artamonova, A.L. Demchuk, N.R. Kamynina, I.B. Kotlobovsky, M.A. Ivanova and others emphasize the need for a competence-based approach in modern conditions of optimization of Russian education. The modern educational model, the tools of which provide the interface of higher education and the sphere of work, as a customer includes:

- Federal state educational standards in the areas of higher education 3++ taking into account universal competencies;
- the main professional educational programs taking into account professional competences designated by professional standards;
- the system of quality control of education and the development of criteria for assessing the level of competence in the funds of evaluation means, as part of the main professional educational program;
- algorithm of knowledge, skills and abilities as an assessment of educational academic achievements of students, including in the field of intercultural interactions ([Artamonova et al., 2015](#); [Ivanova, 2018](#)).

Based on the above-mentioned features of the educational system in Russia, the theory of intercultural interaction of B. Spitzberg (William B. Gudykunst and Bella Moody) and its model consisting of three levels is important for this study:

- individual level containing the personality characteristics;
- episodic level that contains the specific features of intercultural communication between the participants;
- level of relationship ([William, 2012](#)).

Also important is the model of intercultural competence of M. Bayram, consisting of five elements: intercultural attitudes; knowledge; skills of interpreting and relating; skills of discovery and interaction; critical cultural awareness (Bayram, 2000).

In the works of N.Sh. Vatolkin and O. P. Fedotkin, the authors find confirmation of the need to form competences of intercultural interaction among students in the conditions of development of higher education institutions in the country (Vatolkin, Fedotkin, 2018). They convincingly prove the need for universities to form and implement strategies for managing the processes of internationalization through the integration of international and intercultural interaction, through their participation in international projects and the deepening of international partnerships through joint activities.

A. Pekerti and D. Thomas, in their studies on the example of the peoples of the East and Asia proved that the process of intercultural interaction by means of adaptation of one culture in relation to another increases intercultural business interaction (Pekerti, Thomas, 2003).

Moreover, it should be noted that cultural similarities are perceived more qualitatively by people than differences, which contributes to a positive perception of other cultures, according to Lee & Gudykunst (Lee, Gudykunst, 2001).

Since this study of intercultural interaction of University students involves the perception and understanding of works of fine art, the authors rely on the work, which reveals in detail the mechanisms of interaction as communication in General, and artistic communication in particular. These are works of art criticism in which problems of language of fine art of its perception and understanding are solved: R. Arnheim Art and visual perception, B.I. Basin Art and communication, N.N. Volkov Perception of the picture, Yu.Ya. Gerchuk Fundamentals of artistic literacy: Language and meaning of fine art, C.M. Daniel Art of seeing, V. Morozov Art and science of communication: nonverbal communication and others. It should be noted that these scientists consider works of fine art from the point of view of the product of the author's creativity and the artistic image created by them (Arnheim, 2007; Basin, 1999; Volkov, 1976; Gerchuk, 1998; Daniel, 1990; Morozov, 1998).

At the same time, this study is aimed at the perception of fine art as a carrier of communicative properties, through which the process of intercultural interaction of University students is carried out. Fine art reveals the needs of a person in the artistic-figurative, symbolic expression of various emotional experiences of certain moments of life. The second reality is created by art for man, it is a special world expressed by artistic and figurative means. Self-knowledge and familiarization with the world of the second reality serve as one of the most important needs of the human soul.

Scientists in the field of engineering training A. A. Sysoev, E. B. Vesna, Yu. I. Alexandrov in their research claims that due to the well-thought-out educational process, students have an interest in the most creative project as a creative process (Sysoev et al., 2019). In the context of this study, the creative process takes place within the framework of intercultural interaction. This contributes to the formation of students' desire to achieve the best results, creates motivation that corresponds to professional activity.

In conducting the research, the authors rely on the data of the basic methodological principles of the development of the model of formation of research competencies of University graduates, proposed by E.V. Karavaeva, O.V. Vorobyeva, V.P. Tyshkevich (Karavaeva et al., 2018).

The research methodology is based on a comprehensive approach to studying the process of artistic interaction and communication.

The study used the following methods:

- for the analysis of the collected data and their description, the authors used a descriptive-analytical method;
- based on the theory that visual art is a coded, encrypted text consisting of signs of various types with a special nonverbal text structure, the authors used the method of semiotic analysis;
- to identify the main directions of development of artistic intercultural interaction as a communication process, a typological method is used;
- to obtain empirical material confirming (or refuting) the features of the perception of works of art in the process of intercultural interaction, the authors use the method of questioning;
- to assess the reliability of the differences between the percentage shares of the two samples in which the effect of interest was registered, we used the Fischer angular transformation method.

Here we should focus on the changing perception of a complex system of diverse interacting elements of the previously traditional scheme: artist-picture-viewer, which is embedded in the socio-cultural and space-time continuum, as it indicates the viewer as a participant in the process of intercultural interaction.

3. The results of the study. In this article, the authors presented the results of research on the development of a pedagogical model for the formation of universal competences of University students as a structured system, where the interrelated components are united by a single goal of forming the competence of intercultural interaction of students in a holistic pedagogical process. In the article "Improving the Universal Competence of Intercultural Interaction among University Students by Means of Fine Arts: Case Study" the authors present the results of theoretical and experimental research on this problem. They convincingly prove the need to develop an innovative pedagogical model of formation of universal competence of intercultural interaction of students by means of fine arts and its inclusion in the educational process. The process of forming the universal competence of intercultural interaction of University students by means of fine arts should be modeled as a pedagogical model. Then it will be more effective. Interconnected structural clusters of the model should be united by a single educational goal. It consists of an organization of complementary and interconnected clusters. This is a system-forming cluster, motivational-value organizational-content, and diagnostic-effective.

The graphic image of the model of formation of universal competence of intercultural interaction of University students by means of fine arts is presented in [Figure 1](#).

Note that each cluster is considered as a system that consists of certain Bullits.

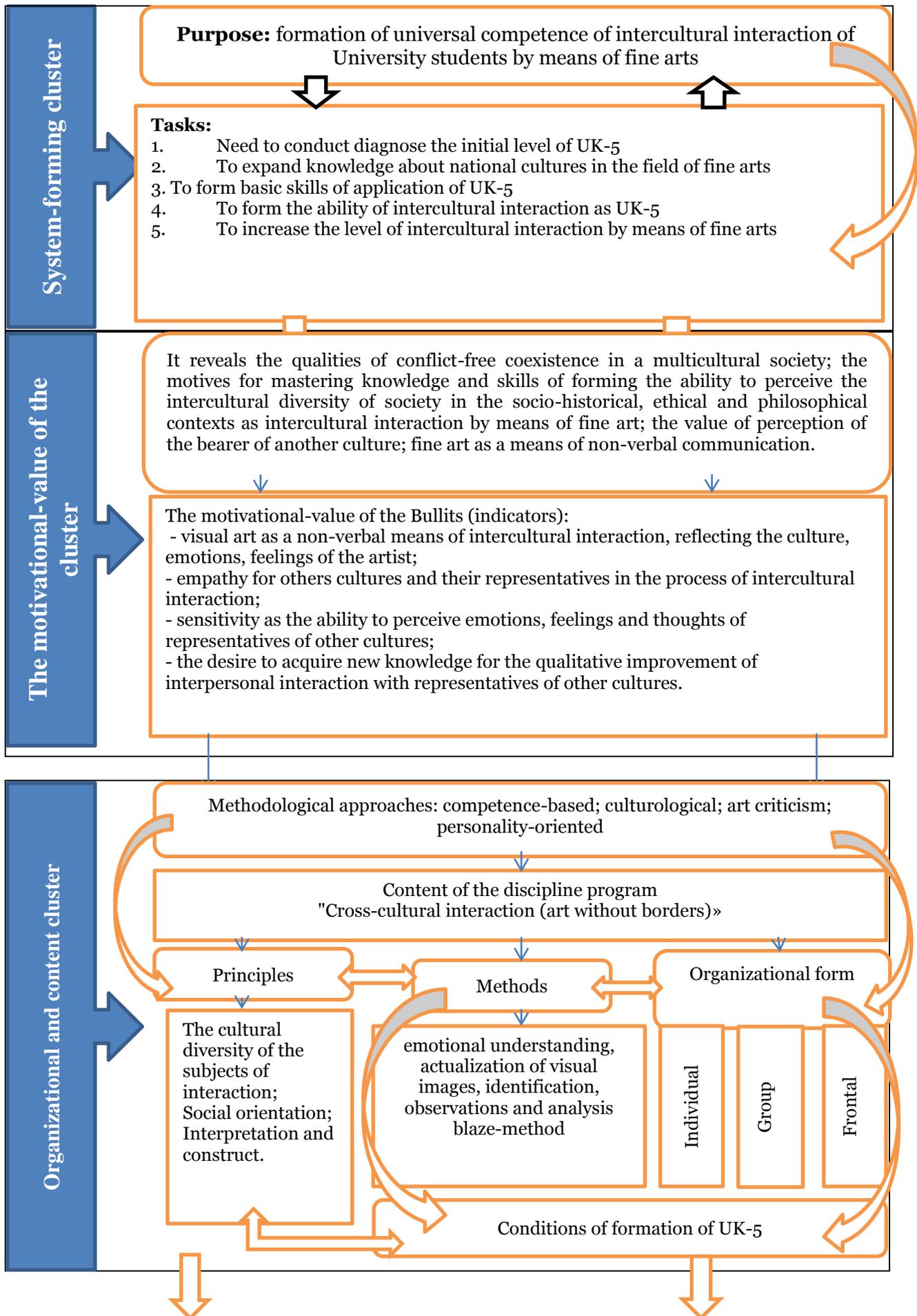
The system-forming cluster of the integral system of formation of the universal competence is defined by the Bullit of the purpose. The goal defines the concept of the educational process and its final result: the formation of universal competence of intercultural interaction of University students by means of fine arts, which is reflected in the specification of tasks.

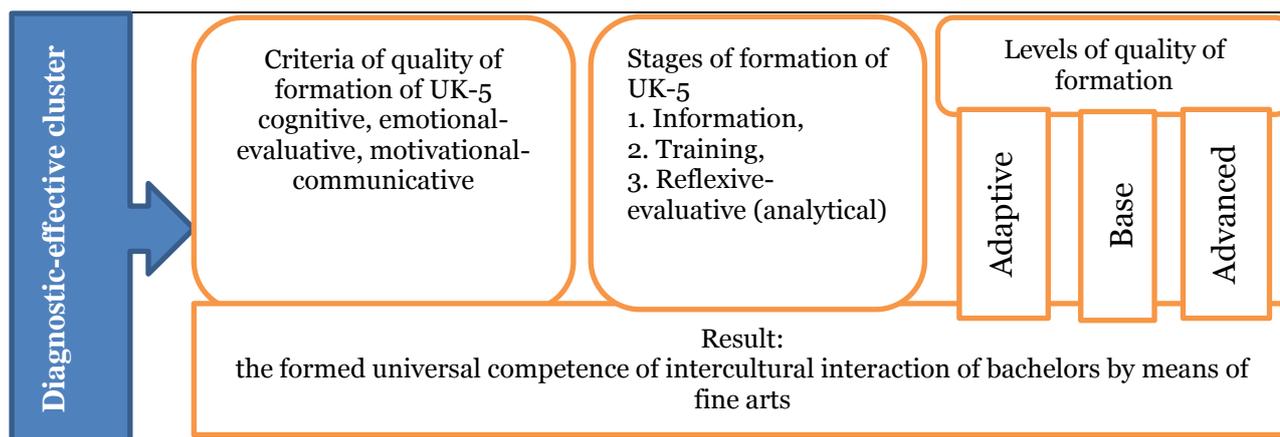
The motivational-value of the cluster. It provides a valuable attitude of students to the formation and development of universal competence of intercultural interaction by means of fine arts. This is reflected in the identification of motives for acquiring knowledge and skills in the formation and development of the ability to perceive the intercultural diversity of society in socio-historical, ethical and philosophical contexts.

Based on the concept of organization and content of education, it is necessary to include in the model of organizational and content cluster.

It is a process of achieving goals. It also provides principles, methods, forms and types of lessons. This cluster defines the conditions for the formation of a universal competence for intercultural interaction. It provides mastery of the methodology of scientific knowledge, an integrated system of subject knowledge of universal competence through the structuring of the content of educational material, which is reflected in the working program of the discipline.

Competence-based; culturological; art criticism; personality-oriented approaches serve as Bullit points of the methodological approach. The basis of the content of this cluster is the author's program of discipline «Intercultural interaction (art without borders)». It is aimed at developing motivation and value attitude to intercultural interaction with representatives of multi-ethnic cultures, skills of intercultural communication by means of fine arts and creative cooperation.





**Fig. 1.** Pedagogical model of universal competence formation and development intercultural interaction of bachelors by means of fine arts

The organizational and content cluster of the universal competence model for the formation and development of intercultural interaction includes:

- principles (are Bullits of which the cultural diversity of the subjects of interaction; social orientation; interpretation and construct),
- methods (are Bullits of which emotional insight, actualization of visual images, identification, observation and analysis, blaze-method by I.V. Alekseeva);
- organizational forms and conditions of formation of UC-5 (individual, group, frontal) (Alekseeva et al., 2017).

Diagnostic-effective cluster of formation of universal competence of intercultural interaction by means of fine arts is built on the basis of criteria of effectiveness of formation of components of intercultural interaction among students.

The level of readiness (initial, basic, advanced) for intercultural interaction by means of fine arts with representatives of different peoples is indicated in Table 1. This is the content component of the criteria for determining the quality characteristics.

The proposed criterion apparatus is used when it is necessary to determine the qualitative characteristics of the components of the process of intercultural interaction, which is the basis for a holistic diagnosis of the level of formation of intercultural interaction.

**Table 1.** Criteria and indicators of components of intercultural interaction of students by means of fine arts

Criteria	Bullits (indicators)
Cognitive	- a set of knowledge on the basis of which the universal competence of intercultural interaction is formed - ability to interpret code systems of different cultures on the example of fine arts; - the presence of a high General cultural and spiritual and moral level of personality; - orientation in the artistic-figurative, semantic sphere of fine art
Emotional-evaluative	- Emotional response to a work of fine art as a means of intercultural interaction with interpretation of their feelings and emotions in the perception of works of fine art by verbal means; - ability to associative perception, artistic generalization, comparison, analysis and synthesis of impressions; - establishing emotional links between art and life in a multipolar world; - conflict-free interaction of personal and mass communication by means of fine arts.

Motivational-communicative	<ul style="list-style-type: none"> <li>- The desire to identify the internal needs of intercultural interaction on the basis of non-verbal communication of fine arts;</li> <li>- the need to study the code systems of different cultures in works of fine art;</li> <li>- sustainable motivation to achieve intercultural interaction, which is expressed in a sense of satisfaction from the interpretation of fine arts and intercultural interaction with representatives of different cultures;</li> <li>- attitude to the visual arts as a way of intercultural interaction by means of non-verbal communication.</li> </ul>
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The following stages: 1 – informational, 2 – educational, 3 – reflexive-evaluation (analytical) is the stages of the process of universal competence development intercultural interaction of bachelors by means of fine arts.

Indicators and descriptors of the universal competence of intercultural interaction by means of visual arts are developed in accordance with the modern requirements of the new 3++ educational standards and are presented in [Table 2](#).

**Table 2.** Indicators and descriptors of universal competence of intercultural interaction by means of fine arts

UC-5	Able to perceive the intercultural diversity of society in socio-historical, ethical and philosophical contexts.			
Stages of assimilation levels	Distinguishing features of descriptors			
	Know	Be Able	To Own	Score in points
UC-5.1. Adaptive	<ul style="list-style-type: none"> <li>- national characteristic culture and arts different peoples, ethnicities and confessions;</li> <li>- features of fine art as a means of nonverbal communication</li> </ul>	<ul style="list-style-type: none"> <li>- to apply the basic theoretical provisions of culture and art of different peoples, ethnic groups and confessions in the process of conflict-free intercultural interaction.</li> </ul>	<ul style="list-style-type: none"> <li>- possess the skills of solving communication problems by means of fine arts;</li> <li>- possess the ability to perceive the visual arts as the intercultural diversity of society.</li> </ul>	1-50
UC-5.2. Base	<ul style="list-style-type: none"> <li>- national features of culture and art different peoples, ethnicities and confessions;</li> <li>- features of fine art as a means of nonverbal communication;</li> <li>- ways of perception of intercultural diversity of society in the sphere of fine arts;</li> <li>- principles of conflict-free interaction of personal and mass communication by means of fine arts.</li> </ul>	<ul style="list-style-type: none"> <li>- apply the basic theoretical provisions of culture and art of different peoples, ethnic groups and faiths in the process of intercultural interaction;</li> <li>- interpret visual art in the context of intercultural interaction</li> </ul>	<ul style="list-style-type: none"> <li>- possess the skills of solving communication problems by means of fine arts;</li> <li>- possess the ability to perceive the visual arts as a cross-cultural diversity of society;</li> <li>- possess the ability of conflict-free coexistence in a multicultural society</li> </ul>	51-80

UC-5.3. Advanced	<ul style="list-style-type: none"> <li>- national characteristic culture and arts different peoples, ethnicities and confessions;</li> <li>- features of fine art as a means of nonverbal communication;</li> <li>- ways of perception of intercultural diversity of society in the sphere of fine arts;</li> <li>- principles of conflict-free interaction of personal and mass communication by means of fine arts.</li> </ul>	<ul style="list-style-type: none"> <li>- apply the basic theoretical provisions of culture and art of different peoples, ethnic groups and faiths in the process of intercultural interaction;</li> <li>- interpret visual art in the context of intercultural interaction</li> <li>- identify cross-cultural diversity of society in the socio-historical, art-historical, ethical and philosophical contexts.</li> </ul>	<ul style="list-style-type: none"> <li>- possess the skills of solving communication problems by means of fine arts;</li> <li>- possess the ability to perceive the visual arts as a cross-cultural diversity of society;</li> <li>- possess the ability to take into account cultural traditions, ethnic groups and faiths, including world religions, philosophical and ethical teachings;</li> <li>- possess the ability of conflict-free coexistence in a multicultural society</li> </ul>	81-100
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Quality criteria for the level of universal competences of intercultural interaction (Table 3) developed on the basis of criteria and indicators are components of intercultural interaction of students by means of fine arts (Table 1) and indicators and descriptors of universal competences of intercultural interaction by means of fine arts (Table 2).

It should be noted that in determining the criterion apparatus of the quality of formation of universal competence of the UC-5, the following requirements to the criteria were taken into account. First of all, the criteria are revealed through a set of indicators of manifestation and their levels. Based on this, it is possible to judge the degree of severity of these indicators. Note that only the manifestations of the criterion qualities are measurable, despite the fact that the qualities themselves are immeasurable.

**Table 3.** Criterion apparatus of quality universal competence of formation and development intercultural interaction of bachelors by means of fine arts

Levels/criteria	Adaptive	Basic	Advanced
cognitive	Low level of knowledge, on the basis of which the universal competence of intercultural interaction is formed - low level of ability to interpret code systems of different cultures on the example of fine arts;	Sufficient level of knowledge on the basis of which the universal competence of intercultural interaction is formed - sufficient level of ability to interpret code systems of different cultures on the example of fine arts; - availability of sufficient cultural and spiritual and moral level of the person;	strongly pronounced the set of knowledge on the basis of which the universal competence of intercultural interaction is formed - pronounced ability to interpret code systems of different cultures on the example of fine art; - the presence of a high cultural and spiritual and moral level of personality; - orientation of a high level in the artistic, figurative, semantic sphere of fine art

emotional- evaluative	<ul style="list-style-type: none"> <li>- Low level of emotional response to a work of fine art as a means of intercultural interaction with the interpretation of their feelings and emotions in the perception of works of fine art by verbal means;</li> <li>- low-level ability to associative perception, artistic generalization, comparison, analysis and synthesis of impressions;</li> </ul>	<ul style="list-style-type: none"> <li>- A sufficient level of emotional response to the work of fine art as a means of intercultural interaction with interpretation of their feelings and emotions in the perception of works of fine art by verbal means;</li> <li>- sufficient level of ability to associative perception, artistic generalization, comparison, analysis and synthesis of impressions;</li> <li>- sufficient level of conflict-free interaction of personal and mass communication by means of fine arts.</li> </ul>	<ul style="list-style-type: none"> <li>- A pronounced emotional response to a work of fine art as a means of intercultural interaction with interpretation of their feelings and emotions in the perception of works of fine art by verbal means;</li> <li>- pronounced ability to associative perception, artistic generalization, comparison, analysis and synthesis of impressions;</li> <li>- establishing a high level of emotional connections between art and the life of the multipolar world;</li> <li>- pronounced conflict-free interaction of personal and mass communication by means of fine arts.</li> </ul>
motivational and communicative	<ul style="list-style-type: none"> <li>- Low level of desire to identify the internal needs of intercultural interaction on the basis of non-verbal communication of fine arts;</li> <li>- low level of need to study code systems of different cultures in works of fine art;</li> </ul>	<ul style="list-style-type: none"> <li>- Sufficient level of aspiration to reveal internal needs of intercultural interaction on the basis of nonverbal communication of fine arts;</li> <li>- sufficient level of need for the study of code systems of different cultures in works of fine art;</li> <li>- a sufficient level of attitude to the visual arts as a way of intercultural interaction by means of non-verbal communication</li> </ul>	<ul style="list-style-type: none"> <li>- A pronounced desire to identify the internal needs of intercultural interaction on the basis of non-verbal communication of fine arts;</li> <li>- a pronounced need to study the code systems of different cultures in works of fine art;</li> <li>- high degree of sustainable motivation to achieve intercultural interaction, which is expressed in a sense of satisfaction from the interpretation of fine arts and intercultural interaction with representatives of different cultures;</li> <li>- a pronounced attitude to the visual arts as a way of intercultural interaction by means of non-verbal communication</li> </ul>

Thus, the development and implementation of a functionally structured pedagogical model is an important tool for the universal competence of formation intercultural interaction. It is a complete system containing many interrelated elements. It is described the interrelated structural components and reveals their functional values as mechanisms for the formation and development of the UC-5.

The presented pedagogical model of formation acts as an open model, ready for changes in its parameters or elements, with possible completion in connection with the arisen needs or social changes.

The effectiveness of the developed model of formation of universal competence of intercultural interaction by means of fine arts was tested in the course of experimental work.

The first stage of the pedagogical experiment that identifies problems and their diagnostics is covered in this article. It confirms the need to develop and include in the educational process of the University a model universal competence that is aimed at forming and developing of intercultural interaction of bachelors by means of fine arts. This was noted in the article I.V. Alekseeva, A.S. Frolikova, H.A. Koltsova, N.A. Tereshchenko (2019) Improving the Universal Competence of Intercultural Interaction among University Students by Means of Fine Arts: Case Study (Alekseeva et al., 2019). This article is its logical continuation. Here highlights the results of the formative phase of the pilot study, which covered a wider range of different universities.

In addition to Russian universities (Moscow international University, Gzhel state University, southern Federal University), foreign universities took part in the experiment: Shirak state University named after M. Nalbandian (Gyumri, Republic of Armenia), Abkhazian state University (Sukhum, Republic of Abkhazia). In these universities, classes were held on the program "intercultural interaction (art without borders)" as part of a formative experiment. There were studied the traditions of another culture using the communicative means of fine art. Art was the basis of interaction between different peoples in a multicultural society. Through visual art, an artistic and figurative communication process takes place. This process is represented by a certain form of intercultural exchange. The artist translates artistic and figurative codes to the viewer, and the viewer perceives and interprets them. Then the viewer transmits the received information to the surrounding multipolar world. This exchange is perceived as an aesthetic intercultural interaction. A total of 158 students took part in the formative stage of the experiment. The composition of students in the control and experimental groups was approximately the same. The composition of students in the control and experimental groups was approximately the same. There are 78 students in the control group and 80 in the experimental group. Students of both Russian and foreign universities showed an adaptive level of knowledge and skills at the beginning of the formative stage of the experiment. The adaptive level on the basics of intercultural interaction by means of art and culture of other peoples is this insufficient in the multicultural world. The data are presented in Table 4.

**Table 4.** Results at the beginning of the formative stage of the experiment to assess the levels of universal competence of intercultural interaction of bachelors

Group	"There is an effect UC-5.3": the problem is solved	"No effect UC-5.3": the problem is not solved
	Number of test subject	Number of test subject
1 the experimental group 80 people (100 %)	24 (30 %)	56 (70 %)
2 control group 78 people (100 %)	24 (30,8 %)	54 (69,2 %)

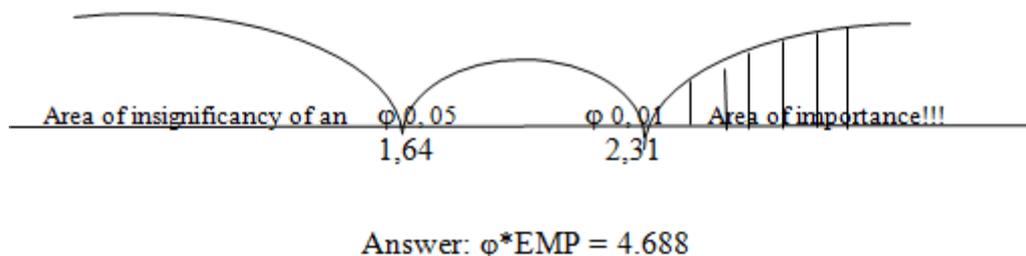
Bachelors of the experimental group showed an advanced level of mastery of the UC-5 at the final stage of the formative experiment. The level was assessed according to the criteria of quality of universal competence of formation and development of intercultural interaction of bachelors by means of fine arts (Table 3). Because, they were trained according to the pedagogical model universal competence of formation and development intercultural interaction of bachelors by means of fine arts.

**Table 5.** Results of the final stage of the experiment. Assessment of the levels of universal competence of intercultural interaction of bachelors by means of fine arts

Group	"There is an effect UC-5.3": the problem is solved	"No effect UC-5.3": the problem is not solved
	Number of test subject	Number of test subject
1 the experimental group 80 person (100 %)	70 (87,5 %)	10 (12,5 %)
2 control group 78 people (100 %)	43 (55 %)	35 (45 %)

The study used the Fischer angular transformation method. The final result of the forming phase of the experiment is estimated at 87.5 %. Compared to 30 % at the beginning of the forming phase of the experiment. The efficiency of 57.5 % is shown. This confirms the effectiveness of the pedagogical model of formation and development of students' intercultural interactions by means of fine arts at the advanced level of the UC-5.3.

Note that the obtained empirical value  $\phi^*$  is in the significance zone and is equal to 4.688 when  $H_0$  is rejected, which is noted on the significance axis of Figure 2.



**Fig. 2.** The Axis of significance of the formation of universal competence of intercultural interaction of University students by means of fine arts as a pedagogical model

This fact focuses on the need to include in the educational process of the University a pedagogical model of universal competence of formation and development of intercultural interaction of students by means of fine arts. This will solve the most important pedagogical problem.

**4. Conclusion**

The study conducted by the authors confirmed the original hypothesis. It is proved that it is necessary to include in the educational process of higher education institutions an integral pedagogical model of universal competence of formation and development of intercultural interaction of students by means of fine arts. This will increase the effectiveness and quality indicators of the development of universal competence of intercultural interaction.

The results of the study led to the following conclusions.

1. The definitions of the concepts "universal competence", "intercultural interaction", "pedagogical model", "cluster", "Bullit" in the context of this study are considered.
2. A pedagogical model of universal competence of formation and development of intercultural interaction of bachelors by means of fine arts has been developed. It combines interconnected structural clusters a single educational goal. They consist of the following complementary and interrelated clusters: system-forming, motivational-value, organizational-content and diagnostic-effective. Each cluster is treated as a system consisting of specific bullets.
3. Criteria and indicators of components of intercultural interaction of students by means of fine arts are developed.

4. Indicators and descriptors of universal competence of intercultural interaction by means of fine arts are developed.
5. The criterion apparatus of quality of formation of universal competence of intercultural interaction is developed.
6. The necessity of including this pedagogical model in the educational process of the University is proved experimentally. This will give high results of the level of intercultural interaction of bachelors.
7. The results of this study emphasize the effectiveness of this model in both Russian and foreign universities. Since visual art is a means of visual cross-cultural interaction. Visual art is a language of nonverbal communication that is accessible to everyone.

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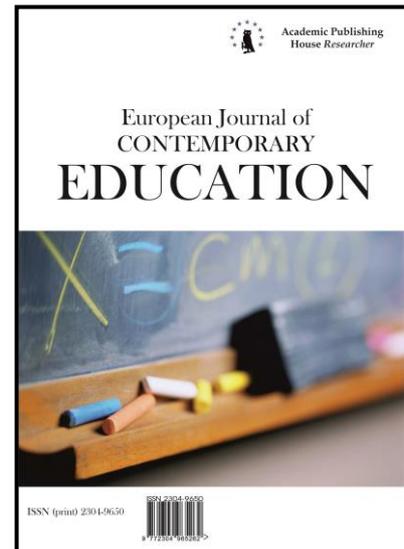
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## Single-Sex School Graduates in the Post-School Mixed-Sex Environment: A Study in Kazakhstan

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### Abstract

The main idea behind single-sex schooling is to reduce the interaction with the opposite sex for better academic, social and emotional development in a belief that this safe environment will eliminate destruction arrived created from opposite-sex classmates. In fact, single-sex schooling results in a decrease in the likelihood of attending the party and having romantic relationships at adolescence (Cardona, Kaufmann, 2017). But, does this perpetuate better outcomes in the short and long run for participants of this schooling type is an abiding interest in many studies? Debates over the pros and cons of single-sex schooling are widespread and some papers are taking an ideological stand, and holding upon polarizing views (Gordillo, 2017). Gordillo (2017) analyzed some meta-analysis studies and found that these papers did not include valuable research papers with opposing findings which give doubtful conclusions.

Most of the existing studies evaluated the academic attainment of single-sex school students and comparative analyses are done to cross-analyze with coeducational students' achievement. This paper, on another hand, focuses on how single-sex school graduates find it challenging their relationship with the opposite sex in mixed-sex spaces in the post-school period. This study particularly focused upon challenges in relationships with individuals of the opposite sex at university, work-space and with the spouse. The study is taken place at Kazakhstan's educational foundations which run both single-sex and coeducational schools. Findings reveal graduates of single-sex schools have not faced significant challenges in relationships with the opposite sex at university, work-space, and spouse compared to coeducational school graduates.

**Keywords:** single-sex education, relationship with the opposite sex, family formation.

### 1. Introduction

One of the reasons for the flourishing of single-sex schools and classes especially in the USA is that the scientific discovery of that boys and girls have different brain development and have

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different ways of learning traits. In 2008–2009, there were more than 1,000 coeducational public schools in the USA that had implemented single-sex classes in their offerings and more than 100 public single-sex schools for boys and girls (Klein, 2012). One of the pioneers of this doctrine is Leonard Sax – a physician and psychologist who founded the National Association for Single-Sex Public Education and runs teacher training sessions nationally (Sax, 2005). Another pioneer is Michael Gurian, an author of a book titled “The Boys and Girls Learn Differently: Action Guide for Teachers” who established the Gurian Institute that trains teachers on gender-based pedagogy (Gurian, 2003). Both of these scientists advocate a single-sex form of education as a model to pursue. However, the Association for Psychological Sciences with their six cognitive scientists counter-argued claims set by Sax and Gurian and conclude that there is no difference in brain functioning and development, and further argued single-sex schooling is not necessary (Halpern, 2007).

It is interesting to note that there are single-sex kindergartens in the USA which were established in the popularity of sex segregation in education. Diehm (2009) took up a doctoral study to evaluate the effectiveness of a single-sex form of education at the kindergarten level, with finding as weak effectiveness of segregated education. Many studies analyzed the academic achievement of students at the primary school level (Malik, Mirza, 2014; Pilson, 2013, O’Neill, 2011; Hopkins, 2001) mostly with findings of no difference in achievements. There are several studies to compare achievements at the secondary school level: Lee, Niederle & Kang (2014) with no difference in findings, Houtte (2004) pro coeducational findings, and Thom (2006) with pro-single-sex education findings. Some studies focused on how single-sex schooling affects performance at a university: Kocak (2019b) with mixed findings and Park, Behrman & Choi (2012) with pro-single-sex education findings.

Besides focusing on academic achievements at different educational levels, some studies focused upon comparing subject-wise achievement, especially in mathematics and science (Prendergast, O’Donoghue, 2014; Sikora, 2013; Doris et al., 2012). It is believed that single-sex education has a positive effect on minority and economically disadvantaged children, and many single-sex schools and classes were established in the USA to improve the academic attainment of these social groups (Green, 2015; Dwart, 2014; Hubbard, Datnow 2005). Studies were also conducted on personality traits like self-esteem and self-concept (Dhar, 2016; O’Neill, Guerin, 2010). For a long-term effect of single-sex schooling upon family formation and work-space achievement researchers generally used available secondary longitudinal research data (Cardona, Kaufmann, 2017; Sullivan et al., 2010, 2011, 2012; Woodward et al., 1999).

There is a vast number of studies performing comparative analyses between single-sex and coeducational students’ performance and personality traits. To be able to understand overall pro-single-sex or coeducational result there are meta-analyses which have collected all related studies, after shortlisting through filtering criteria remained studies were classified into pro-single-sex or not (Mael et al., 2005). In the literature review, the focus will be given to meta-analyses studies and researches conducted to analyze the long-term effects of single-sex schooling.

### **Objectives of the Study:**

1. To study the effect of single-sex schooling on the level of challenges faced in relationship with the opposite sex in mixed-sex post-school environments. Particularly with groupmates at university, colleagues at the workplace and spouse.
2. To develop policy analyses for educational foundations that run single-sex schools for gifted children in Kazakhstan.

### **Research Questions of the Study:**

1. Do graduates of single-sex schools find it equally challenging in relationships with opposite-sex individuals; groupmates at university, colleagues at the workplace and spouse?
2. Do male graduates of single-sex schools find it equally challenging in relationships with opposite-sex individuals; groupmates at university, colleagues at the workplace and spouse?
3. Do female graduates of single-sex schools find it equally challenging in relationships with opposite-sex individuals; groupmates at university, colleagues at the workplace and spouse?

### **Hypotheses:**

H1: Single-sex school graduates face more challenge to study along with students of opposite-sex in mixed-sex university

H2: Single-sex school graduates face more challenges to work along with personnel of opposite-sex in mixed-sex work-space.

H3: Single-sex school graduates face more challenges to adapt to the gender psychology of spouses.

### **2. Literature Review**

In 2005, a group of researchers conducted a resourceful systematic study for the US Department of Education on the effectiveness of single-sex education. The study was held by authors Mael, Alonso, Gibson, Rogers, and Smith from the American Institute of Research. The study aimed to analyze if single-sex education had a positive effect on academic accomplishments, socioemotional development, gender inequity and school climate or culture that may have an impact on performance. This study was necessary to know the outcome of single-sex schooling from a summary of existing research in a time when demand for single-sex schools and single-sex classrooms were growing in the public domain in the USA.

As a part of the systematic study, the 2,221 existing studies were located from electronic databases through exhaustive search. The studies had to be carried out in Westernized nation and the language of the paper had to be in English for proper coding. For final review the initially collected studies had to go through three phases of shortlisting under a certain set of criteria and most importantly studies opted to be empirical quantitative studies with proper statistical tests applied, hence few good qualitative papers also were included in the final list. Just one criterion which is the study to be experiential was dropped aside.

*“According to the guidelines of the WWC (What Works Clearinghouse), all studies other than randomized controlled trials, quasi experimental designs (QED) with matching, or regression discontinuity designs would be excluded prior to Phase III. Under the WWC criteria for inclusion, virtually all single-sex studies would have been eliminated from the review process because of the lack of experimental research on this topic. Therefore, for this review, a conscious decision was made to relax these standards and include all correlational studies that employed statistical controls.”* (Mael et al., 2005, p. xi).

At the shortlisting process, 40 studies passed through all requirements and remained for review, from 40 studies 112 findings have been derived as some papers took up research from multiple angles. In the last stage, the studies were scrutinized under the criteria of sample characteristics, psychometric properties, internal validity, effect, and bias. The shortlisted studies were brought under one of four categories: Supporting Single-sex, Supporting Coeducation, Null, and Mixed.

*“If a study’s findings all supported SS (Single-sex) schooling for a given outcome variable, it was coded as “Pro SS”. If the study’s findings all supported coeducational for a given outcome variable, it would be coded “Pro CE (Coeducation)”. A study was coded “Null” if for all findings regarding that outcome variable, there were no differences between the SS and CE schools. A study was coded “Mixed” if the study had significant findings in opposite directions for different subgroups on the same variable.”* (Mael et al., 2005, p. xii).

For Concurrent Academic Accomplishment outcomes, the 43 findings were derived, 15 (35 %) findings revealed Pro Single-sex output, 1 (2 %) Pro Coeducation, 23 (53 %) were Null and 4 (10 %) with Mixed result. The single-sex schools had shown higher accomplishment in terms of Concurrent Academic Accomplishment which covered areas of All-Subject, Mathematics, Science, Verbal/English, Social Studies Achievement Test Scores and Total Grade. In terms of Long-Term Academic Accomplishment outcomes 4 findings were shortlisted, 1 finding (25 %) was Pro Single-sex, 0 (0 %) Pro Coeducation, 3 (75 %) Null and 0 (0 %) with Mixed result. Long-Term Academic Accomplishment covered achievements in Postsecondary Test Scores, College Graduation, and Graduate School Attendance. Just 4 shortlisted studies in this angle reveal very few studies have been carried out in post-school (university) academic performance.

The systematic study also took place on Concurrent Adaptation and Socioemotional Development outcomes which covered field of studies as Self-concept, Locus of Control, School Track/Subject Preference, Educational Aspirations, Career Aspirations, Delinquency, Attitudes

Toward School, Time Spent per Week on Homework and Attitudes Toward Working Women. Out of 49 findings, 22 (45 %) was Pro Single-sex, 5 (10 %) Pro Coeducation, 19 (39 %) Null and 3 (6 %) with Mixed results. The findings reveal the Pro Single-sex stance in these outputs.

The next set of outcomes was under Long-term Adaptation and Socioemotional Development heading which embarrassed achievements in School Completion, Postsecondary Success, Postsecondary Unemployment, Eating Disorders, Choice of College Major, Sex-Role Stereotyping, Political Involvement and Percent Married to First Spouse. The total 10 findings distributed as 5 (50 %) Pro Single-sex, 2 (20 %) Pro Coeducation, 3 (30 %) Null and 0 (0 %) with Mixed category. In this sphere also single-sex students stood out slightly better than coeducational students.

Perceived School Culture heading combined Climate for Learning, Opportunities for Leadership Roles and School Environment outputs. This set of outputs had 4 findings with 2 (50 %) Pro Single-sex, 0 (0 %) Pro Coeducation, 2 (50 %) Null and 0 (0 %) Mixed results. The last heading Subjective Satisfaction combined two outputs namely Satisfaction with School Environment and College Satisfaction. This outputs had 2 findings 1 (50 %) Pro Single-sex, 1 (50 %) Pro Coeducation, 0 (0 %) Null and 0 (0 %) Mixed. The last two sets of outputs also reveal a slight higher Pro Single-sex school position.

In total, there are 32 outputs with 112 findings, 46 (41 %) Pro Single-sex, 9 (8 %) Pro Coeducation, 50 (45 %) Null and 7 (6 %) with Mixed findings. In general terms, single-sex school students outperformed coeducational students in this systematic review study. It should be noted that just one output Percent Married to First Spouse with one finding (study) covered relationship with opposite-sex in the post-school scenario. There is a dearth of study at this angle and this particular paper aims to bridge the gap in this area of study.

Mael et. al (2005) were interested to analyze studies carried on teenage pregnancy, college performance, differential treatment by teachers, parental satisfaction, bullying in schools, and teacher satisfaction; hence, there were too few papers in this end and these aspects were not covered. Authors also suggest studies to be carried out in the future on the effect of single-sex schooling in work-related long-term outcomes such as job performance, leadership performance, mixed-sex work team performance, performance and leadership in volunteer associations, job involvement, and organizational commitment.

Cardona and Kaufmann (2017) took up research about the effect of single-sex schooling on individuals' marriage and family outcomes and the study was based in the UK. Historically, the UK has a rich history of single-sex education and still, this educational type finds its place in the country despite quite a decrease over the past decades. Cardona and Kaufmann (2017) mention that at present in the UK, 5 % of girls and 2.7 % of boys are educated in this schooling type. Cardona and Kaufmanns (2017) in this study aimed to analyze if the limited interaction with the opposite sex during school years in single-sex schools has long-term effects, particularly family formation and its outcome.

Cardona and Kaufmann (2017) to answer the research questions took up the existing secondary data of the 1958 National Child Development Study (NCDS) conducted in the UK. 1958 NCDS is a long term multidisciplinary research which over the years researched children born during the same one week of March in 1958. This longitudinal research aimed to project the population for better policymaking, thousands of studies have been conducted on availed data. Over a period of years, the cohort group was observed, interviewed and cognitive and non-cognitive tests were conducted to avail as much data as possible.

*"The data is extremely rich in terms of individual and family characteristics (among many others, family size and sibling composition, parents' education, occupation, interest in the education of their children, marital status, religion, ethnicity etc.), measures of children's cognitive and non-cognitive skills, information on children's health, early development and physical appearance (including height, weight and questions on the child's attractiveness answered by teachers)." (Cardona, Kaufmann, 2017: 2)*

The 27 % of the shortlisted cohort group consisting of 11,156 individuals went to single-sex schools at the age of 16, giving a quite good number for comparative analyses. This shortlisted number is from an initial total of 17,416, the decrease is due to the elimination of individuals from Scotland as there is a different education system and as well non-response appeared over the years. The single-sex schools tend to enroll higher-performing children or children of the higher socio-

economic class group. In fact, many studies conclude that individuals with academic and economic privilege have a better opportunity in family formation.

The main data for this study came from an interview conducted with the cohort group at the age of 42. Variables included information as “ever having been married or cohabiting”, “the likelihood of being separated or divorced” and “the likelihood of having any children”. The findings revealed for male single-sex schooling had a negative effect on “ever having been married or cohabiting”. For female single-sex participants, there is no significant difference in the same variable with their counterparts from coeducational schools. In term of “the likelihood of being separated or divorced” the male coming from single-sex schooling have a negative result in this angle also. Again as the previous variable in this angle also there is no difference between females coming from two schooling types. And in the third variable “the likelihood of having any children” there is no difference between both male and female groups.

Alice Sullivan, Heather Joshi and Diana Leonard together drafted three research papers in 2010, 2011 and 2012 on the effects of single-sex schooling. In all three studies, the 1958 NCDS longitudinal data was used as done by Cardona and Kaufmann (2017). The focus of Cardona and Kaufmann’s (2017) research was mainly marriage aspects and however, Sullivan, Joshi, and Leonard took up many dimensions of both short and long-term effects of single-sex schooling. The 1958 NCDS study did not include children were born in North Ireland. As it has been discussed previously, this study is also of significance as the sample group of 1958 can project the entire population, hence the data set has shortcoming from the angle of single-sex schools is meant for academically advanced children or these are private fee-paying institutions which are selective in nature. At the age of 16 among single-sex school goers, 78 % attended Private schools and 13 % at Comprehensive schools. Private schools are fee-paying schools or grant-based schools, and Comprehensive schools are schools for the neighborhood with general participation without any selective process. These studies lack in terms of “like with like” principles, hence these are among few quality pieces of research with comprehensive data on the long-term effects of single-sex schooling.

Sullivan, Joshi and Leonard, in a 2010 study, took up the effect of single-sex schooling on academic outputs at different ages. The conclusions are as follows (i) at the age of 16 in 1974 girls attending girls-only school showed significantly better results compared to girls from coeducational schools at O-level exam, there was no difference male students’ achievement (ii) at the age of 18 in 1976 there was no significant difference between single-sex students and coeducation students’ performance including both sexes at A-level exam (iii) at the of 33 in 1991 the 25 % men hailing from boys’ schools, 11 % of coeducated men, 21 % of girls’ school women and 7 % of coeducated women received degrees, the finding shows significant pro-single-sex education difference on gaining degree in adulthood, (iv) at the age of 42 in 2000 the cohort group was tested on basic reading and innumeracy skills, and the findings revealed the shortcoming is not due to single-sex education (v) at the age of 46 in 2004 the variable was on lifelong learning particularly any sort, of course, being taken in last 4 years, and the finding showed there is no association between course enrolment and schooling type.

Sullivan, Joshi, and Leonard, in 2011, studied the effect of single-sex schooling on labor market outcomes at the age of 42. According to analyzes for males, there is no effect of single-sex schooling on labor market success even though single-sex participants were of academic or socio-economic privilege. There is an advantage for women coming from single-sex schooling, they received a pay premium of about 5 % compared to coeducated women. Hence single-sex schooling does not have a significant effect on women to work in male-dominated jobs, there is no significant difference.

The last research conducted by Sullivan, Joshi and Leonard in 2012 is focused upon social and family outcomes, similar to Cardona and Kaufmann’s study in 2017, and both of these studies used the same data. Sullivan, Joshi and Leonard in 2012 (ibis) conclude, as Cardona and Kaufmann’s (2017) finding, that male single-sex school graduates are disadvantaged in divorce, and no difference in childbearing variables. However, surprisingly, in terms of getting married, these two group of authors differ on findings, Cardona and Kaufmann (2017) conclude negative finding for male single-sex school graduates but Sullivan, Joshi and Leonard (2012) results show no difference among single-sex male; this is due to applying two different statistical tools in identifying difference. In terms of other outcomes, there is no difference between women attended single-sex and coeducation on malaise (mental health) at the age of 42, hence there is a negative effect for men who attended all-boys selective schools. Another interesting variable is on the quality

of relationship with the spouse, both men and women coming from segregated education are more likely to express their relationship as extremely happy.

The last study for review is by Woodward, Fergusson and Horwood (1999) who have conducted research in New Zealand. The data used for analyzes is secondary longitudinal data of the Christchurch Health and Development Study. This multidisciplinary research is a collection of lifelong data of 1,265 children (635 males; 630 females) born in the Christchurch urban region over a four-month period during 1977. Similar to 1958 NCDS research this study also collected data on sample groups through various means over period years till age 18, particularly “parent interviews, teacher assessments, medical records, standardized tests and interviews with the children” (ibid, p. 5). The children who have done schooling in single-sex format were accounted to be 37.6 % and a statistically significant majority of the single-sex school were private non-state funded schools, making single-sex schooling in New Zealand selective in nature. The findings of the study are single-sex school students (i) performed significantly better in national School Certificate examinations, (ii) demonstrated higher Burt reading test scores, (iii) were less likely to leave school early, (iv) were less likely to leave school without qualifications, (v) were less likely to have been unemployed by the age of 18 years. The achievements of single-sex students were evident both for boys and girls.

### **3. Materials and Methods**

The place of study is Kazakhstan, and particularly, at schools run by Bilim-Innovation International Educational Foundation and Bilim-Orda International Public Fund. Kocak (2019b) performed an in-depth study on these two sister organizations and its schools by taking an interview from the president and school directors and performing content analyses. The foundation runs jointly 28 high schools for gifted children, and these high schools for gifted children distributed as follows: 19 all-boys, 8 all-girls and just one coeducational high school. The foundations also run two coeducational vocational high schools, two coeducational international schools and university.

The two educational foundations graduated almost 20,000 from its schools. To know a statistically significant sample size, the sample size calculator from the SurveyMonkey platform was utilized. The 377 sample size is an optimal size for a 20,000 population with a 95 % confidence level and a 5 % confidence interval (margin of error). To the online survey, the 540 graduates responded, through filtering process 523 remained at hand. The total response of 523 is greater than the statistically significant sample size of 377.

Google Forms software was used to create an online questionnaire. Through “URL shortener” software the link for the online questionnaire was shortened and was sent to alumni coordinators of the schools through WhatsApp. Alumni coordinators forwarded the link to the graduates through the same instant messaging software of WhatsApp. The questionnaire was available from 4th February, 2019 till 14th March, 2019, for the duration of 40 days.

The questions were designed on a Likert scale with answer options “Very much easy” (+2), “Easy” (+1), “Neutral” (0), “Difficult” (-1) and “Very much difficult” (-2). The questions were raised as “How challenging it was to ....?”.

Table No. 1 displays the frequency distribution of respondents, the descriptive analysis of the results was achieved by Google Sheets and Minitab software. Table 2 displays an inferential analysis of the collected data. The ANOVA test was applied to compare the statistical difference between the groups. The Minitab statistical software was used in testing the hypothesis of results. The “\*” indicates the statistical significant difference with an alpha value of “0.05” and “\*\*” indicates the highly statistical significant difference with an alpha value of “0.01”.

**4. Data analysis**

**Table 1.** The frequency distribution of demographic data

Variable	Category: Frequency	Percentage
Gender	Male: 368 Female: 155	70.4 % 29.6 %
Age	N: 523 Mean: 27.792 Minimum: 17.000 Maximum: 40.000	100 %
School	Boys' High School: 325 Girls' High School: 122 Vocational College: 62 Coeducational High School: 12 Coeducational International School: 2	62.1 % 23.3 % 11.9 % 2.3 % 0.4 %
Schooling Type	Single-sex: 447 Coeducational: 76	85.5 % 14.5 %
University graduation	Graduated: 420 Pursuing: 92 Not graduated: 11	80.3 % 17.6 % 2.1 %

**Inferential analysis of collected data**

Table 2 displays inferential analysis for H1 (Single-sex school graduates face more challenges to study along with students of opposite-sex in mixed-sex university). The test compares just among respondents who have graduated or pursuing an undergraduate programme at higher educational institutions.

**Table 2.** The inferential analysis of H1

Category	Factors	N, Mean, StDev	P-Value
All (N: 512)	Coeducational school Single-sex school	74 1.041 1.232 438 0.7991 1.1484	0.099
Male (N: 361)	Coeducational school Single-sex school	41 0.951 1.264 320 0.8344 1.1368	0.541
Female (N: 151)	Coeducational school Single-sex school	33 1.152 1.202 118 0.703 1.179	0.057
All single-sex (N: 447)	Male Female	121 0.678 1.178 326 0.8313 1.1472	0.212

Table 3 displays inferential analysis for H2 (Single-sex school graduates face more challenges to work along with personnel of opposite-sex in mixed-sex work-space). The test compares just among respondents who have ever worked along with personnel of opposite-sex in mixed-sex work-space.

**Table 3.** The inferential analysis of H2

Category	Factors	N, Mean, StDev	P-Value
All (N: 425)	Coeducational school Single-sex school	45 1.200 1.120 380 0.9816 1.1027	0.210
Male (N: 311)	Coeducational school Single-sex school	27 1.111 1.121 284 1.0176 1.1135	0.677
Female (N: 114)	Coeducational school Single-sex school	18 1.333 1.138 96 0.875 1.069	0.101
All single-sex (N: 380)	Male Female	96 0.875 1.069 284 1.0176 1.1135	0.274

Table 4 displays inferential analysis for H3 (Single-sex school graduates face more challenges to adapt to gender psychology of spouse). The tests compare just among respondents who are married or divorced at present.

**Table 4.** The inferential analysis of H3

Category	Factors	N, Mean, StDev	P-Value
All (N: 308)	Coeducational school Single-sex school	35 1.057 1.027 273 0.8571 1.0837	0.302
Male (N: 226)	Coeducational school Single-sex school	22 0.909 1.109 204 0.9118 1.0467	0.991
Female (N: 82)	Coeducational school Single-sex school	13 1.308 0.855 69 0.696 1.180	0.079
All single-sex (N: 273)	Male Female	69 0.696 1.180 204 0.9118 1.0467	0.153

### 5. Findings

1. In terms of facing the challenge to study along with students of opposite-sex in mixed-sex university, there is no statistically significant difference between graduates of single-sex and coeducational schools. And there is also no statistical difference between female and male graduates of single-sex schools.

2. In terms of facing challenge to work along with personnel of opposite-sex in mixed-sex work-space, there is no statistical significant difference between graduates of single-sex and coeducational schools. And there is also no statistical difference between female and male graduates of single-sex schools.

3. In terms of opinion about challenge to adapt to gender psychology of spouses, there is no statistically significant difference between graduates of single-sex and coeducational schools. And there is also no statistical difference between female and male graduates of single-sex schools.

## 6. Discussion

Cardona and Kaufmann (2017) revealed that single-sex schooling leads to a decrease in attending a party and having romantic relationships at adolescence and to observe how schooling type effects relationship with opposite-sex after graduation is an interesting study. And through this study's findings, this timely segregation does not lead to gender-based relational challenges.

As Gordillo, 2017 suggests many times debate over single-sex and coeducational educational format takes ideological position and difficult to judge and generalize. This can be observed how Sax and Gurian advocate single-sex education through their scientific discovery of how boys and girls learn differently and also cognitive development differs. And the same view is counter-argued by the Association for Psychological Sciences with opposing scientific discovery (Halpern, 2007), and their argument of there is no need of having segregated education. And hence this particular topic of relationship with opposite-sex in future years is also open for various interpretations.

Mael et. al (2005) conducted a systematic review of literature, to analyze empirical research papers and their findings. Out of 2,221 studies just 40 were shortlisted and comparative analysis was done in 32 outcomes. Hence just one outcome "Percent Married to First Spouse" was dedicated to post-school opposite-sex relationships, this is due to the shortage of research in this area. Mael et. al (2005) also suggested studies to be conducted on the effect of single-sex schooling in work-related long-term outcomes such as job performance, leadership performance, mixed-sex work team performance, performance and leadership in volunteer associations, job involvement, and organizational commitment; which are related to the relationship with opposite-sex in mixed-sex work-space. There are studies on family formation hence studies on working in mixed-sex work-space are negligible. And this particular study hoped to put light on a couple of these angles from Kazakhstan's perspective. However, even more, in-depth studies on these future research suggestions should be carried.

Cardona and Kaufmann (2017) conducted research particularly on the achievement of single-sex school graduates in family formation by using available longitudinal data in the UK. The findings revealed that male single-sex school graduates were disadvantageous in "ever having been married or cohabiting" and "the likelihood of being separated or divorced" in comparison to their counterparts from coeducational schools. There was no difference among female graduates. This study couldn't take this angle as there is no longitudinal data available to compare marriage, separation and divorce. The handful of data collected through the questionnaire was not sufficient.

## 7. Conclusion

Through the findings of this study, it can be concluded that single-sex graduates do not find it more challenging in relationships with opposite sex in post-school mixed-sex spaces, particularly in studying at university, working in the work-place and adapting to gender psychology of spouse. Both single-sex and coeducational school graduates face challenges in opposite-sex in post-school environment hence as noted earlier there is no significant difference between two groups. Overall it can be concluded that there is no negative effect of being educated at single-sex schools for post-school relationship with opposite-sex.

## 8. Suggestions

Parents are encouraged to admit single-sex schools without fear of future challenges of building relationship with opposite-sex. The more study should be carried out in this direction to be able to understand and to draw conclusions on this subject. A particular study to compare single-sex and coeducational schools for gifted children should be carried out. An in-depth study of family formation outcome with various variables will be advised. Effects of educational type on leadership style of mixed-sex work-place managers, will be an interesting research.

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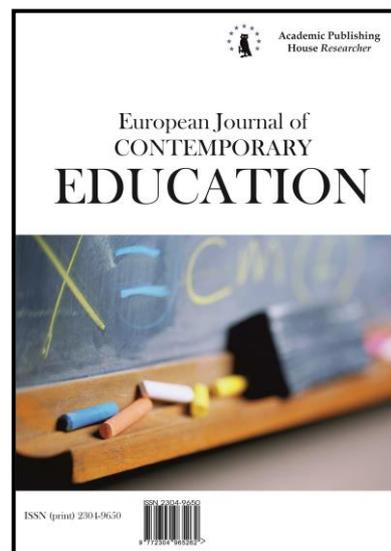
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## Using Data Analysis Methodology to Foster Professional Competencies in Business Informaticians

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### Abstract

This paper addresses the topical issue of searching for optimum technology for fostering professional competencies in a target audience of business informatics students. The authors discuss the relevance of using the competency-based approach in the context of pedagogical goal-setting. The work describes the key stages in a study that involved identifying several areas of activity for business informaticians to focus on in the fields of all-round and deep data analysis and data warehousing. The paper describes the authors' own methodology for helping a student master fundamental algorithms and methods of business analysis. The work shares the findings from the authors' pedagogical experiment on fostering said competencies. The study employed the following methods: analysis, synthesis, formalization, methods of mathematical statistics (Rosenbaum's Q test), and pedagogical experimentation.

**Keywords:** professional competence, business requirements, business informatics, business analytics, data warehouses, professional competencies, knowledge, abilities, skills, data analysis methodology, pedagogical experiment, methods of mathematical statistics.

### 1. Introduction

In present-day society, the professional qualities of specialists in various spheres of activity directly depend on their ability to work with information. Special demands are being placed on specialists working in the area of business informatics.

In most economies, there is an increasing social demand for specialists with sufficient knowledge in the areas of information-analytical processing of large volumes of data, unstructured

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information, and software tools. These are the competencies that must be in the arsenal of business informaticians specifically.

Working with decision support systems, artificial intelligence, and intelligent information technology may require studying the characteristics of the actual process of development of professional competencies.

Professional competence is a determinant of successful performance by a specialist, which is based on the volume of their knowledge and abilities and a fusion of their experience and personal qualities, i.e. all the potential that is crucial to achieving high results in their professional activity and being competitive in the labor market (Tret'yakova, 2010).

Competencies have been structured by a number of researchers, who have offered a range of insightful assessments and inferences in respect of the various types thereof, including P.R. Atutov, S.Ya. Botashev, A.P. Belyaeva, V.S. Bezrukova, A.A. Derkach, E.F. Zeer, D. Mertens, L.M. Mitina, and others.

According to J. Raven, competence is a person's capability to perform effectively a specific action within a specific subject domain, which incorporates narrowly specialized knowledge, special subject skills and ways of thinking, and a sense of responsibility for their actions. The researcher views as 'high-level competencies' a strong sense of initiative and organizational skills, required to achieve the goals set, and a readiness to assess and analyze the consequences of one's own actions (Raven, 1984).

V.A. Izvozchikov views the concept of competence as consisting of the following three major aspects: (1) problem-practical (ability to properly articulate and effectively resolve objectives in a given situation), (2) conceptual (ability to properly conceptualize the situation in a more general context), and (3) value-based (ability to properly assess a situation, goals, and objectives from a standpoint of one's own personal and commonly shared values) (Izvozchikov, 1996).

I.A. Zimnyaya construes competence as a person's intellectually and personally conditioned experience of engaging in social-professional activity, which is based on knowledge (Zimnyaya, 2003).

A.V. Khutorskoi views a competency as a set of qualities required in order to work in a certain line of activity. By contrast, the scholar construes competence as a person's "evolved quality (set of qualities) that incorporates a minimum of experience in a certain area" (Khutorskoi, 2005).

E.F. Zeer conceives of competence to be not so much a large amount of knowledge and experience but a person's capability to make actual use of their amassed knowledge and professional abilities where and when necessary in the course of performing their professional duties (Zeer, 2003).

V.V. Serikov construes competence as a "way of existence of knowledge, abilities, and erudition that facilitates the disciple's self-actualization and helps them find their place in this world" (Serikov, 1999).

The competency-based approach is a methodology for designing and organizing the educational process. Along with the transfer of a body of knowledge, abilities, and skills, it helps ensure the student's personal development and foster in them a broad outlook, an interdisciplinary vision of issues, and a capacity for creative work, self-learning, and the learning of common human values. As a necessary condition for preparing a competitive professional in college, the competency-based approach implies making appropriate changes to strategies of pedagogical goal-setting, selection and construction of the content of learning material, organization of educational activity, and planning and assessment of learning outcomes.

A graduate of the Business Informatics program is a specialist who possesses, at a threshold level, interdisciplinary competencies of a business analyst both in the area of development and application of crosscutting digital technology and in the area of organizational design, consulting, and entrepreneurship (Frolov, Sakhnyuk, 2019).

A work by A.V. Demina and A.I. Bezrukov accentuates the need to make use of the project-based approach, which is aimed at fostering in one the competencies needed to work with an organization's IT infrastructure (Demina, Bezrukov, 2019).

Certain researchers have emphasized the need to foster in business informaticians a clear idea of the place and role of information-analytical technology and software tools in resolving professional objectives, help them build a solid knowledge of terminology, and help them master

appropriate systemic scholarly approaches to structuring large arrays of data (Stepanov, Stepanova, 2014).

It has been suggested that a business informatician will not be able to do without competencies in the area of information-analytical support, forecasting, and risk management. A business informatician must have the ability to implement analytical projects and solutions on optimizing an organization's business-processes (Fursov et al., 2015; Knyazev, 2012; Knyazev, 2011).

## **2. Materials and methods**

The aim of this study was to analyze the use of methodologies for working with data in the educational process for the purposes of fostering business analytics competencies in future business informaticians.

Business analytics is a multidisciplinary area that incorporates information technology, databases, intelligent data processing algorithms, mathematical statistics, and business information visualization techniques.

The study consisted of several stages: (1) identifying business informaticians' key lines of activity in the area of data analysis; (2) identifying a set of competencies required to master the latest data analysis technology, which incorporates the theoretical and practical aspects of data warehousing, knowledge discovery in databases, and data mining; (3) determining the content of the knowledge, abilities, and skills required to develop said competencies; (4) putting together a roster of disciplines aimed at developing a certain pool of knowledge, abilities, and skills; (5) identifying algorithms and methods in business analytics that can help foster said competencies; (6) developing a methodology that will help students master relevant business analysis algorithms and techniques; (7) conducting an experiment on fostering said competencies.

The study employed the following methods: analysis, synthesis, formalization, methods of mathematical statistics (Rosenbaum's Q test), and pedagogical experimentation.

The authors' methodology for the use of data analysis technology was tested at the Krasnodar branch of Financial University under the Government of the Russian Federation. To test the methodology, the authors conducted a pedagogical experiment that engaged third-year students majoring in Business Informatics.

In conducting the study, the authors adhered to a plan for their comparative pedagogical experiment, which included the following steps: (1) form two equivalent groups (the experimental and control groups); (2) conduct a pedagogical experiment; (3) conduct a final testing session and a comparison of the results for both groups – the experimental group, which was exposed to pedagogical impact, and the control group, formed to ensure the experiment's purity and assess the outcomes of the impact on the experimental group.

In the first stage of the comparative pedagogical experiment, the authors conducted the selection and leveling of the control and experimental groups. The total study population numbered 90 individuals (N), all of them being third-year students majoring in Business Informatics. The batch consisted of the following four student groups: (1) 301-BI (25 individuals), (2) 302-BI (22), (3) 303-BI (21), and (4) 304-BI (22). Initially, the groups were formed in a random fashion. The average score on disciplines within the information module of the core part of the curriculum was an indicator that determined the homogeneity of groups within the sample. The average score in terms of student progress on disciplines within the information module was as follows: the 301-BI group – 4.04 points; 302-BI – 3.98; 303-BI – 4.1; 304-BI – 4.10. Based on this, it may be assumed that students in the groups had about the same level of knowledge of information disciplines prior to the experiment. Next, the authors drew the experimental sample from the population. The strategy for putting together the sample implied engaging real groups of students to form the experimental and control groups. To form the experimental group, the authors joined two of the student groups. The same was done with the control group. The groups to join were selected in a random fashion. The groups could be joined if they were found to be homogeneous. To test the groups' homogeneity, the authors calculated Student's coefficients. The Student's t-test value for the groups 301-BI and 303-BI was  $t = 0.284$ . The critical value was  $t_{cr} = 2.021$  ( $\rho = 0.05$ ). Consequently, it was possible to join the two groups, as  $t < t_{cr}$  ( $\rho = 0.05$ ). The experimental group was made up of students from the groups 301-BI and 304-BI.

The Student's t-test value for the groups 302-BI and 303-BI was  $t = 0.1591$ . The critical value was  $t_{cr} = 2.021$  ( $\rho = 0.05$ ). Consequently, these two groups could be joined, as  $t < t_{cr}$ . The control

group was made up of students from the groups 302-BI and 303-BI. The size of the experimental group was 47, and that of the control group was 43 individuals.

The groups had to be joined in order to ensure compliance with the requirements of methods of statistical processing, namely Rosenbaum's Q test, whereby the minimum number of respondents must be 11, and the difference in the number of respondents between the samples must be not more than 10.

In terms of the experiment's modifiable conditions, the authors employed interdisciplinary business cases, which were tackled by students in the experimental group, while those in the control group were given traditional assignments.

As a non-modifiable condition for the conduct of the experiment, the authors employed the same theoretical learning material.

To determine the level of one's baseline knowledge of data analysis, the authors tested respondents in both the experimental and control groups. To measure the level of their baseline abilities and skills, the authors gave them practical assignments.

The second stage of the comparative pedagogical experiment involved exposing the experimental group to pedagogical impact using a data analysis methodology, for the purposes of fostering in them a set of professional competencies in business informatics. Those in the control group were given standard assignments in regular disciplines.

The authors' data analysis methodology deals with fostering business informaticians' professional competencies in the area of big data through having them analyze interdisciplinary business cases based on the following three disciplines within the field's module: Business Analysis Information Technology, Business Information Visualization, and Data Analysis.

Before putting together the assignments, it was necessary to determine a set of special competencies needed for working with big data. To identify these competencies, the authors employed the available accumulated experience of solving various business analytical problems.

As a result, the authors identified the following professional big data competencies needed to conduct quality business analysis:

- ability to collect and consolidate data, use data transformation and cleaning algorithms, and apply the practical aspects of data warehousing;
- ability to conduct analysis, put forth hypotheses, and employ the technologies of knowledge discovery in databases and data mining.

To develop the competency dealing with the ability to collect and consolidate data, use data transformation and cleaning algorithms, and apply the practical aspects of data warehousing, a student needs to know the following: basic principles of data analysis, rules for structuring data, and algorithms for preparing data for analysis. Data warehousing implies knowledge of general principles and key concepts in data warehousing and the various types of data warehouses.

The data preprocessing process, required to organize data warehouses, implies fostering knowledge of the various ways to transform data.

An area of working with data such as visualization implies knowledge of the principles and methods used to present data in such a way as to ensure an efficient workflow and knowledge of the various classifications of visualization techniques.

Data cleaning and preprocessing requires knowledge of the concept of 'quality of data', which implies a collection of data's properties and characteristics that determine the degree to which they are suitable for analysis.

To develop the competency dealing with the ability to conduct analysis, put forth hypotheses, and employ the technologies of knowledge discovery in databases and data mining, students must know the basics of association rules theory, methods of implementing association rule search systems, and hierarchical association rules.

Working with data mining requires knowledge of objectives for clustering, clustering algorithms, and problems with clustering algorithms.

Solving classification and regression problems, which are central in data analysis, requires knowledge of methods for actually solving them.

In terms of the first competency, the one dealing with the ability to collect and consolidate data, use data transformation and cleaning algorithms, and apply the practical aspects of data warehousing, it will help to foster in business informatics students a set of abilities related to relational schemas in data warehousing (e.g., Star and Snowflake). To be able to implement hybrid

technology and fuzzy logic, a student needs to have the ability to put together fuzzy slices or fuzzy queries in relational databases.

Retrieving and transferring data into a warehouse implies the use of ETL software. A student majoring in Business Informatics must have the ability to develop a procedure for retrieving data and the ability to transform data to a certain representation, format, or type that is suitable for a task.

Solving data visualization problems as part of the analytical process requires the following abilities: (1) ability to assess the type and behavior of data, the dynamic range of values, the degree of smoothness, and the presence of factors that may affect the quality of data (e.g., noise, missing or anomalous data, etc.); (2) ability to identify techniques for loading data into an analytical application and parameters that need to be used in that context; (3) ability to employ visualization techniques.

When it comes to the second competency, which deals with the ability to conduct analysis, put forth hypotheses, and employ the technologies of knowledge discovery in databases and data mining, students majoring in business informatics will need to develop the ability to work with association rules, technology for retrieving knowledge, clustering, classification, and regression.

In terms of association rules, a student needs to be able to detect associations between various events and describe quantitatively the reciprocal linkages between them.

Implementing knowledge retrieval technology requires formulating association linkages and using algorithms for generating them. More specifically, this will require the ability to compose hierarchical association rules and use methods of searching for hierarchical association rules. Working with association rules in the context of retrieving knowledge from a data warehouse, most importantly, requires the ability to look for and make use of consistent patterns.

To solve the clustering problem in the field of data mining, students majoring in Business Informatics need to have the ability to assess the distance between objects (Euclidean and Manhattan distances).

Two of the most common problems in data mining are classification and regression. Classification requires the ability to build models that describe a predefined set of classes or categories, including regression ones, and put together rules for subsuming an object under a certain class.

The formedness of abilities, as skills honed to perfection, is what characterizes the degree to which the training has been successful and is the next stage in building the required competencies.

In terms of the first competency, which deals with the ability to collect and consolidate data, use data transformation and cleaning algorithms, and apply the practical aspects of data warehousing, students majoring in Business Informatics need to develop the skill of uploading data into a warehouse.

Loading data requires the ability to add new records and alter existing ones. Adding new records requires comparing this information with the one that is in the warehouse.

During the loading process, one may encounter a number of issues, like, for instance, problems caused by blocked loads or wrong load order, and, in some cases, there may be not enough space in the warehouse. The skills of resolving this kind of issues can be developed only through performing the loading of data into a warehouse multiple times.

Post-load operations include re-indexing and verifying data. From a standpoint of a business analyst's competencies, of the greater importance is the skill of solving the verification problem.

To be able to draw conclusions based on the data in the warehouse, a specialist must be confident of both the reliability and completeness of those data. In this respect, of importance is the acquired skill of enriching data.

Solving academic problems will help develop in students the skills of transforming ordered data for forecasting or grouping purposes. To foster the competency dealing with the ability to conduct analysis, put forth hypotheses, and employ the technologies of knowledge discovery in databases and data mining, it will help to develop in students a set of skills that enable solving professional problems that are typically faced by business analysts.

Solving academic problems on business analysis should help a student acquire the skills of applying association rules. Developing further the ability to assess the distance between objects as part of solving the clustering problem in the field of data mining should help foster in business informatics students the skill of selecting a metric for putting together a cluster model.

Developing further the ability to build a model describing a certain set of classes or categories (a training sample) should help foster the skill of forecasting and determining independent variables (predictors) for the purposes of building a classification model.

Solving a regression problem helps foster the skills of assessing the degree to which a simple linear regression model corresponds to real data, determining the correlation coefficient, assessing the significance of a multiple regression model (F-test), selecting variables in a regression model, and interpreting a regression model.

To help develop in students the required knowledge, abilities, and skills via data analysis methodology, the authors identified the following key stages in the learning process: data sampling, data cleaning, data transformation, data mining, and data interpretation.

The first stage deals with data sampling. At this stage, a student gains knowledge of the principles of data warehousing. This knowledge should foster the ability to develop procedures for retrieving and transferring data into a warehouse. Once the step of developing the data retrieval procedure is completed, it becomes possible to foster the skills of loading data into the warehouse from intermediate applications, having in consideration the hierarchy of applications in the procedure. The skill of adding and altering records is linked with comparing new data with the information that is available. Multiple uploads should help foster the skills of resolving problems with the data warehouse interface.

The second stage deals with data cleaning. At this stage, a student gains knowledge of the quality of data. This knowledge helps foster the ability to assess data based on parameters that are crucial to loading data into the warehouse and the skills of identifying methods for loading data into the application and determining the data's parameters. The data cleaning stage involves post-load operations. At this stage, a student develops the key skills of verifying and enriching data in a specific programming environment.

The third stage is associated with data transformation. At this stage, students acquire knowledge of technology for transforming ordered data. Students can develop the ability to design relational data schemas through working with database management systems (DBMS), based on which data warehouses are built. Implemented databases can be used to foster the ability to put together fuzzy queries in relational databases, which are typical in data warehousing. The ability to transform data is developed through working with tables in a relational DBMS. The use of standard SQL queries helps develop the skills of grouping and sorting data, quantization, obtaining the minimum or maximum value in a group, and obtaining other calculated values. Putting together standard reports in working with a relational database will help develop the skills of fine-tuning data.

The fourth stage deals with data mining. At this stage, the student gains knowledge of objectives for clustering, algorithms for clustering and issues associated with them, and methods of classification and regression. This knowledge will help foster the ability to theoretically detect association linkages and describe them quantitatively.

Working with relational databases helps foster the ability to employ algorithms for generating association linkages and utilize consistent templates for searching the data in various subject areas.

A key capability to foster is the practical ability to build association linkages between objects in a relational database, which forms the basis of clustering in data mining.

In parallel with the ability to resolve the clustering problem in working with relational databases, a student develops the ability to classify objects based on the creation of a training sample. After solving the classification data mining problem, it becomes possible to develop the ability to build a regression model and interpret the coefficients of regression to describe the distribution of the values of the objects' attributes.

Solving business problems based on working with a relational database or a relational data warehouse helps a student develop their skills of conducting market basket analysis, generating frequent itemsets using the standard Apriori algorithm, and identifying metrics for the process of formation of classes.

The fifth stage deals with interpretation. At this stage, a student gains knowledge of the principles of how to present data in order to come up with an effective solution to a business problem. It involves fostering the ability to visualize business information, on the one hand, and the ability to perform modeling and forecasting and determine independent variables, on the other.

Knowledge of the basics of visualization of business information helps develop the ability to employ a range of visualization techniques in the context of presenting analytical information. Normally, the skills of visualization are developed in putting together reports in an application. Modeling implies cultivating the skills of evaluating a resulting model using statistical methods.

The knowledge, abilities, and skills that business informatics students could acquire via the authors' data analysis methodology should help develop the competencies needed to work with big data that are sought after at the present stage in the development of IT technology.

To help foster in students a set of relevant competencies in the use of the latest data analysis technology, the authors designed a set of assignments based on resolving real-life business problems. As an analytical platform, the authors employed the Deductor Academic software package.

The authors developed special crosscutting assignments based on resolving real-life business problems (e.g., creation of data warehouses, OLAP, credit scoring, and bulk mailing optimization). A crosscutting assignment is a business case that implies a linkage between a number of disciplines and consists of several blocks that are tackled in a certain sequence. The assignments of the business case employed in this experiment are outlined below.

The students were asked to solve a business problem that was based on a certain situation that had arisen in an organization. One was to identify critical points in the company's business processes and resolve a set of issues facing the executive team in terms of making tactical decisions. To this end, the students were to collect all the missing information, bring forward a solution hypothesis, develop the structure of a data warehouse, fill the warehouse with data, perform a cleaning of the data, prepare the data for further activity dealing with analysis, perform a data analysis based on data mining techniques, and come up with an effective business decision that could help the executive team resolve the issues facing the organization. The students were asked to answer a set of questions that are typically of concern to the executive team, answers to which could influence the company's overall development. These questions may deal with identifying a category of clients who bring the company the greatest profit. Alternatively, an organization may face a problem such as optimizing the operation of its warehouses in terms of handling leftover items. Trading companies may attach relevance to a problem such as the structure of their sales in different periods. Respondents were to provide answers to the questions based on their work across all the technological stages in data analysis prescribed by the methodology.

The third stage in the comparative pedagogical experiment involved assessing the formedness of the knowledge underpinning a student's competencies in the use of the latest data analysis technology through testing. The outcomes of performing the assignments were an indicator of the formedness of the abilities and skills underpinning the competencies.

### **3. Results**

The authors tested their pedagogical methodology by way of a comparative pedagogical experiment.

Using their methodology the authors exposed to pedagogical impact students in the experimental group. Students in the control group performed standard assignments prescribed by the curriculum. The objective was to have developed in one a set of competencies in the area of big data. The level of developed competencies in students in the experimental group was compared with that in students in the control group.

To measure the level of respondents' knowledge, abilities, and skills, the authors employed a 100-point scale.

The results of the experiment were evaluated by way of assignments offered to the students at its start and end. This helped determine the dynamics of the development in students of the required knowledge, abilities, and skills based on the basic, advanced, and high levels of competence.

Students who scored 50 to 65 points were placed in the basic level group, 65 to 85 points – the advanced level group, and 86 to 100 points – the high level group.

The analysis was conducted on all the three categories of competencies (knowledge, abilities, and skills).

As part of the experiment, Business Informatics students in the experimental group (47 individuals) worked on business cases containing crosscutting assignments in the following three disciplines: Business Analysis Information Technology, Business Information Visualization,

and Data Analysis. Business informatics students in the control group (43 individuals) performed standard assignments in regular academic disciplines.

Figure 1 illustrates the actual results of the authors' pedagogical experiment. The histogram reflects the mean values for the experimental and control group through the lens of the components of the competencies under examination (knowledge, abilities, and skills) before and after the experiment.

In the initial stage (prior to the experiment), the mean values for the resulting points in the experimental and control groups did not have significant differences, with these values not reaching the level required for the basic-level grade.

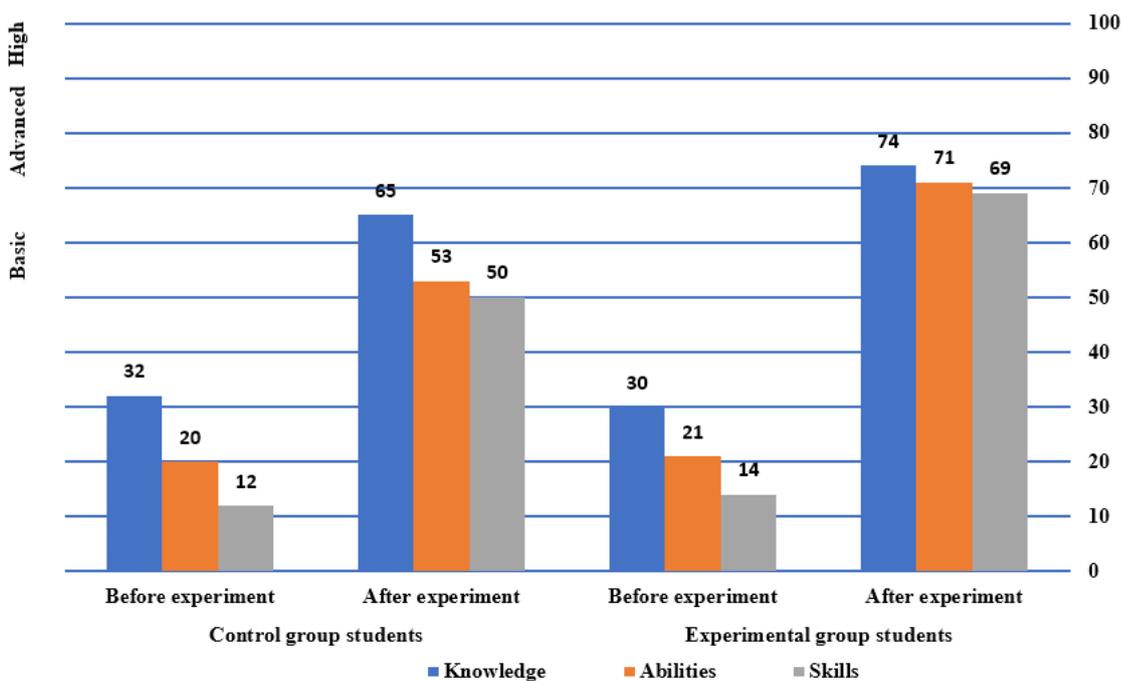
The levels across the categories 'knowledge', 'abilities', and 'skills' were determined based on the points scored. The level of knowledge was determined via special assignments, and that of abilities and skills – via special business problems.

The mean values for the category 'knowledge' were 32 points in the control group and 30 points in the experimental group.

With the category 'abilities', the mean values were 20 points in the control group and 21 points in the experimental group.

With the category 'skills', the mean values were 12 points (the control group) and 14 points (the experimental group).

It may be stated that the knowledge, abilities, and skills acquired by the students previously were not enough for them to be able to answer all the questions and solve all the problems on the business case assignments.



**Fig. 1.** Histogram detailing the results of the experiment

The mean values of scores had differences after the experiment. The average score on the category 'knowledge' in the control group was 65 points, 'abilities' – 53 points, and 'skills' – 50 points.

Table 1 displays the figures on the formedness of competencies in data analysis in students in the control group. With this group, 48.84 % exhibited a basic level, 46.51 % – an advanced level, and 4.65 % – a high level of competence on the category 'knowledge'.

**Table 1.** Results in the Final Stage (after the Experiment) in the Control Group

	Knowledge	Abilities	Skills
Did not reach the basic level (less than 50 points)	0 %	6.98 %	6.98 %
Basic level (50 to 65 points)	48.84 %	88.37 %	93.02 %
Advanced level (66 to 84 points)	46.51 %	4.65 %	0.00 %
High level (85 to 100 points)	4.65 %	0.00 %	0.00 %

The results were somewhat poorer on the categories ‘abilities and ‘skills’. None of the students in the control group was able to reach a high level here, with nearly 7 % unable to reach even a basic level.

With the experimental group, the average score on the category ‘knowledge’ was 74 points, ‘abilities’ – 71 points, and ‘skills’ – 69 points.

Table 2 displays the figures on the formedness of competencies in data analysis in the experimental group. The results demonstrated by this group were higher on all the three categories than those achieved by the control group. There were fewer differences on the category ‘knowledge’, although the number of those who reached a high level was 12.77 % (with the control group, it was 4.65 %). Among those in the experimental group, 2.13 % demonstrated a high level of abilities, with the figure being 0 % with the control group.

**Table 2.** Results in the Final Stage (after the Experiment) in the Experimental Group

	Knowledge	Abilities	Skills
Did not reach the basic level (less than 50 points)	0 %	0 %	0 %
Basic level (50 to 65 points)	14.89 %	21.28 %	40.43 %
Advanced level (66 to 84 points)	72.34 %	76.60 %	59.57 %
High level (85 to 100 points)	12.77 %	2.13 %	0.00 %

To test the statistical significance of the differences in the results, the authors employed Rosenbaum’s Q test. This method makes it possible to compare the figures in two samples and determine if there are differences between them. The number of subjects must be not less than 11, while the difference in the number of subjects between the samples must be not more than 10 (provided that each group numbers not more than 50 subjects). The authors’ experiment met these requirements. The results were compared in the initial and final stages of the experiment.

To test the absence of differences between the resulting values of scores for the control and experimental groups in the initial stage, the authors formulated the hypotheses for each category (‘knowledge’, ‘abilities’, and ‘skills’):

– hypothesis  $H_0$ : the scores achieved by students in the experimental group in the initial stage (prior to the experiment) on the category ‘knowledge’ (abilities and skills) are not higher than those achieved by students in the control group;

– hypothesis  $H_1$ : the scores achieved by students in the experimental group in the initial stage (prior to the experiment) on the category ‘knowledge’ (abilities and skills) are higher than those achieved by students in the control group.

Having determined the empirical values  $Q_{emp}$  for each case, the authors compared the resulting values with the critical values  $Q_{cr}$ . Given that the number of students in each group was higher than 26,  $Q_{cr} = 8$  ( $\rho = 0.05$ ) and  $Q_{cr} = 10$  ( $\rho = 0.01$ ). The resulting empirical values turned to be smaller than the critical ones. For the category ‘knowledge’  $Q_{emp} = 3$ , ‘abilities’ –  $Q_{emp} = 5$ , and ‘skills’ –  $Q_{emp} = 2$ . Based on this, the authors accepted the hypothesis  $H_0$ . Consequently, it may be

concluded that the results obtained in the study's initial stage for the control and experimental groups did not have statistical differences. The groups exhibited a similar level of formedness of knowledge, abilities, and skills in data analysis.

To test the statistical significance of the results in the final stage (after the completion of the experiment), the hypotheses  $H_0$  and  $H_1$  were formulated again:

– hypothesis  $H_0$ : the scores achieved by students in the experimental group in the final stage (after the experiment) on the category 'knowledge' (abilities and skills) are not higher than those achieved by students in the control group;

– hypothesis  $H_1$ : the scores achieved by students in the experimental group in the final stage (after the experiment) on the category 'knowledge' (abilities and skills) are higher than those achieved by students in the control group.

The authors' calculations helped obtain the empirical value for the category 'knowledge' –  $Q_{emp} = 4$ . This value was not higher than the critical value even at  $\rho = 0.05$ , so the hypothesis  $H_0$  was accepted. Based on this, it was concluded that student results on the category 'knowledge' were approximately the same, despite the fact that the average score of students in the experimental group was higher.

The empirical value of the coefficient for the category 'abilities' was  $Q_{emp} = 32$ . Thus,  $Q_{emp} > Q_{cr}$  ( $\rho = 0.01$ ). The authors rejected the hypothesis  $H_0$  and accepted the hypothesis  $H_1$ . Based on this, it was concluded that the results of students in the experimental group were higher than those of students in the control group on the category 'abilities'.

The authors compared the empirical value of the coefficient for the category 'skills', which was  $Q_{emp} = 36$ , with the critical value. On the category 'skills', the conclusion was similar to the previous one – the results of students in the experimental group were higher than those of students in the control group.

#### **4. Discussion**

The authors' comparative pedagogical experiment was conducted under real-life conditions of the educational process in a college, having in consideration the distribution of classes in the schedule. The process's real-life conditions imposed some restrictions on the pedagogical experiment. It was impossible to ensure entirely homogenous conditions for the participants. The educational process's conditions predetermined what the population would be in the experiment – 90 third-year students majoring in Business Informatics. The division of students into groups as part of the learning process prevented the authors from making proper use of the probability sampling of subjects method. The strategy for putting together the sample implied engaging real student groups at an educational institution as the experimental and control groups. The authors attempted to neutralize the factors impacting on experiment results through leveling the experimental and control groups in the first stage of the study. As a criterion for leveling, the authors used the average score on disciplines within the information module of the core part of the curriculum.

The experiment has helped contest statements by certain researchers that the present-day Russian system of higher education is characterized by overall negative objective conditions when it comes to the education of students pursuing a Bachelor's degree in Business Informatics. In this context, researchers I.I. Bobrova, I.Yu. Efimova, and E.G. Trofimov have detected a mismatch between expectations set by employers to college graduates, which typically are high, and the actual level of the latter's abilities and skills, which typically is low. The findings from their experiment indicate that the competency-based approach could well be the way to go in the present-day context of the development of education (Bobrova et al., 2018). In the area of ICT, it may help to employ the technique of developing original competencies for particular areas of activity (e.g., data analysis). These competencies could be fostered within the framework of various disciplines. The approach employed with regard to general competencies for the Business Informatics course seems to have run its course. Trends associated with the predominant use of traditional forms of learning and insufficient use of the latest software and communications tools, likewise, could be overcome through properly formulating competencies for particular areas of activity.

The experiment has also helped substantiate the conclusion drawn by certain researchers about the efficiency of the module-based approach in integrating several disciplines in the training of future specialists. In the view of E.A. Barakhsanova and V.A. Varlamova, the technology of

organizing the educational process ought to be based on modular interdisciplinary integration, factoring in the regionalization principle. The researchers appear to be right in their conclusion that in implementing the competency-based, activity-based, and person-oriented approaches it may help to set new requirements for the content of academic disciplines (Barakhsanova, Varlamova, 2015).

Based on the findings from a study by A.S. Kindyashova, the use of problems-based technology to foster subject competencies should facilitate the achievement of productive levels of competence (Kindyashova, 2016). This process augments the use of software tools and the electronic educational environment (Pereira et al., 2018).

The findings from an experiment conducted by E.M. Vorontsova indicate that the process of fostering information competence in students tends to be characterized by positive dynamics, i.e. there are substantial changes in students' knowledge, abilities, and skills of an information nature, which are supported by special didactic training and the use of electronic resources (Vorontsova, 2015).

The latest research on fostering professional competencies in the subject area of working with big data indicates that competency-based didactics makes it possible to employ the IT tools of business analysis and big data to resolve professional problems (Kuzmina et al., 2019).

Based on the findings from a dissertation-based study by O.G. Lysak, the use of educational cluster technology as a tool for self-teaching within the innovation chain 'science – IT tools – business' helps boost the efficiency of the process of fostering professional competencies in undergraduate students (Lysak, 2019).

## 5. Conclusion

The authors explored some of the key business requirements in the area of business analytics, determined some of the key professional competencies in this subject area, and identified some of the key abilities and skills required to actualize those competencies.

The authors introduced a special data analysis methodology intended to help cultivate said knowledge, abilities, and skills. The methodology involves the following stages: data sampling, data cleaning, data transformation, data mining, and data interpretation. Testing the data analysis methodology helped confirm the authors' conclusion about the efficiency of the competency-based approach in preparing specialists in the IT sphere based on the use of IT technology.

In the experiment's first stage, those in the experimental and control groups did not reach the basic level in terms of their knowledge, abilities, and skills, which figures, as they had just started to study the subject area of data analysis. The results' statistical significance was tested using the non-parametric Rosenbaum's Q test method.

In the final stage, after the completion of the experiment, the authors compared the figures for each category – 'knowledge', 'abilities', and 'skills'. The calculations revealed that this time the figures for the experimental group were significantly higher than those for the control group, with  $Q_{emp} > Q_{cr}$  ( $\rho \leq 0.01$ ), which was fair for the categories 'abilities' and 'skills'. The difference between the figures for the experimental and control groups was linked with the use in the experiment of a pedagogical methodology developed by the authors. The figures for the category 'knowledge' in the control and experimental groups were approximately the same, with the difference in the figures not being statistically significant ( $Q_{emp} < Q_{cr}$  ( $\rho \leq 0.05$ )). This may be explained by the fact that in this subject area professional competencies are mainly fostered based on one's abilities and skills.

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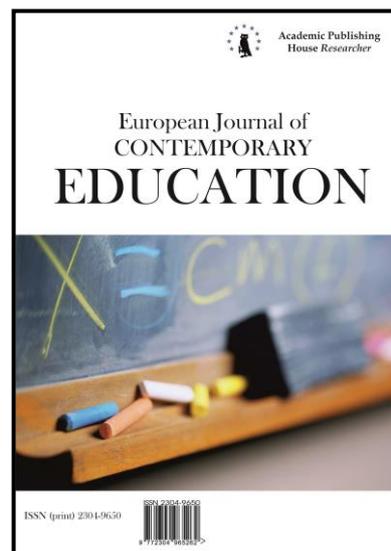
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## Dynamics of the Sociability of Future PE Teachers in the First Decades of the 21st Century

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### Abstract

The article aims to answer the question, what is the dynamics of the future physical education (PE) teachers' sociability in the first decades of the 21st century? The study documented the peculiarities of sociability in future PE teachers in 2001. It was conducted in 2018 and aimed to answer the question of whether the changing social environment and educational reform in the last decades have recently been linked to changes in the sociability of future PE teachers. An analysis of sociability was made using the adapted Rogov questionnaire and the Bales System of process categories in the interaction process analysis. The research model was selected by interviewing a sample of 3rd and 4th year students (n = 139) in 2001 and in 2018 (n = 134). The survey data showed that in 2018 status striving of future PE teachers is statistically significantly stronger than in 2001. The research findings revealed that in 2001 during the teaching practice students (future PE teachers) were more committed to solidarity, encouraged others more frequently, were calmer, felt more satisfied, and communicated more easily than in 2018. In 2018 during the teaching practice students survived bigger tension and more frequently showed antagonism than in 2001.

**Keywords:** sociability, physical education teachers, social training, teaching practice.

### 1. Introduction

The integration of the country into a market-based environment and the ever-accelerating pace of life raise even more requirements for physical education (PE) teacher than a decade ago. The professional activity of today's PE teacher is especially in need of social competence, since academic excellence no longer guarantees the success of a professional activity and satisfaction with the results of work. Today's teacher (in our case – PE teacher) solves not only problems of the quality of education, of the development of skills, of integration and communication and other issues, but also carries out new social roles. Therefore, the social training of the teacher becomes not an advantage, but as a prerequisite for a successful personality development process (Goroshit, Hen, 2014).

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Previous research has shown that sociability of the teacher determines the quality of the teaching interaction (social relationships between the teacher and the learners) (Dicke et al., 2015; Jennings, 2015). Growing number of works have argued that socially prepared teacher can help reduce the stress of schoolchildren and increase their self-confidence and self-esteem (Jennings, Greenberg, 2009; Roeser et al., 2012; Jennings, 2015; Tynjälä et al., 2016). Recent research has indicated that social training improves the ability of teachers: the ability to know more precisely their own and other emotions, the ability to more accurately assess their strengths and weaknesses (Jones et al., 2013); ability to cope with stress, i.e. effectively to regulate your emotions, thoughts and behaviors in various tension situations (Flook et al., 2013; Vesely et al., 2014); ability to communicate constructively and collaborate with students of all ages (Patti, 2006; Stormont et al., 2015); ability to make responsible decisions in accordance with ethical standards, safety requirements, and social norms (Garner, 2010).

Some of the problems of social training among teachers were discussed in the context of general teachers training by Lithuanian scientists (for instance, Barkauskaite et al., 2006). Teachers communication culture (Aukstkalniete, 2001) and students' relations with teachers were investigated a little deeper (Barkauskaite, Guoba, 2015). Social training of PE teachers as a specific problem was discussed in more detail in the monograph of Malinauskas (2006), but the problems of the training of PE teachers in the last decade have not received enough attention.

The theoretical relevance of this work is based on the fact that in Lithuania the assessment of the development of sociability of teachers is not a thoroughly analysed, moreover phenomena occurring in the society indicates that scientific research of this problem is appropriate: in changing conditions of the society, teacher's pedagogical competences also change (Triandis, 2018). We have to admit that it has not succeeded to detect research works aimed to investigate the sociability of PE teachers in the perspective of time. So this empirical study provides new knowledge about future PE teachers in the context of socio-economic changes.

Research done in Lithuania more than a decade ago (Bulajeva, 2000) showed that the main subjects lacking in future teachers are higher self-esteem, dignity, abilities to manage emotions, develop positive attitudes, overcome tension, anxiety, constructively resolve conflicts and emerging problems. Nevertheless, lately, future teachers are experiencing emotional difficulties due to lack of social competence, which can lead to the failure of the whole educational process (Lazdauskas, Saikauskiene, 2015). It has been suggested (Becker et al., 2014; Lazdauskas, Saikauskiene, 2015) that the feelings experienced by the teacher during a lesson are affected by the emotions experienced by the students. The scope of teaching practice in 2001 was 17 credits and in 2018 – 20 credits. During the teaching practice future educators now often identify the challenges of class management, which depend on sociability, on the management of pedagogical communication and cooperation skills (Lazdauskas, Saikauskiene, 2015).

Recent studies (Barkauskaite, Guoba, 2015) indicate that future teachers lack the knowledge and skills of pedagogy, seminars for social skills development, situation analysis, video tracking and discussion, as well as knowledge of the student's values. With respect to the latest research data (Barkauskaite, Guoba, 2015), the practical preconditions for sociability and development of competences are revealed in teaching practice, when reflecting on both school and university experience, the future teacher begins to work.

Only in practice it becomes clear whether the future teacher (in our case – PE teacher) is capable of creating a positive atmosphere of communication and collaboration. In this work, the focus is on teaching practice, since teaching practice is a period in which the final student's professional provisions for pedagogical work are formed. Teaching practice is the educational area in which social competence is developed. Therefore, it can be assumed that in the preparation of social competent teachers during teaching practice, the focus should be on the readiness of teachers to communicate and cooperate. The increased requirements for teachers' communication and cooperation culture and their social competence raise new challenges for the social training of future teachers and the organization of teaching practices whose purpose is to provide students, assisted by mentors and practitioners, with the opportunity to study in the workplace, thus gaining some of the competences and experience necessary for the pedagogical work (Hussain et al., 2013). It is indicated (Barkauskaite, Peciuliauskiene, 2007) that no global research on teaching practice has been conducted since the beginning of the school reform to this day (almost 16 years). This also proves the relevance of this study.

*The research problem of the present study* is that it is not clear what the role of social training (in our case – teaching practice as the main form of social training) for the development of the sociability of future PE teachers in the last decades in the context the changing social environment. A study carried out more than a decade ago (2001) recorded some peculiarities of the sociability of future PE teachers (Malinauskas, 2003). The study conducted in 2018 aimed to answer the question of whether the changing social environment and educational reform in the last decades have recently been linked to changes in the sociability of future PE teachers.

*The aim of this study* was to investigate the dynamics of the future PE teachers' sociability in the first decades of 21st century. *The following research tasks* guided this study: 1) to establish the differences in sociability dimensions (social competence, status striving, performance-avoid orientation) among future PE teachers in 2001 and in 2018; 2) by the method of observation to compare the level of future PE teachers' sociability in 2001 and in 2018.

The research is based on Malinauskas' (2004) proposed concept among PE teacher's sociability that social training among future PE teachers is a purposeful training of specialists in order to successfully fulfill their social roles. Sociability means the mastery of social skills, the ability to adapt and adequately behave, self-knowledge, effective communication and cooperation, decision-making, and problem solving (Malinauskas, 2004).

Social competence is one of the most important components of sociability, the ability to create effective interpersonal relationships, when efficiency is recognized not only by the individual but also by other individuals (Antiniene, Lekaviciene, 2012). It can therefore be argued that social competence determines the level of social efficiency. Not only social competence was investigated but also two other variables (status striving and performance-avoid orientation) were analyzed, because these variables are very important in the changed social environment (for instance, steady increase in the pace of life, difficulty in employability). Status striving is interpreted as an attempt to be recognized and successful in a particular group, and performance-avoid orientation is an attempt to choose only tasks to be overcome. For instance, when oriented to performance-avoid goals, students' purpose or goal in an achievement setting is to avoid the demonstration of incompetence. Attention is focused on the self.

## **2. Methods**

This research is based on pragmatic philosophy concept of dynamics (Triandis, 2018), which states that in changing conditions of society, teacher's pedagogical competences also change. This idea is manifested in the following motto "changing personality in dynamic environment".

*Instruments.* Questionnaire (adapted questionnaire by Rogov (Rogov, 1998)) and observation (System of process categories in the interaction process analysis (Bales, 1970)) were used in the present study.

Adapted questionnaire by Rogov (Rogov, 1998) is comprised of 131 statements. Three of the seven components identified by E. Rogov's questionnaire were analyzed: level of social competence, status striving and performance-avoid orientation. For the present study pilot testing of the questionnaire was performed at the Lithuanian Academy of Physical Education (now Lithuanian Sports University). Seventy-six students of the Faculty of Sport Pedagogy were examined. They were investigated using the adapted questionnaire by Rogov. By pilot testing the questionnaire was administered to the students on two occasions. The second test took place one month after the first. The test-retest correlation ranged from .83 to .88 (Malinauskas, 2003). The Bales System of process categories in the interaction process analysis is presented in Table 1.

**Table 1.** System of process categories in the interaction process analysis, related psycho-social group functions and processes (Bales, 1970)

Function	Processes (categories of observation and analysis)
Social-Emotional Area: Positive Reaction	1. Shows solidarity, raises other's status, gives help, reward 2. Shows tension release, jokes, laughs, shows satisfaction 3. Agrees, shows passive acceptance, understands, concurs, complies
Task Area: Attempted Answers	4. Gives suggestion, direction, implying autonomy for other 5. Gives opinion, evaluation, analysis, expresses feeling, wish 6. Gives orientation, information, repeats, clarifies, confirms
Task Area: Questions, Problems Formulation	7. Asks for orientation, information repetition, confirmation 8. Asks for opinion, evaluation, analysis, expression of feeling 9. Asks for suggestion, direction, possible action
Social-Emotional Area: Negative Reactions	10. Disagrees, shows passive rejection, formality, withholds help 11. Shows tension, asks for help, withdraws out of field 12. Shows antagonism. Deflates other's status, defends/asserts self

In order to ensure the validity of the observation instrument (Bales System of process categories in the interaction process analysis), preparatory studies have been carried out. Based on the observation scheme, two independent observers conducted the observation act, who, without consulting, registered categories of interaction process during the same lessons. Correlation coefficients (according to Pearson) were used to check out the validity of the observation instrument. It has been established that Bales System of process categories in the interaction process analysis essentially meets the requirements for the validity of the study instrument. The correlation coefficients for the categories range from 0.76 to 0.89. Based on these calculations, it is concluded that the data obtained by Bales System of process categories in the interaction process analysis could be interpreted meaningfully.

*Statistical Analysis.* Research data were statistically processed using *SPSS 22.0 (Statistical Package for Social Sciences)*. Descriptive statistics, namely means, standard deviations, were calculated. Skewness (the symmetry of a distribution) and kurtosis (the homogeneity of a distribution) coefficients were calculated to assess univariate normality because Student's *t*-test requires normally distributed data. Skewness and kurtosis coefficients between +1 and -1 indicated that data were normally distributed. We calculated the reliability of each dimension given by the index of Cronbach's alpha internal consistence. A statistical analysis used the Student *t*-test for independent samples and the chi squared ( $\chi^2$ ) test. Effect sizes were calculated using Cohen's *d*. Cohen's *d* effect sizes are generally defined as small ( $d = .2$ ), medium ( $d = .5$ ), and large ( $d = .8$ ).

*Sample and Procedure.* Students of Lithuanian Sports University and Lithuanian University of Educational Sciences (now Vytautas Magnus University) were chosen because 80 % of Lithuanian PE teachers are trained by these universities. Study design of repeated measures was used, in which change of peculiarities among similar respondents over time was assessed. The research sample was selected using a targeted screening procedure: third- and fourth-year students were selected because they had already undergone teaching practice. The study was organized in two stages. In the first study, in 2001, the study group consisted of 139 third- and fourth-year students. The second study was conducted after more than a decade in 2018. In 2018,

the study group consisted of 134 third- and fourth-year students. There were no significant differences between the first (in 2001) and the second (in 2018) groups by age ( $p > .05$ ) and gender ( $p > .05$ ).

The researchers presented the study and provided the participants information about the study objectives. Participants completed the questionnaire (described above) during scheduled class time, with no time limit. This research meets the ethical guidelines, including adherence to the legal requirements of the country where this study was conducted. Participants were instructed to mark the response “I agree to participate” or “I disagree to participate” (on the survey’s first page) to give their consent to participate in the study before beginning the survey.

### 3. Results

The assumption was made that social education (teaching practice) encourages the development of sociability in future PE teachers. Therefore, we analysed the level of sociability in future PE teachers during teaching practice or after it – i.e., in the third or fourth year of studies. Sociability dimensions among future PE teachers ( $M \pm SD$ ) (social competence, status striving, performance-avoid orientation) in 2001 and 2018 are presented in Table 2.

In order to compare the components of sociability in 2001, and in 2018, the components’ scores differences were determined using Student’s *t*-test. Table 2 shows that students’ data in the second study compared with the students’ data in the first study (in 2001) showed that the status striving of students is statistically significantly stronger in the second study (in 2018):  $t(271) = -2.01, p < .05$ ; Cohen’s  $d = .19$ ).

**Table 2.** Sociability dimensions among future PE teachers during first and second investigation ( $M \pm SD$ )

Sociability dimensions	$M \pm SD$		Cohen’s $d$
	In 2001 (n = 139)	In 2018 (n = 134)	
Social competence	10.20±1.11	10.13±1.27	.06
Status striving	08.40±1.63	08.69±1.38*	.19
Performance-avoid orientation	09.30±1.14	09.47±1.12	.15

Note. \*  $p < .05$ ; \*\*  $p < .01$ .  $M$  = mean;  $SD$  = standard deviation; Cohen’s  $d$  – effect size.

The only tendency that has emerged is that in 2018 students' performance-avoid orientation increased ( $t(271) = -1.24, p > .05$ ) but the difference was not statistically significant. Statistically significant difference with respect to the social competence among future PE teachers was not established ( $t(271) = 0.48, p > .05$ ).

In order to compare the changes in the sociability among future PE teachers in 2001 and in 2018, Bales System of process categories in the interaction process analysis was used during the teaching practice. The average frequencies of the categories describing the level of sociability among future PE teachers were determined (Table 3).

Table 3 showed that statistically significant differences were observed in 2001 and in 2018 during teaching practice in preparedness of students to create emotionally positive and emotionally negative relationships. It can be assumed that this observation-based change is related to the changed social environment (increasing emigration, difficulty in employability, demographic is deteriorating) and insufficient attention to the social training of future PE teachers during the teaching practice.

Attention should be paid to the fact that the ability of sports teachers to create emotionally positive relationships was better in 2001 than in 2018. In the first study (2001) students statistically significant ( $\chi^2(1) = 3.81, p < .05$ ) more often showed solidarity, raised other's status, gave help, reward, more often encouraged others. In 2001 students were statistically significant

( $\chi^2 (1) = 4.17, p < .05$ ) calmer, more satisfied (showed tension release, jokes, laughs, showed satisfaction).

**Table 3.** The average frequencies of recorded categories during the control students' classes during first and second investigation

Categories	The average frequencies of recorded categories		$\chi^2 (1)$
	In 2001	In 2018	
1. Shows solidarity, raises other's status, gives help, reward	18	8	3.85*
2. Shows tension release, jokes, laughs, shows satisfaction	17	7	4.17*
3. Agrees, shows passive acceptance, understands, concurs, complies	9	8	0.06
4. Gives suggestion, direction, implying autonomy for other	15	13	0.14
5. Gives opinion, evaluation, analysis, expresses feeling, wish	23	24	0.02
6. Gives orientation, information, repeats, clarifies, confirms	20	18	0.11
7. Asks for orientation, information repetition, confirmation	11	15	0.62
8. Asks for opinion, evaluation, analysis, expression of feeling	7	9	0.25
9. Asks for suggestion, direction, possible action	8	12	0.80
10. Disagrees, shows passive rejection, formality, withholds help	2	5	1.29
11. Shows tension, asks for help, withdraws out of field	5	14	4.26*
12. Shows antagonism. Deflates other's status, defends/asserts self	3	11	4.57*

Note: \*  $p < .05$ ; \*\*  $p < .01$ .

Emotionally negative relationships increased in 2018 compared to 2001. In the first study (in 2001) students were statistically significant ( $\chi^2 (1) = 4.26, p < .05$ ) less stressed (showed less tension, less frequently asked for help, less frequently withdrew out of field), as well as statistically significant ( $\chi^2 (1) = 4.57, p < .05$ ) less frequently showed antagonism, deflated other's status than in 2018.

#### 4. Discussion

The aim of this study was to investigate the dynamics of the future PE teachers' sociability in the first decades of the 21st century. The results of the present study showed that the recent social environment and the ongoing educational reform are possibly related to changes in the sociability among future PE teachers. The results of this study are in line with our previous research data that a person is socially mature when choosing and realizing values (Malinauskas, 2015). Students' (future PE teachers') research was carried out when they performed teaching practice, because it was observed that teaching practice as one of the most important forms of social training helps future PE teachers not only to improve themselves professionally, but also increases their sociability.

With respect to McLeskey et al., (2017) after teaching practice, students have developed a much higher level of communication and interactive skills. It can be assumed that teaching practice, as one

of the forms of social training, not only helps to develop and consolidate social skills, but also inspires experimentation, i.e. transform, change your behavior, beliefs and values (Durlak, 2015).

The authors of the transformational learning theory, Bell et al. (2016) indicate that adults, unlike young people, have their own beliefs, values and assumptions that give them a threefold expression of experience: psychological, social, and cognitive. Thus, social training during teaching practice is only effective when the future PE teacher changes his beliefs and skills (in our case, changes his perception of sociability) due to the pedagogical interaction with the schoolchildren. This has also been mentioned by other authors (Harden et al., 2018): only with critical thinking the PE teacher identifies and verifies the assumptions of his behavior that can help him succeed. Therefore, we can suggest that higher education institutions, which pay more attention to social training during teaching practice, can expect a higher level of sociability among future PE teachers. In our opinion, this suggested that the future PE teachers lacked social training in 2018 by comparing with social training in 2001. The fact that during the teaching practice in 2001 future PE teachers more often showed solidarity, were calmer, more satisfied (showed tension release, jokes, laughs, showed satisfaction) compared to the future PE teachers in 2018, may mean there is possible satisfaction with the future professional activities among students.

The fact that emotionally negative relationships increased in 2018, compared to 2001, could be explained by the fact that some students (mostly adolescents) during their lessons are more prudent and inappropriate. These relationships are inevitable during a pedagogical interaction, since during the practice students often experience tension and anxiety. The results of the present research were also in line with the data of earlier research (Aukstkalnyte, 2001), which suggests that many pedagogical communication and collaboration problems are caused by specific peculiarities of schoolchildren's age.

The increased number of emotionally negative relationships could also be explained by the changing social environment (increased alienation), because there is no clarity about the future, a large proportion of young people emigrate, it becomes more and more difficult to find a job and work at favorite job. Alienation therefore means a weakened ability of the personality system's capacity to judge, evaluate, and think through the world (Thompson, 2013). Alienation affects not only the feelings of individuals, it also affects and determines their moral attitudes and evaluative capacities. Alienation means a pathology of moral cognition, a particular deformation of the capacities for moral judgment shaped by the kind of social relations that occur particularly within modern economic life; relations characterized by rationalized hierarchical social structures, routinized patterns of everyday life (Thompson, 2013).

A number of future PE teachers learn the basics of pedagogical communication and cooperation from their experience, but this is often a long and painful path. In fact, it is possible to accumulate and develop a social skills reserve during social training exercises and teaching practice; contemplative/emotion training which reduces negative emotional behaviour could be used (Kemeny et al., 2012; Virgili, 2015; Meichenbaum, 2017; Vazne et al., 2018). Therefore, it can be assumed that social skills acquired at a higher education institution can be transferred to other spheres of life (Hargreaves, 2017), can promote the development of a harmonious personality and the development of its social competence. Considering the data of students (future PE teachers) in 2018, it can be argued that more attention should be paid recently to social training during teaching practice. Nevertheless, we would think that new and more in-depth studies are needed to analyze how the sociability of future PE teachers is determined by the length of the teaching practice.

Previous studies have analyzed the sociability of future PE teachers using cross-sectional designs, which does not allow causal conclusions (Gallagher, Vella-Brodrick, 2008). In this study, however, we employed longitudinal design (repeated cross-sectional study) to assess the dynamics of the future PE teachers' sociability in the first decades of 21st century. Another strength of this study is that the research was conducted with not only self-report measures but also with observational measures.

Several limitations of the present study should be noted. First limitation was that our results were limited to future PE teachers and the findings may not be generalized to the whole population of university students in Lithuania. This analysis did not examine students from another study programs, and as a result, the conclusions only apply to future PE teachers. The extended sample might be employed in further investigations and future research should include the wider population and analyze the existence of possible differences.

## 5. Conclusion

When comparing the difference between the components of sociability among future PE teachers (level of social competence, status striving and performance-avoid orientation) now and more than a decade ago, it was found that in 2018 status striving among future PE teachers is statistically significantly stronger than in 2001. However, there were no statistically significant differences with respect to level of social competence and performance-avoid orientation between the first and the second surveys.

By using observation as a method of data collection during teaching practice the research findings revealed differences in the sociability among future PE teachers in 2001 and in 2018. The data suggested that during the teaching practice in 2001 future PE teachers more often showed solidarity, raised other's status, gave help, reward, more often encouraged others, were calmer, more satisfied (showed tension release, jokes, laughs, showed satisfaction), and communicated easier than in 2018. In 2018 during the teaching practice students survived the bigger tension and more frequently showed antagonism than in 2001.

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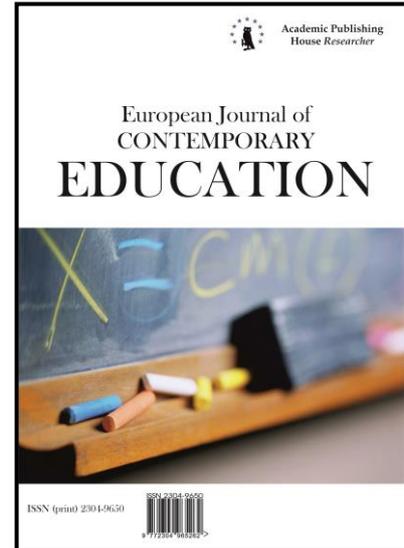
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## **Firms' Problem-Oriented Student Theses as an Innovative Method of Teaching and Knowledge Transfer from Universities to Industry**

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### **Abstract**

The objective of this paper is to explore the role of student theses developed in response to specific firms' problems under the supervision of university teachers as an innovative teaching method with a high level of personal engagement. The paper presents the results of research based on 150 interviews conducted in Krakow with team members engaged in preparation of student theses (each consisting of a university teacher, a master or bachelor student, and a company representative). The statistical analysis is based mainly on the Regression Tree Method and Spearman correlation coefficient. The interview-based research among key actors involved in preparation of firms' problem-oriented student theses confirmed the high effectiveness of this method of knowledge transfer from universities to industry. Thesis knowledge generated in this process brings positive effects to firms, university supervisors and students. Along with an increase in the assessment of practical skills obtained by students, the assessment of the suitability of work for the enterprise increases. Also as the satisfaction rating for cooperation increases, the benefit rating in the form of closer contacts with companies also increases. Satisfying results of university–industry relations obtained through the process of applied thesis preparation could be achieved if different kinds of stimulation types were implemented. On the side of the university, there should be incentives dedicated to the institutional level as well as tools dedicated to individual researchers. Studies have shown high usability of problem-oriented student theses. All parties to this process recognize significant benefits, which confirms that this type of collaboration is a WIN-WIN situation.

**Keywords:** creativity, higher education, entrepreneurship, knowledge transfer.

### **1. Introduction**

Innovation is non-standard solution developed as a trial and error process. Universities create a space in which such processes can be realised internally or through interactions with external partners. In this paper we try to explore an innovative method by which students prepare

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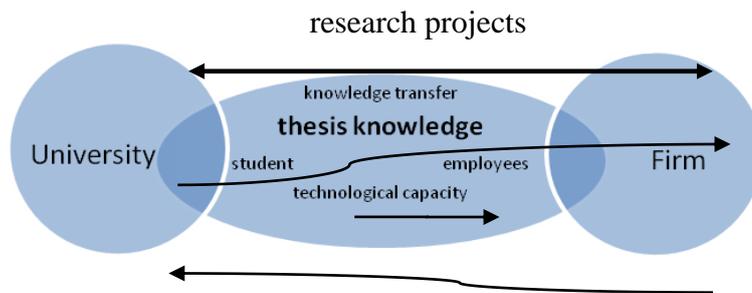
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final year theses that are oriented to solving firms' real-world problems. Flows of value within problem-oriented student theses are analysed. We refer to knowledge generated in this process as thesis knowledge; it enables transfer of academic knowledge from a university to a firm, delivers information to academics about the current technological capacity of industry and its preferred fields of implementable research, and makes teaching processes more oriented to innovation.

We analysed the benefits that students gain from working on firms' problem-oriented theses. Direct interpersonal relations are a key value of such cooperation, while cognitive and relational social capital is treated as an important asset in this aspect (Steinmo, 2015). Supervision of firms' problem-oriented student theses requires much more time and engagement from academics than is the case for more theoretical theses. We present the results of questionnaire-based research among 150 respondents from teams consisting of university teachers, students, and representatives of firms in Krakow for which theses were prepared. We especially analyse students' opinions on extending their own skills/knowledge within different areas related to realizing applied theses, as well as views from the perspectives of their supervisors.

**Thesis knowledge: benefits for universities and industry**

The formalised character of the preparation of students' theses, which complete certain stages of their academic education, covers incentives for engagement in this process both for them and for academics who act as supervisors. Working on real problems defined by firms' managers make this process more attractive and offers several positive effects for all engaged actors. Knowledge generated as part of this process can be referred to as 'thesis knowledge' and flows both ways between companies and universities. Academic knowledge is transferred from universities to firms, while firms provide information to academics about current technological capacity and preferred fields of implementable research. Students have an opportunity to gain work experience and are more attractive to firms as employees than staff recruited in a more traditional way. They can also develop a project realised in the form of a thesis which can be supported by the academic knowledge of their supervisors and university laboratories.



**Fig. 1.** Flows of value within firms' problem-oriented student theses  
Source: own elaboration

Even if the problem undertaken by the student is not solved to a satisfactory standard from the firms' management point of view, they have the opportunity to verify the student's potential usefulness in the organisation, thus minimising recruitment costs and increasing the probability of finding good employees. A qualitative analysis of Scottish technology-based firms revealed that many small units encounter growth constraints in relation to recruitment (Coad, Reid, 2012). Participation in the process of student thesis creation could partly solve this problem and offers an opportunity to establish direct personal relations between company managers and academics. Student theses prepared in cooperation with firms enable the accumulated potential of universities to be exploited. Due to the

probability of finding commercially effective solutions through the process of thesis preparation, costs of education are reduced from the point of view of society as a whole. When new technology is developed in such a process as a result of long-term co-operation (usually 1–5 years), less time is needed for the student who developed it to implement it in practice.

One problem with knowledge transfer from universities to industry is related to overestimating the value of technology developed by public research institutions and the problem of finding venture capital (Clarysse et al., 2007). Even with the low required level of funding, student thesis programs dedicated to firms can not only develop new technologies or improve existing ones, but also encourage future transfer of technologies from universities to business. Chandrasekaran et al. (2015) point out that collaboration with universities brings industry an increased recruitment rate of graduates and promotes their brand name as a desired workplace.

The quality of research done at universities determines its utility for industry, which is always looking for world leaders (Mansfield, Lee, 1996). Another determinant of the attractiveness of universities to industry is the critical mass of researchers and equipment (Mansfield, 1995). There is no one universal set of industry preferences regarding the optimal university as a source of innovation; for example, pharmaceutical and chemical firms prefer to locate their R&D units in places with a high density of highly regarded university departments, while others choose regions where relatively low-ranked departments are concentrated (Abramovsky et al., 2007).

Universities have positive impact on economic development (Fotea, Gutu, 2016; Sarkar, Perényi, 2017). Pettigrew (2001) points out that minimal engagement between researchers and practitioners regarding dissemination of their research is not enough because the wrong questions can be asked. Therefore industry–university relations should also be treated as a source of real problems which could be solved by academics. There is an open question as to how many students should be engaged in ‘applied theses’. Interdisciplinary teams of students working on real problems. Higher engagement of students in firms’ problem-oriented theses could increase the most effective indicators of probable success in student research, as identified by Shaw et al. (2013): research self-efficacy, approach to learning, familiarity with the research environment and positive attitude to research. As attitude towards entrepreneurship determine the entrepreneurial intentions (Wach, Wojciechowski, 2016) student theses developed in response to specific firms’ problems can make entrepreneurship more attractive for them.

Benefits for students when working on problem-oriented theses for firms

The motivation of students is increased by working on theses oriented to solving real problems in firms. This also supports their multi-faceted engagement, which, according to Bryson and Hand (2007), plays a key role in inspiring teaching and learning. Students get a chance to use production infrastructure in firms and learn not only about the current technological processes used there, but also can conduct experiments in university laboratories. Higher student engagement in the process of thesis creation is related to interactions with firms, which could also reduce burnout. As shown by the research of Robins et al. (2018), burnout indicators in all dimensions were higher in study than in work. Research among undergraduate students showed that those who reported having acquired skills from interaction with supervisors were significantly more satisfied (Del Río et al., 2018). Research by Jamieson and Gray (2006) showed that most student respondents did not want to discuss their expectations with supervisors. Cooperation with firms or other institutions gives students an opportunity to be engaged in participatory research which should not only be followed by action, but also “it is action which is researched, changed and re-researched within the research process by participants” (Wadsworth 1998: 9). This special kind of action research is attractive for students who are particularly problem or solution oriented. It allows the effectiveness of action research to be verified, as noticed by Hughes et al.: “the key test of validity for action research is not whether research procedures conform to rules established by academics and professional researchers, but whether the knowledge works in practice” (2004, p. 9). There is no better opportunity to verify learned knowledge than by applying it to a real-life problem and receiving feedback from experienced users. Even if a student’s proposal in a practical thesis is not implemented by a firm or other institution, the student benefits from a very deep negative case analysis, which is one of the key points in the process of action learning (Smith, 2017). The proposed model of a student’s thesis creation process should also reduce at least four out of the six problem categories identified by Hansen and Hansson (2017): inability to apply

research methods, inability to self-study, lack of creativity and lack of motivation. An applied thesis will also support evaluation of students' work in the context of creativity, where 'producing something' is among the six elements of student activity in this field (Jahnke et al., 2017).

Solving firms' problems is also an effective way of engaging this group of stakeholders in the developing of skills expected of graduates and valuable in the labour market. In students' opinions (Jorre, Oliver, 2018), the role of employers in defining the learning outcomes of courses should be broader as this would improve graduates' employment prospects. Direct contact with firms, with students going beyond formal practice and being treated as partners who could increase competitiveness is important for their future employment, especially as a few students engage with the placement opportunities offered by universities' career services (Rae, 2007). Although the impact of technology-based classrooms on students' grades is not confirmed (Nicol et al., 2018), cooperation with firms during thesis preparation could compensate for the lack of laboratory equipment at universities. It also supports development of creativity which is however difficult to measure (Ramankulov et al., 2019).

Threats, benefits, and incentives for students' thesis supervisors

Direct contact with industry related to student thesis supervision oriented to solving practical, technological problems is time consuming, not only due to the costs of establishing and maintaining such relations. Also, awareness that students' work will potentially be used in practice increases psychological pressure on supervisors to control it more than if it were just an academic exercise. Furthermore, such engagement could be perceived as a limitation of pure academic freedom, which is often treated as an opportunity to perform long-term research which is often in conflict with research focused on a pragmatic purpose. Chandrasekaran et al. (2015) point out a number of threats for academics related to university–industry interactions, including loss of academic freedom, long-term research, and academic integrity, stressing that academic research focuses on long-term challenges rather than the time-sensitive product development projects that are typical of industry.

Auranen and Nieminen (2010) point out that systems of university financing based on input measures have higher levels of stability compared to those with output-oriented measures. Probably, higher stability of flow of financial resources supports the engagement of students' supervisors in accepting firm-oriented theses.

## **2. Materials and methods**

Testing period 2017.04.03–2018.03.01. 400 emails were sent to students' thesis supervisors at 5 universities in Krakow (Cracow University of Economics, AGH University of Science and Technology, Cracow University of Technology, University of Agriculture in Krakow and The Faculty of Industrial Design at The Academy of Fine Arts) asking for interviews in cases of a supervised thesis being oriented to solving a firm's problems. In effect, 62 positive answers were received, and 150 interviews were conducted by the end of February 2018 with members of teams consisting of a university teacher, a student and a representative of the company for which each thesis was developed (24 in the field of technology, 16 in industrial design, 7 in economics and 3 in agriculture). Questionnaire-based interviews were performed by groups of students coordinated by us. Interviews covered 9 engineering thesis, 15 bachelor and 26 master thesis. 20 thesis supervisors had a PhD title, 27 were associate professors, and 3 were full professors. In the Polish higher education system, student theses are prepared over a period of 1 to 3 semesters; they require a structured written form, are reviewed by an external reviewer, and are formally defended. Most of the interviews are available in Polish on-line at [www.innowacyjnystart.pl](http://www.innowacyjnystart.pl), which is a regional platform dedicated to innovation policy (some of the respondents' statements from these interviews are quoted in this paper). The statistical analysis presented below is based mainly on the Regression Tree Method (Breiman et al., 1984) and Spearman correlation coefficient.

## **3. Results**

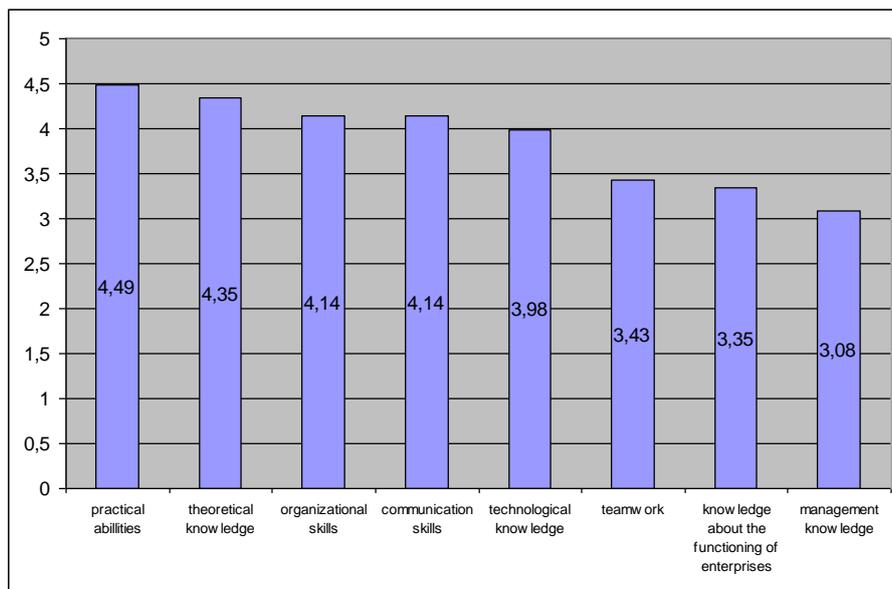
### **Opinions of students, their thesis supervisors and firms' representatives regarding applied theses**

Students' opinions

Students were generally very satisfied with possibility of realizing their thesis for selected firms. The average rating was 4,52 (in 5 point scale, where 5 means very satisfied and 1 very unsatisfied) and only two of them gave mark lower than 4). One of the explanations for this could

be the practical dimension of theses in the context of future employment: “Students feel that theoretical work does not translate in any way into their further professional career. Therefore, most often, if think about future work in industry, they are looking for a technological practice as part of a master's thesis or engineering.” (K. Lalik, AGH University of Science and Technology, October 30, 2017).

Contact with firms gave students rather positive image of them because 4/5 of them declared interest in finding employment in units for which their theses were realized. The initiative of preparing applied theses in almost half cases was in the students’ hands while firms played such a role in over 1/3 of them. University initiative in this field was only in 6 cases which could be connected with lack of incentives for such activities within innovation policy.



**Fig. 2.** Students' opinions on extending own skills/knowledge within different areas related to realizing applied theses (in 5 point scale, where 5 means in very high degree and 1 in very low degree), n=50  
Source: own elaboration

The highest level of extending own skills/knowledge among students regarded practical abilities (the average score 4,49 in 5 point scale, where 5 means in very high degree and 1 in very low degree) and theoretical knowledge (4,35). The important dimension of practical knowledge is the possibility to verify proposed solutions: “Thanks to the work on this project, I learned that contact with the end user is the most important. It can not be replaced by anything else.” (P. Morawa, Faculty of Industrial Design, September 4, 2017).

High average scores over 4 points were given to organizational skills (4,14) and communication skills (4,14). A relatively low score was given to skills within teamwork (3,43) which is partly connected with the fact that individual work of students dominated (42 from 50) while only three were working in pairs, three in three persons teams and two in four persons teams. Also, almost 2/3 of students (34) declared that such theses should be realized in bigger teams. The lowest score was given to increase of management knowledge (3,08). Students declare that supervision of applied theses required high engagement from university teachers but that they also formulated skepticism regarding their common interest in working with students in this formula: “A large part of professors, on the other hand, simply do not want to participate in such endeavors, because it requires them to have their own involvement, and not just a signature in the right place.” (J. Marcinowski, Cracow University of Technology, September 1, 2017).

Following hypothesis was verified

There is a relationship between the declared degree of extension

**H1:** of student skills within individual competences and the level of suitability of work for the company.

The verification of this hypothesis was carried out using the Shapiro Wilk test however due to the distribution of all variables significantly different from normal ( $p < 0.05$ ), the Spearman correlation coefficient was used.

**Table 1.** Benefits for students versus usefulness of applied theses for firms – Spearman correlation coefficient

Benefits for students		usefulness of applied theses for firms
Student – theoretical knowledge	<i>rho</i>	-0,037
	<i>p</i>	0,820
	<i>N</i>	40
Student – organizational skills	<i>rho</i>	0,028
	<i>p</i>	0,863
	<i>N</i>	40
Student – teamwork	<i>rho</i>	-0,136
	<i>p</i>	0,404
	<i>N</i>	40
Student – practical skills	<i>rho</i>	0,378
	<i>p</i>	0,016
	<i>N</i>	40
Student – knowledge about the functioning of enterprises	<i>rho</i>	-0,068
	<i>p</i>	0,676
	<i>N</i>	40
Student – technological knowledge	<i>rho</i>	0,058
	<i>p</i>	0,722
	<i>N</i>	40
Student – management knowledge	<i>rho</i>	0,086
	<i>p</i>	0,599
	<i>N</i>	40
Student – communication skills	<i>rho</i>	-0,004
	<i>p</i>	0,982
	<i>N</i>	40

*rho* – Spearman correlation coefficient; *p* – statistical significance, *N* – number;

\*  $p < 0,05$ ; \*\*  $p < 0,01$ ; \*\*\*  $p < 0,001$

Source: own elaboration.

There was a statistically significant correlation ( $\rho = 0.38$ ;  $p < 0.05$ ) between the assessment in the scope of extending practical skills and the assessment of the usefulness of work for the enterprise; the correlation was moderately strong as evidenced by the  $\rho \leq 0.5$ ; it was a positive correlation, which means that along with an increase in the assessment of practical skills obtained, the assessment of the suitability of work for the enterprise increases. The hypothesis should be adopted only in this respect.

### Supervisors' opinions

Orientation for real problem solution in supervisors' opinion increases the level of student engagement I the process of thesis preparation compared to standard types theses. In 3/5 cases they described students engagement as much higher than in standard thesis preparation, in 1/10 cases slightly higher and in the rest the same as regular theses, but never lower. Supervisors underline interest of students in the realization of applied theses and think that work for firms is valuable for both sides.

The level of student engagement in preparation of applied theses could be stronger if they work part time at the firm during the last year of study: “It is in such cases, when they work in a given company, that students usually go out with the initiative of writing this type of work. Such works are more interesting, they give a specific added value. Frankly, as a promoter, I love them, because then students write them more dynamically and with greater commitment.” (A. Boratyńska-Sala, Cracow University of Technology, June 28, 2017).

Analysis of supervisor opinion about benefits obtained from realization of applied theses showed that the most important was better preparation of the student for professional work (average score 4,20 in 5 point scale, where 5 means very high benefits and 1 very low). In second place of importance was strengthening contact with the company (3,49) and better knowledge of the company's current technological capabilities (3,45). Supervisors know the value of student work for firms: “I have a feeling that we are doing something that has practical justification. The company is certainly very happy, because it would never be able to build such a laboratory even for reasons of costs, but also because of experience.” (M. Jaszczur, AGH University of Science and Technology, September 1, 2017).

In last place was increase in university income due to cooperation with the company (only 1,37) which shows that procedural solutions in this field are necessary. Despite this, supervisors treat applied theses as a win-win situation: “I used to look for a losing side and only the one who does not participate in it loses.” (K. Lalik, AGH University of Science and Technology, October 30, 2017).

Thesis supervisors do not see almost any form of appreciation of their activity connected with applied thesis from universities (only two of them from AGH University of Science and Technology declared that it was appreciated in the form of rector's award for didactic achievements). Supervisors know that much more important is the process of applied thesis creation that achieved solutions or products: “There is no easy way: order - work - implementation. As a rule, the student prepares several concepts that are later verified by the company in terms of financial, legal and production capacity.” (M. Liskiewicz, Faculty of Industrial Design, September 6, 2017).

Following hypothesis was verified

**H2:** There is a relationship between the degree of entrepreneur satisfaction with cooperation with the university and the degree of benefits achieved by the university from the implementation of student work for companies.

**Table 2.** Supervisors opinion versus degree of entrepreneur satisfaction with cooperation with the university – Spearman correlation coefficient

		Degree of entrepreneur satisfaction with cooperation with the university
Supervisor – strengthening contacts with companies	<i>rho</i>	0,360
	<i>p</i>	0,026
	<i>N</i>	38
Supervisor – increase of university income from cooperation with companies	<i>rho</i>	-0,004
	<i>p</i>	0,982
	<i>N</i>	38
Supervisor – better knowledge of current technological capabilities of companies	<i>rho</i>	0,202
	<i>p</i>	0,223
	<i>N</i>	38
Supervisor – better preparation of students for professional work	<i>rho</i>	0,092
	<i>p</i>	0,584
	<i>N</i>	38

*rho* – Spearman correlation coefficient; *p* – statistical significance, *N* – number;

\* *p* < 0,05; \*\* *p* < 0,01; \*\*\* *p* < 0,001

Source: own elaboration.

There was a statistically significant correlation ( $\rho = 0.36$ ;  $p < 0.05$ ) between the degree of employer satisfaction with cooperation with the university and the degree of achievement by the university of benefits in the form of closer contacts with companies; the correlation was moderately strong as evidenced by the  $\rho \leq 0.5$ ; it was a positive correlation, which means that as the satisfaction rating for cooperation increases, the benefit rating in the form of closer contacts with companies increases. The hypothesis should be adopted only in this respect.

#### **Firm's representatives opinions**

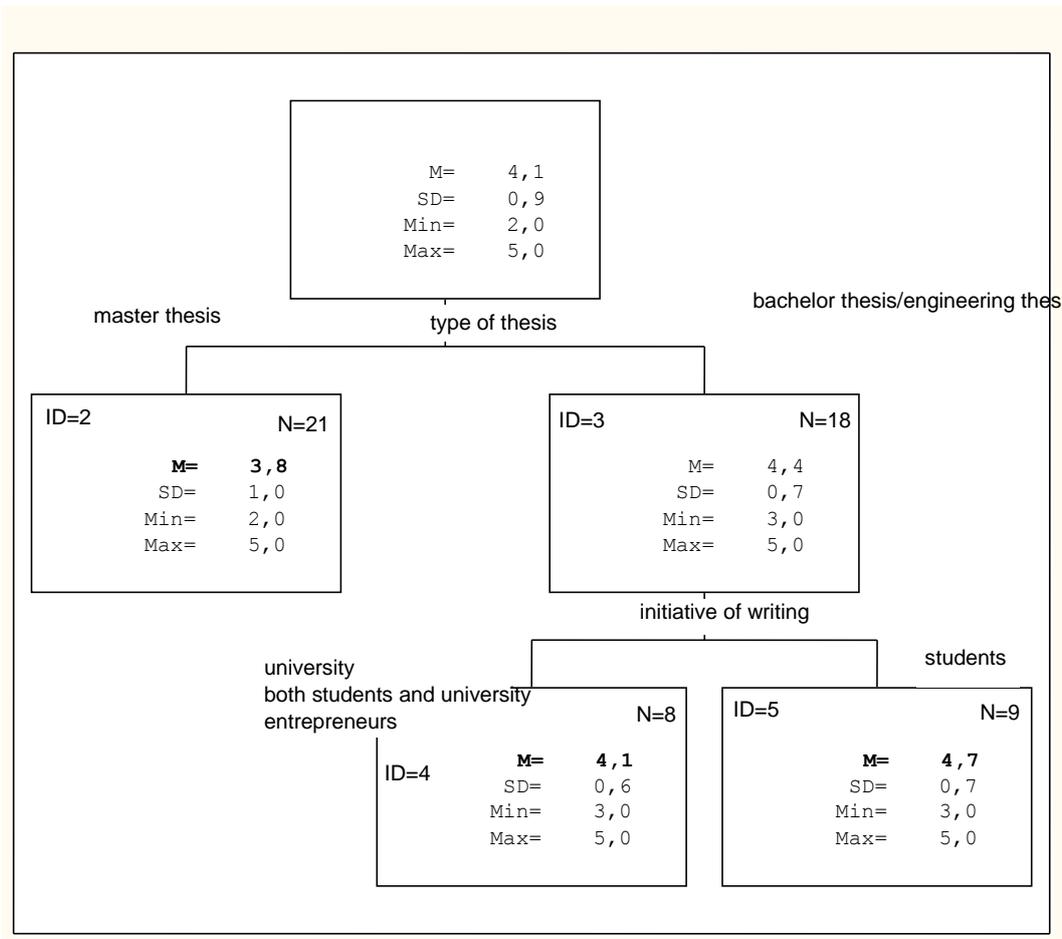
The average score of usefulness of students' theses for enterprise was 4,02 (in 5 point scale, where 5 means very high and 1 very low). Also according to firms' representatives, the possibility of implementation received the same high score. The level of innovation of proposed solutions was estimated a little bit lower (average score 3,93). Students engagement in work was estimated as very high (average score 4,73). Every four firms out of ten has previous experience in cooperation with universities. All of them except one declared that it was positive. An important aspect of students' roles in firms were the non-standard ideas formulated by them, as people with external perspective: "Cooperation with the student is always interesting and satisfying. Young people know and can use the modern management model and add freshness to the organization. It must be emphasized that the cooperation between our company and the student was great" (B. Bajor, Bajo, June 22, 2017).

Entrepreneurs declared high hopes that projects implemented for them within students theses, but prepared by a team of representatives of different fields of study related to the issue, will be useful for the firm (the average score was 4,2 (in in 5 point scale, where 5 means very high usefulness and 1 very low). The level of satisfaction of contact with universities was generally high (average score 4,34 in in 5 point scale, where 5 means very high level of satisfaction and 1 lack of satisfaction). In one case they really see the uniqueness of a product developed in this way, although it is a niche one: "In the case of the BCS 622 bundle, the biggest reward for me is that it is the only such machine in Europe." (B. Burkiewicz, Agro – Partner, September 22, 2017).

Entrepreneurs understand the role of individual engagement in project realization: "On the one hand, what counts for us is the innovation and the chances of the project for commercialization, on the other hand the team of people behind the given project is very important. Without determined people who know what they want to achieve, even the best idea has little chance of success" (S. Gruszka, Wolf Group, September 11, 2017).

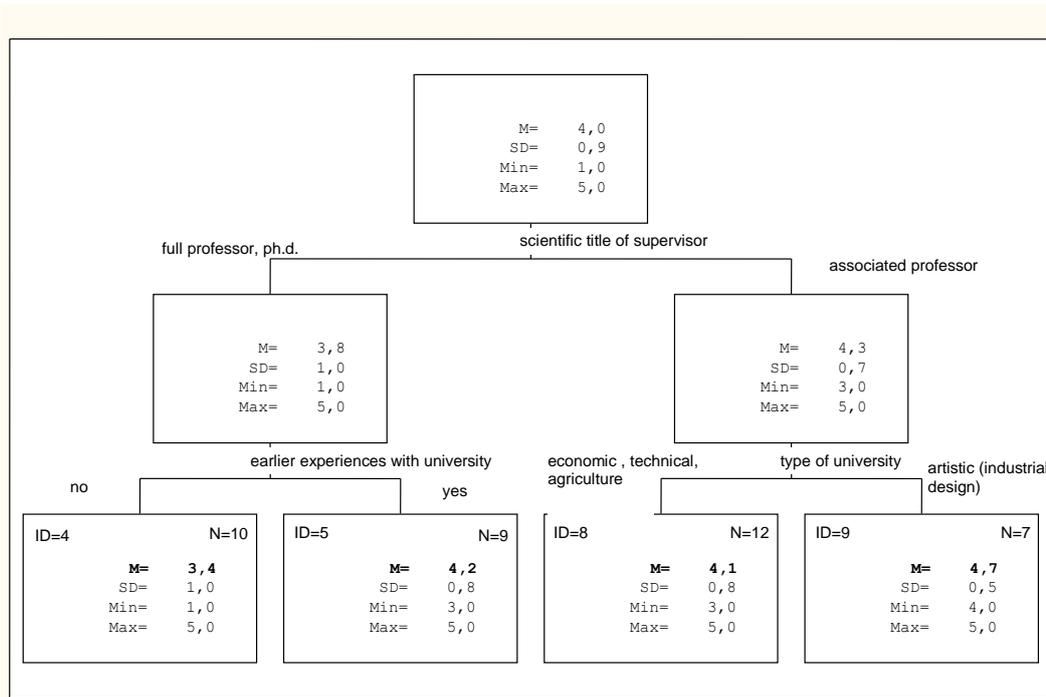
#### **Determinants of usefulness, innovation and possibility of implementation of applied theses for firms**

Independent variables used in the regression tree models are: type of students thesis, number of students involved, type of university, supervisor's academic degree, previous experience of firm with university and thesis writing initiative. Dependent variables are usefulness of thesis for the enterprise, innovation level of proposed solution and possibility of its implementation.



**Fig. 3.** Chart regression tree model: usefulness of thesis for the enterprise (dependent variable)  
Source: own elaboration

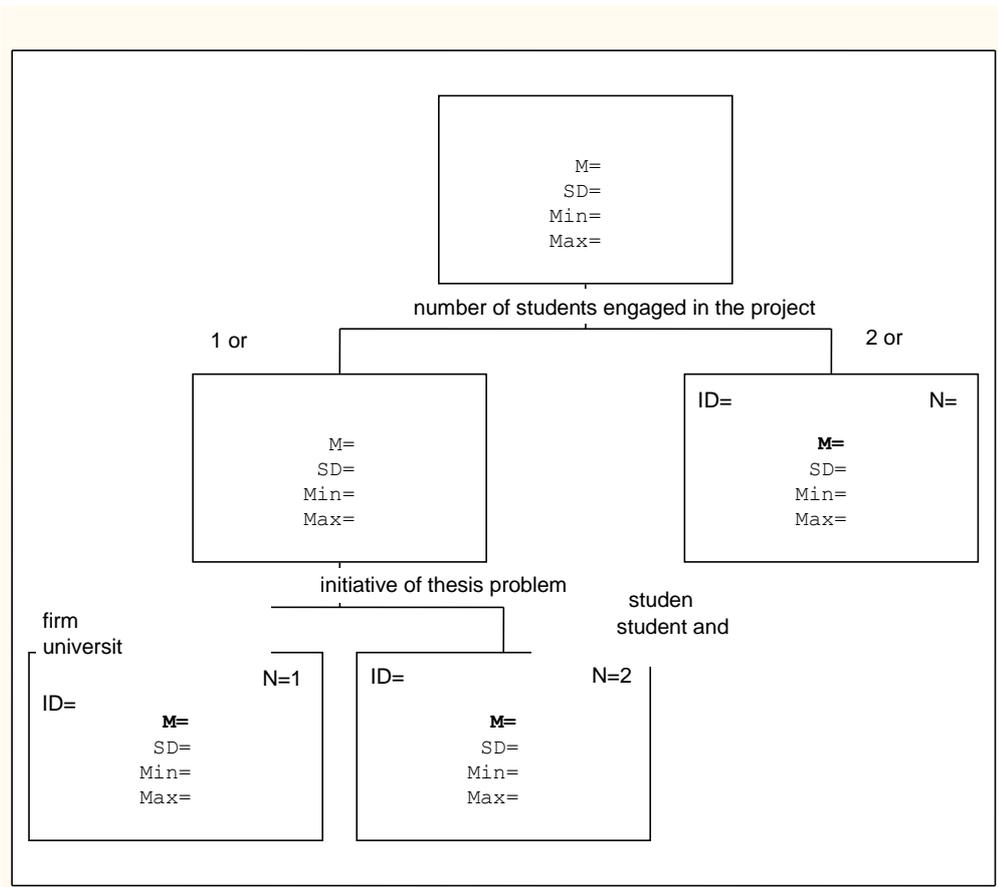
Figure 3 presents regression tree model where the dependent variable is usefulness of student's thesis for the enterprise. If writing of applied thesis (bachelor or engineer) was initiated only by students its usefulness for enterprise in 5 point scales is 4,7 (9 thesis, ID5) while in other cases only 4,1 (ID4). Master's theses also received weaker marks compared to others in the aforementioned scale (3,8, ID3).



**Fig. 4.** Chart regression tree model: level of innovativeness in opinion of firms representatives (dependent variable)

Source: own elaboration

If the theses were supervised by full professor or Ph.D. and firms has not had earlier experience with university, the level of innovativeness of applied theses was ranked as 3,4 in 5 points scale (ID4). In case of the same group of supervisors and earlier contact of firms with university, the level of innovativeness was ranked as 4,2. Theses supervised by associated professors were evaluated as much more innovative in the opinion of firms' representatives (mark 4,3) compared to theses supervised by full professors or Ph.D. (3,8). The possible explanation could be that supervisors with a Ph.D. have not had enough experience and full professors have limited time to engage in co-operation process with firms. If the theses were supervised by associated professors from an artistic university (Faculty of Industrial Design) its average innovativeness was ranked as high as 4,7.



**Fig. 5.** Chart regression tree model: possibility of thesis implementation from the perspective of firm representatives (dependent variable)  
Source: own elaboration

The possibility of students' thesis proposals being implemented in firms in the case when 2 or 3 of them were engaged in the project is higher (average mark 4,8) than when it was 1 student or 4 of them. It shows that both individual work and work in bigger groups is not as effective as in case of 2-3 person teams. In cases where it was 1 or 4 students and the initiative of choosing thesis topic was initiated by students or both from students and entrepreneurship, the mark is much higher (average mark 4,4) than in case when it was an initiative of the firm or university. It confirms that students' motivation plays a critical role in determining the possibility of implementing the solutions proposed and developed in theses.

#### 4. Discussion

Preparation of theses dedicated to solving selected firms' problems is appreciated by students. Most important for them in the context of extending their own skills/knowledge was improving their practical abilities as they feel that this is important for their future career development. Firms for which theses were prepared are also seen by students as desirable workplaces. Applied student theses could support firms in resolving identified problems of growth constraints in relation to recruitment (Coad, Reid, 2012). These companies gain an opportunity to employ creative workers with basic knowledge of the firm's problems. This system of applied theses strengthens contact between industry and universities in a natural way and could increase the role of employers in defining course learning outcomes (Jorre, Oliver, 2018). The high level of satisfaction of the interviewed company managers within the process of problem-based thesis creation confirmed that industry–university collaboration is a WIN–WIN situation (Chandrasekaran et al., 2015). The research showed that the level of engagement of student thesis supervisors who work to solve specific firms' problems is much higher than in other cases. Because higher interaction with supervisors is positively evaluated by students (Del Río et al., 2018), this process of thesis preparation increases their general satisfaction with their studies.

Even if as a result of thesis preparation there are no positive findings that can be applied in firms, students receive a chance to undertake deep negative case analysis, which is treated as a key point in the process of action learning (Smith, 2017). The research showed that students' own motivation has a crucial impact on the usefulness of proposed solutions in theses from the perspectives of firms. Academics feel almost no support or gratitude for their supervision of students' applied theses. Because it is much more time consuming than in the case of more theoretical thesis supervision, wider implementation of the proposed model requires changes in university remuneration policy.

## 5. Conclusion

The interview-based research among key actors involved in preparation of firms' problem-oriented student theses confirmed the high effectiveness of this method of knowledge transfer from universities to industry. Thesis knowledge generated in this process brings positive effects to firms, university supervisors and students, making it a win-win process for all stakeholders. Along with an increase in the assessment of practical skills obtained by students, the assessment of the suitability of work for the enterprise increases. As the satisfaction rating for cooperation increases, the benefit rating in the form of closer contacts with companies also increases. Still, as noticed by Agasisti and Catalano (2006), universities rely on the number of enrolled students as the main factor determining access to public funds. The introduction of a formula of remuneration for activity in the field of real firm/institution problem-oriented students' theses could stimulate higher impact of universities (or students) in socio-economic development.

Satisfying results of university–industry relations obtained through the process of applied thesis preparation could be achieved if different kinds of stimulation types were implemented. On the side of the university, there should be incentives dedicated to the institutional level (for example, governmental or regional subsidies for those who have a certain percentage of theses oriented to solving specific real-world problems) as well as tools dedicated to individual researchers. This last category could include both financial rewards and formal conditions related to a minimal share of supervised theses realised for real-world needs.

The research results relate to theses indicated by thesis supervisors. Supervisors might prefer cases which, in their opinion, are more likely to achieve positive results or success. In fact, the system of applied theses might be not as positive as presented here. It could be interesting to choose a group of cases which did not produce positive results, not because an applicable solution was not found, but rather when the thesis could not be continued because of conflicts in relations or other obstacles. It could also be interesting to verify whether the writing of applied theses supports students' future career development.

## 6. Acknowledgements

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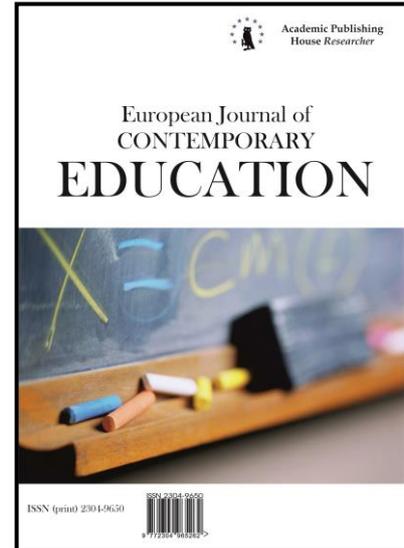
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## A High Score for the Unified State Examination for an Applicant – A “Quality” Graduate for the Educational System in the Future?

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### Abstract

Today, the formation of the personnel potential of the pedagogical educational system is characterized in terms of “double negative selection” when not the best school graduates go to the pedagogical institute and not the best graduates of the institute go to the educational system. The presented contradiction has determined the goal of the study: to develop a model of the individual trajectory of student training to improve the quality of the graduate of the pedagogical profile based on the development of its substantial and level characteristics and a correlation analysis between the quality of the entrant and the graduate of the pedagogical institute. The experiment was conducted among (n = 328) full-time students who completed their studies at the Pedagogical Institute in 2017–2019. Based on the development of monitoring the quality of formation of a student – a future teacher, it has been proved that a high score of the Unified State Examination by an applicant is not always an indicator of the high quality of a graduate for the educational system in the future. On the basis of the author’s model, the study has substantiated the position that the concept of selection of pedagogical institutes and the quality of professional training of a future teacher should reflect the tendency to move from standardization to individualization of the process at all levels of “enrollee-student-beginner teacher”. In practical

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terms, the introduction of the author's model will individualize vocational training and reduce the lack of "quality" teaching staff in the system of general and additional education.

**Keywords:** quality of education, student, pedagogical institute, Unified state exam, model.

### **1. Introduction**

Today, there is an ambiguous situation in Russian society in relation to the educational system: periods of satisfaction are replaced by stages of various criticisms (Klyachko, 2019; Margolis, 2015). In society, questions are being actively raised regarding the implementation of the innovative content of education, the search for innovative approaches to improving the quality of training of future teachers and the professional skills of young specialists (Ilyina, Loginova, 2019; Nagovitsyn et al., 2018; Ryabova, 2004). Of particular relevance are active discussions on the issue of increasing social prestige and the status of the teaching profession (Borisenkov, 2015; Khusnutdinova, 2017; Nagovitsyn et al., 2019; Volchegorskaya et al., 2018). Quite often, one can hear the opinion not only in Russia but also abroad (Melki et al., 2018; Wadii et al., 2018; Yankovych et al., 2019) that the level of teaching staff does not meet the goals and standards of modern higher and secondary education (Barber, Murched, 2008; Bowe and Gore, 2017).

Among the determining and key factors on which the development of teacher education depends on the level of its qualitative characteristics (Evans, 2014; Ledovskaya et al., 2019; Ojeda, 2019). However, at present, there are significant differences in understanding and interpretation in the concept of "quality of training or education of teachers" and its substantial characteristics (Gore et al., 2015; Hanushek, Rivkin, 2010; Lenskaya, 2008).

Modern interpretations of the quality of education have different definitions (Ilyina, Loginova, 2019; Savchenko et al., 2018; Saquicuya et al., 2019). From the social and psychological-pedagogical category that determines the level and result of the education process to increase the level of special competence (Panina et al., 2019) and the mental, moral and physical development that students achieve at a certain stage (Hanushek, Rivkin, 2010; Osipov et al., 2016; Perevoshchikova et al., 2019). Before the integral property, which determines the ability of the pedagogical system to meet the existing and potential needs of the individual and society for the training of highly qualified teachers (Gore et al., 2015; Lenskaya, 2008; Valles et al., 2015). As shown by the Law on the Education of the Russian Federation: the quality of teacher education is a comprehensive characteristic of educational activities and student training, expressing the degree of their compliance with federal state educational standards and the requirements and needs of the individual or legal entity in whose interests educational activities are carried out (Perevoshchikova et al., 2019). A detailed sociological analysis of opinions on this issue from various points of view indicates a fundamental difference and looks at the analogy of the quality of teacher education with market or economic categories of the service sector (Barakhsanova et al., 2017; Darling-Hammond, 2000; Saquicuya et al., 2019).

The approaches to the process of monitoring the quality of teacher education are ambiguous in the modern scientific world (Darling-Hammond, 2000; Emelyanova et al., 2019; Miranda et al., 2018). Assessment of the quality of professional training of teachers can be the academic success of students, the results of final qualification exams, individual achievements of students during training, etc. (Harris, Sass, 2011; Leguey et al., 2018; Perevoshchikova et al., 2019). In this area, there is a significant amount of scientific work revealing the various facets of this process (Desimone, 2009; Nagovitsyn et al., 2019; Saquicuya et al., 2019). Scientists are invited to consider the phenomenon of assessing the quality of education of a teacher from three main points of view: the individual, state authorities and society (Donovan, Cannon, 2018; Ojeda, 2019; Ryabova, 2004).

A significant part of researchers associates this definition with the content of the concept of "quality" of a young specialist in the field of secondary and additional education, which is determined by measurable and unmeasured characteristics (Emelyanova et al., 2019; Evans, 2014; Tzivinikou, 2015). Among the measured characteristics most often include the level of professional training, the implementation of continuing education, as well as the academic performance of trained students, and the share of the unmeasured – individual creative and communicative competence (Klyachko, 2019; Panina et al., 2019).

In the direction of quality monitoring, there are studies focused on the theoretical and practical justification of the system of independent assessment of the results of vocational training

in an educational institution (Gore et al, 2017; Perevoshchikova et al., 2019). Unified information systems for monitoring and control are proposed through increasing the effectiveness of the implementation of social and professional accreditation of various educational programs of higher education of a pedagogical profile (Barakhsanova et al., 2017; Pavlenko et al., 2019). Based on the interests of employers, through the development of original diagnostic and assessment procedures, models are proposed for assessing the quality management of certification of educational processes in higher education (Saquicuya et al., 2019; Valles et al., 2015).

Initially, not only approaches to the quality of training of a graduate of a pedagogical profile are offered, but also to the quality of an applicant who enters a higher pedagogical school (Gore et al., 2017; Nagovitsyn et al., 2019; Panina et al., 2019). So, the very first indicator of a higher education institution of any profile, including the pedagogical direction, in Monitoring the performance of educational institutions of higher education, is the average score of the Unified State Examination (USE) of students. Namely, students accepted according to the results of the USE for full-time study in bachelor and specialist training programs at the expense of the corresponding budgets of the budget system of the Russian Federation.

Today, the formation of the personnel potential of the pedagogical system of general and additional education is characterized in terms of “double negative selection” (Gore et al., 2016). This selection takes place at the stage of admission to institutes and universities of a pedagogical profile, where not the best graduates of schools and professional colleges go (Ginerva et al., 2016; Ryabova, 2004). And at the stage of transition from a higher educational institution to the labor market, not the best graduates of pedagogical universities go to the educational system (Goldhaber, 2015; Valles et al., 2015).

The identified urgent problem and the contradictions presented above have determined **the aim of the study**: to develop a model of the individual trajectory of student training to improve the quality of the graduate of the pedagogical profile based on the development of its substantial and level characteristics and a correlation analysis between the quality of the entrant and the graduate of the pedagogical institute.

## 2. Materials and Methods

The experimental study was conducted among (n = 328) respondents: full-time students of the Glazov State Pedagogical Institute, who studied at the bachelor's degree in "Pedagogical education (4 years of study)" and "Pedagogical education (bachelor with a term of study of 5 years). All students participating in the experiment completed their studies at the institute in 2017–2019. at the faculty of teacher and art education. Students were trained according to two standards: the Federal State Educational Standard of Higher Professional Education, approved in 2010–2011 and the Federal State Educational Standard of Higher Education, approved in 2016. By the following training profiles: “Preschool education”, “Primary education”, “Music”, “Physical education”, “Preschool education and Further education”, “Primary education and Biology”, “Primary education and Russian language”, “Primary education and Mathematics”, “Primary Education and Native Language”. Depending on the results of the USE and individual conditions upon admission to the pedagogical institute, the study participants were divided into the following experimental groups (EG) (n = 7):

- EG1 (n = 37) – received by the main competition and having an average of 70 to 80 USE points;
- EG2 (n = 79) – according to the main competition and on average from 60 to 70 USE points;
- EG3 (n = 25) – according to the main competition and on average from 50 to 60 USE points;
- EG4 (n = 22) – in the target direction and an average of 70 to 80 USE points;
- EG5 (n = 63) – in the target direction and on average from 60 to 70 USE points;
- EG6 (n = 68) – in the target direction and an average of 50 to 60 USE points;
- EG7 (n = 34) – according to a special quota (orphans).

According to focus groups, respondents were differentiated regardless of the training profile and the year of graduation. The experimental sample did not include students who entered the institute without taking into account the results of the USE (graduates of secondary vocational education).

*Statistical analysis:* Processing the results of the study was carried out using the statistical program SPSS Statistics 20. The significance of differences in the results was determined using Chi-square ( $X^2$ ) at  $p < 0.01$  и  $p < 0.05$ . Mathematical and statistical processing was carried out between the indicators of all experimental groups for each indicator proposed in the study. The choice of this criterion for mathematical and statistical processing is determined by the following characteristics: it allows you to compare distributions regardless of whether they are normally distributed or not, and also regardless of the different number of respondents in focus groups. Application of the criterion is possible when the results of focus groups according to the state of the indicator being studied are distributed into more than two categories, in our case (high, average, low).

The experimental work was carried out from 2013 to 2019 on the basis of the analysis of scientific literature and federal standards of higher education, the collection of official information, the study of archival documents, sociological and comparative methods, modeling, analysis and the formulation of relevant conclusions.

At the first stage of the study, the analysis of scientific and methodological literature allowed us to identify the main areas of training for future teachers for all levels of general education: preschool education, primary general education, basic general education, general secondary education. Monitoring of federal standards of higher education of various generations has identified key aspects of professional training of a bachelor of teacher education: the formation of a complex of general cultural, general professional and professional competencies, academic performance of students in educational, industrial and undergraduate practice, the results of state final certification in the form of protection of Graduation Qualification work.

An analytical study of various approaches to the implementation of the educational process of future teachers in the system of "entrant-student-beginner teacher" pointed to the main directions in the development of indicators on the effectiveness of the quality of student training at the institute. Namely, the portfolio of individual achievements (educational, scientific, cultural, creative, social and sports activities of the student during the training), the complete or expel of student contingent during the training, and ultimately the effectiveness of the employment of graduates in the system of general and additional education.

Based on the detailed development of a system of indicators of the quality of student professional training at a pedagogical institute, each of them was differentiated by levels: high, average and low:

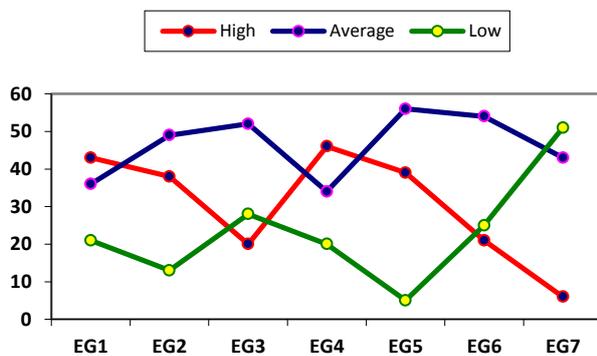
**Table 1.** Criteria-level system for monitoring the quality of professional development of a student – a future teacher

<b>Indicators</b>	<b>High</b>	<b>Average</b>	<b>Low</b>
Common cultural competency block	Creative activity: the ability to independently make decisions, solve problems / tasks of a theoretical or applied nature based on the studied methods, techniques, technologies	Productive activity: the ability to collect, systematize, analyze and correctly use information from independently found theoretical sources and illustrate theoretical positions with them or substantiate the practice of application	Reproductive activity: presentation of theoretical and practical material within the objectives of the course
Common professional competency block			
Professional competency block			
Educational and industrial and undergraduate practices	The average score for all types of practice:		
	is at least 4.7 (inclusive) and there is a set of letters of appreciation from the practice	is at least 3.8, but not more than 4.7 and at least one thank-you note from practice	no more than 3.8 (inclusive)

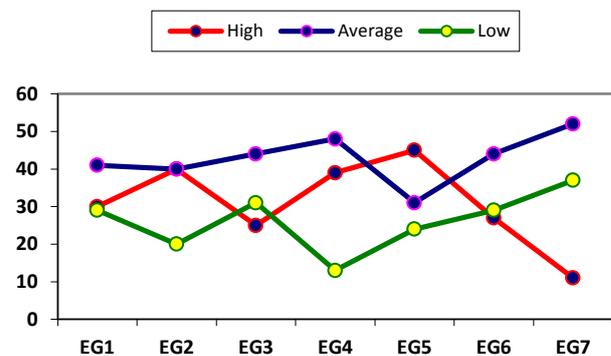
Portfolio of individual achievements	Increased social scholarship in one of the areas (scientific, educational, social, cultural and creative, sports):		
	for at least three semesters during training	for no more than two semesters during the training	absence for all time of training
Graduation Qualification work	“Excellent” rating: the study has novelty and practical significance, it is mandatory for practical use	“Good” rating: the study has practical value, can be recommended for practical use	“Satisfactory” rating: the study has no novelty and practical significance, it is not recommended for practical use
Institute complete or expel	Institute complete or expel concern at:		
	with successful completion of the final certification on the same profile to which he entered	with successful completion of the final certification in another profile to which he entered	with a statement or academic failure
Employment after Institute	Formal employment by training profile	Formal employment in another training profile	Not officially employment or not employed at all

The criteria-level system proposed in the study for monitoring the quality of professional development of a student – a future teacher, made it possible to implement monitoring of the educational process in detail and propose adjustments to professional training based on an individually differentiated approach.

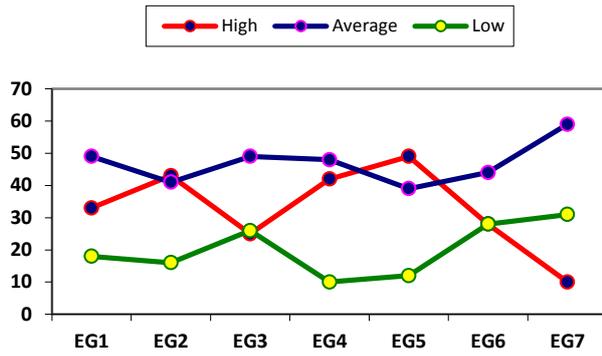
At the second stage of the study, using the system of indicators developed at the first stage (n = 8) based on a detailed study of the archival documents of the faculty, we analyzed the path of formation of each student – a future teacher (n = 328) from all focus groups (n = 7). Based on the systematization and classification of the studied graduate data in percentage terms for each focus group, a visual representation was implemented for each indicator in Figures 1-8:



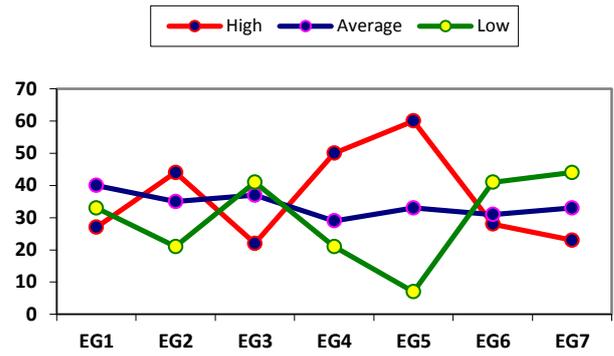
**Fig. 1.** Results for the block of common cultural competencies



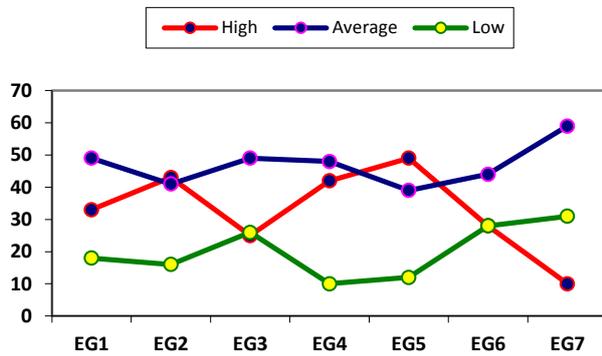
**Fig. 2.** Results for the block of common professional competencies



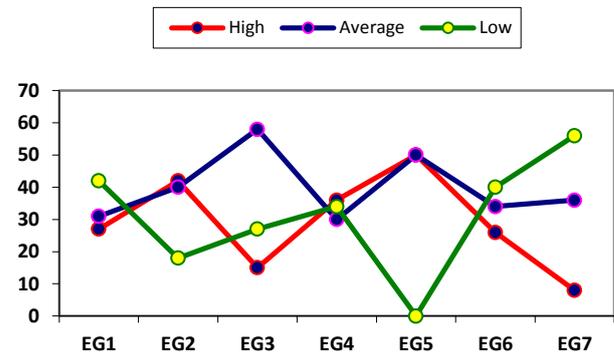
**Fig. 3.** Results for the block of professional competencies



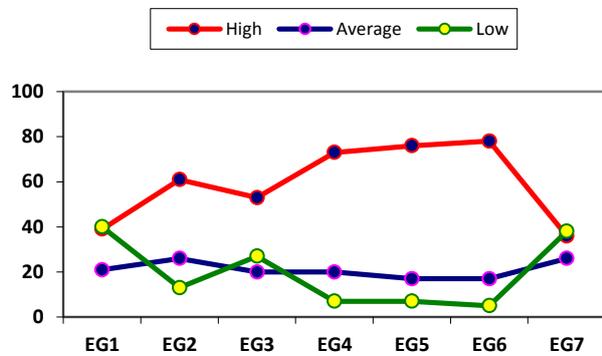
**Fig. 4.** Results for all types of practices



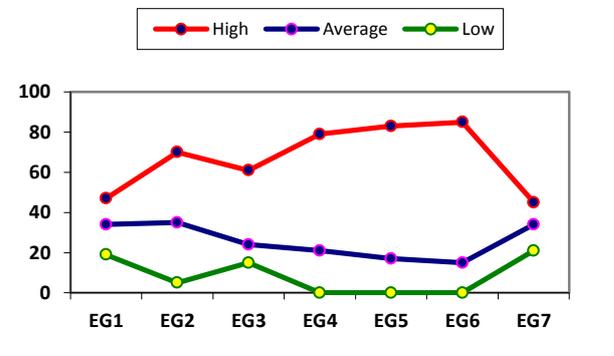
**Fig. 5.** Portfolio results of individual achievements



**Fig. 6.** Results of Graduation Qualification work



**Fig. 7.** Results of Institute complete or expel



**Fig. 8.** Results of employment after institute (who graduated from the Institute)

To identify the reliability of the systematized data of graduates by focus groups, further mathematical and statistical data processing was implemented at  $p < 0.05$  and  $p < 0.01$ . As a result, a horizontal ranking of all focus groups for each indicator from high to low performance was revealed. Summary results are presented in [Table 2](#):

**Table 2.** Comparative results of focus groups based on mathematical-statistical data analysis

Indicators	Results from High to Low*	Comparison**
Common cultural competency block	EG4-EG1-EG5-EG2-EG6-EG3-EG7	EG1/EG2/EG4/EG5 ( $p > 0.05$ ), EG3/EG6 ( $p > 0.05$ ), EG2/EG6 ( $p < 0.05$ ), EG1-6/EG7*** ( $p < 0.01$ and $p < 0.05$ )
Common professional competency block	EG5-EG2-EG4-EG1-EG6-EG3-EG7	EG2/EG4/EG5 ( $p > 0.05$ ), EG5/EG1 ( $p < 0.05$ ), EG1/EG3/EG6 ( $p > 0.05$ ), EG1-6/EG7 ( $p < 0.01$ and $p < 0.05$ )
Portfolio of individual achievements	EG5-EG2-EG4-EG6-EG1-EG3-EG7	EG2/EG1 ( $p < 0.01$ ), EG5/EG4 ( $p < 0.05$ ), EG1/EG4 ( $p < 0.05$ ), EG2/EG4 ( $p < 0.05$ ), EG3/EG6 ( $p < 0.05$ ), EG1/EG6 ( $p > 0.05$ ), EG1-6/EG7 ( $p < 0.01$ and $p < 0.05$ )
Professional competency block	EG5-EG4-EG2-EG6-EG1-EG7-EG3	EG2/EG1 ( $p < 0.05$ ), EG5/EG4 ( $p < 0.05$ ), EG2/EG4 ( $p > 0.05$ ), EG1/EG3/EG6/EG7 ( $p > 0.05$ ), EG2/EG6 ( $p < 0.05$ )
Graduation Qualification work	EG6-EG5-EG4-EG2-EG3-EG1-EG7	EG3/EG1 ( $p < 0.05$ ), EG2/EG1 ( $p < 0.01$ ), EG4/EG2 ( $p < 0.05$ ), EG4/EG5/EG6 ( $p > 0.05$ ), EG2/EG3 ( $p < 0.05$ ), EG1/EG7 ( $p > 0.05$ )

\* Results from High to Low by the number of high-level students by the corresponding indicator;

\*\* in comparison, for  $p < 0.01$  and  $p < 0.05$ , the first is EG, which has a higher result;

\*\*\* EG1-6/EG7 – mathematical-statistical comparison of each individually EG1, EG2, EG3, EG4, EG5, EG6 in comparison with EG7

### 3. Findings

The implemented comparative statistical analysis for each indicator made it possible to determine the positive and negative aspects of the professional training of students – future teachers. EG7 students, orphans who entered the pedagogical institute under a special quota, turned out to be the lowest category of students in terms of effectiveness. For all indicators, the significance of differences between the EG7 group and other focus groups was recorded at  $p < 0.05$  and  $p < 0.01$ , except for academic performance in all types of practices ( $p > 0.05$ ) and in addition to the indicator for deductions with the EG1 group ( $p > 0.05$ ).

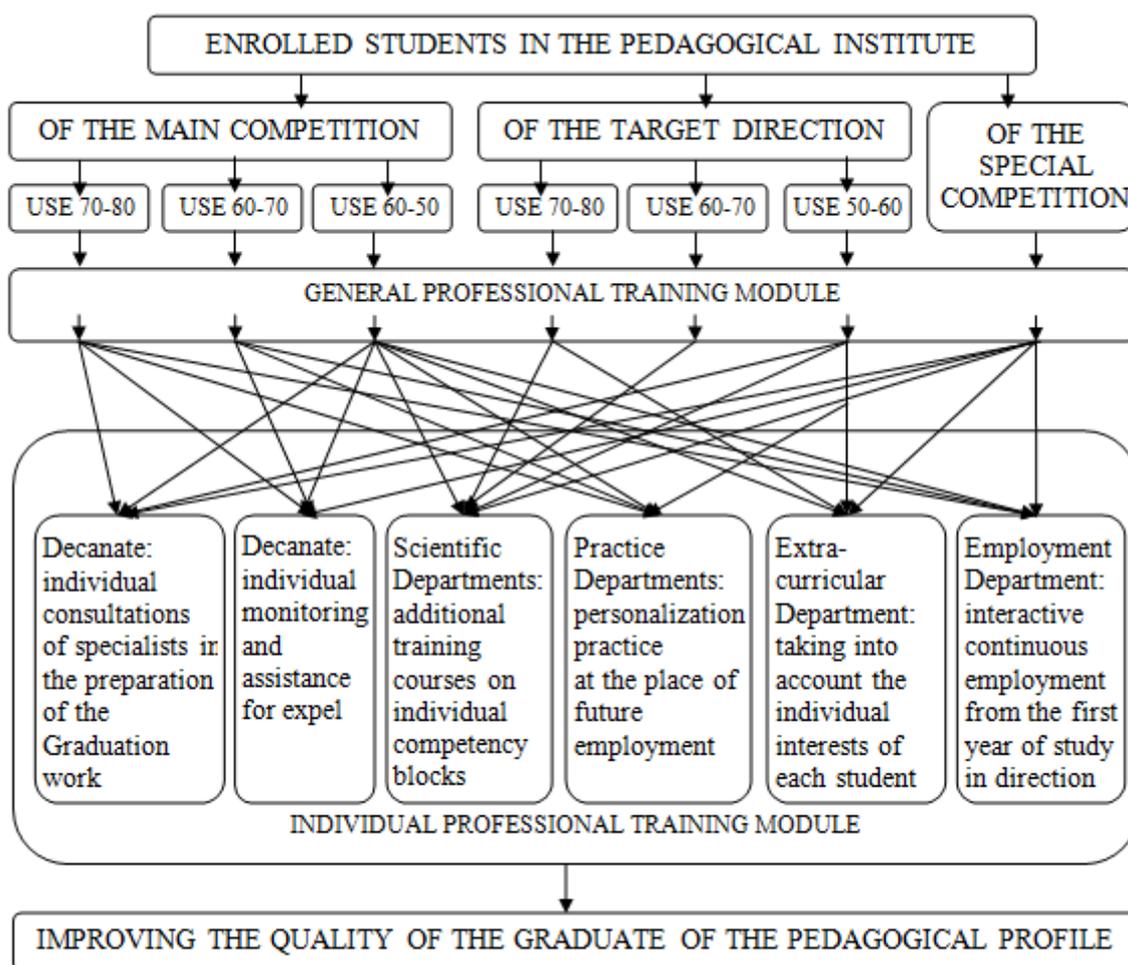
EG1 students, who entered the pedagogical institute in the main competition and who had the highest average USE (70-80 points), turned out to be low on the indicators "Institute complete or expel" and "Employment after Institute". These data prove the need to adjust vocational training with these students and to implement an individually-differentiated approach before their employment in the education system.

Of particular note are students of EG5 and EG6, who entered the target area and have lower scores when they are admitted, compared to groups EG1 and EG4. Students with 60-70 USE points in their arsenal were ahead of all groups in the indicators "Professional competency block", "Portfolio of individual achievements", "Educational and industrial and undergraduate practices". In turn, students studying in target areas, having in their arsenal upon admission only 50-60 USE scores, showed the highest rates for the most key indicators of the quality of professional training, "Institute complete or expel" and "Employment after Institute".

The results of focus group students who entered with higher USE scores in comparison with lesser USE scores in the criteria-level monitoring system proves the opposite dynamics in the success of their studies at the institute. On the basis of mathematical and statistical processing, the effectiveness of the educational process in a pedagogical institute is not sufficient with a contingent of students who have a higher USE result upon admission. In turn, monitoring of focus group students who entered the main competition in comparison with students with targeted areas proves the positive effect of concluding a target contract with applicants. On the basis of mathematical and statistical processing, a high level of quality of the formation of future teachers

among students with targeted areas is reliably manifested compared with the contingent of students who entered the main competition.

The classification of focus groups by horizontal ranking of all focus groups for each indicator determined the vector of additional educational work with students to improve the quality of teacher training for general and additional education. The identification of focus groups that have lower statistical indicators on average for the group determined the main directions for adjusting vocational training for future recruits and training students at the pedagogical institute. As a result, a model of an individual trajectory of professional training to improve the quality of a graduate of a pedagogical profile (Fig. 9):



**Fig. 9.** Model of an individual trajectory of professional training to improve the quality of a graduate of a pedagogical profile

#### 4. Discussion

The results of the research work supplement the data of studies conducted to improve the prestige of teaching through improving the quality of teacher education (Evans, 2014; Khusnutdinova, 2017). The studies focus on economic and social directions to increase the level of professional development of a teacher in the student period, and then in the process of professional activity as a novice teacher (Bowe, Gore, 2017; Ilyina, Loginova, 2019; Margolis, 2015). Nevertheless, in this context, many scientists prove that the formation of a “quality” teacher should start at school at the senior level (Gore et al., 2016; Klyachko, 2019). Since it is already at this stage that young people should form an internal motivation for the implementation of future professional activities (Evans, 2014; Ledovskaya et al., 2019; Ginerva et al., 2016; Nagovitsyn et al., 2019). At this stage, a systematic, individualized professional selection of schoolchildren for future professional pedagogical activities is required (Goldhaber, 2015; Gore et al., 2017). However, as

part of our study, we have limited ourselves only to the “graduate” stage of the pedagogical institute (Nagovitsyn et al., 2019). And on the basis of long-term data obtained on the implementation of teacher training for the system of general and additional education, we have individualized the process of formation of a teacher through the development of an author’s model. The model of the individual trajectory of vocational training to improve the quality of the graduate of a pedagogical profile is of particular practical relevance and is based on the results of systematizing and classifying the content and level characteristics of students by target focus groups.

Certain aspects of the model developed in the study update scientific guidelines for improving the quality of the formation of the future teacher in the system of not only general, but also additional education (Desimone, 2009; Pavlenko et al., 2019; Tzivinikou, 2015). The contradictions revealed in the study in the system of formation of students of various blocks of competencies from general cultural to professional and the organization of student practice in various areas of the education system, according to the authors (Donovan, Cannon, 2018; Leguey et al., 2018; Perevoshchikova et al., 2019), prove the need for further adjustment of the educational process.

The modernization of the educational and educational paradigm pays increasing attention to the individualization of the personality of students in the pedagogical profile, as a fundamental social value (Desimone, 2009; Ryabova, 2004). This process involves the implementation of higher pedagogical education in such a way as to ensure an individual trajectory of the personal and professional formation of each student – a future teacher (Harris, Sass, 2011; Valles et al., 2015). This individually-differentiated strategy for the personal movement from the applicant to the professional development of the young teacher generates many educational and educational routes for students to value pedagogical self-determination, revealing the individual personality facets of the educational space (Ilyina, Loginova, 2019, Yankovych et al., 2019). The criteria-level system proposed in this study for monitoring the quality of professional development of a student – a future teacher, includes a systematic analysis of the main components of the quality of higher education in the pedagogical profile.

To solve the problem raised in the study, it is necessary to systematize and individualize the monitoring system of educational activities in the higher pedagogical school (Ojeda, 2019; Panina et al., 2019). The experimentally identified indicators most fully reflect the professional training of a bachelor of teacher education (Panina et al., 2019; Perevoshchikova et al., 2019). Indicators for the formation of a complex of general cultural, general professional and professional competencies, academic performance of students in educational, industrial and undergraduate practice (Darling-Hammond, 2000; Melki et al., 2018), the results of the state final certification in the form of defense of final qualification work, allow us to comprehensively analyze educational activities of students. Analysis of the portfolio of individual achievements of students in the scientific, cultural, creative, social and sports areas shows the level of extracurricular activity of students. In turn, it is the indicators of expulsion (Gorbunova, 2018; Kochergina, Prakhov, 2016) and student employment that show the effectiveness of the pedagogical institute in providing “quality” personnel to its main “customer”: general and additional education systems (Pavlenko et al., 2019).

The results of the study reveal the depth to a holistic and systematic understanding of the modernization of the educational process of the pedagogical institute in the aspect of professional orientation of students. Statistically recorded data on the significance of differences between the focus group data, which, when entering the institute, have higher USE scores in comparison with students who have lower USE scores, show the formation of inappropriate professional motivation among students of the first group. The found motivational and value orientations of these focus groups on the implementation of pedagogical activities pose a certain risk of a further increase in the number of underemployed graduates in pedagogical profile. Which, ultimately, may be one of the key conditions for lowering the quality indicators of professional training and, in general, the inefficiency of the training system for future teachers.

Thus, only with the synergistic and systemic interaction of all departments of the university on the basis of individualization of vocational training (deans, departments, educational and social work departments, the department of pedagogical practice and the institute’s employment department), the effectiveness of the implementation of the Federal projects “Teacher of the Future” and “Success of Every Child” is possible.

*Limitations.* The present study has been limited to the sample of Glazov State Pedagogical Institute students who entered the institute in 2013–2015 and who graduated or expelled from the

institute in 2016–2019 at the faculty of teacher and art education. In this regard, the number of study participants in each EG was heterogeneous in size. However, the number of participants in each group was converted to a percentage. This allowed to increase the reliability of the comparative results of the study. The resulting sample does not provide an opportunity to cover the entire target audience, as the study was conducted only at the Glazov State Pedagogical Institute. In accordance with this, the results can be defined as preliminary, and for further more detailed analysis it is necessary to carry out a comparative analysis of pedagogical institutes of Russia. A larger, same sample size will provide more diverse information on the subject.

### **5. Conclusion**

The study presents the author's vision of a systematic activity to improve the quality of a graduate of a pedagogical profile. The results of the study prove the lower level of success of students who entered with higher exam scores compared to students with lower exam scores. In turn, a comparative study of students who entered the pedagogical institute in the main competition with students in the target direction proves the high level of quality of the formation of future teachers among students with target areas, compared with the first group.

The study has developed an original criterion-level system for monitoring the quality of professional development of a student – a future teacher. The system of indicators of the quality of professional training of the future teacher developed in the study has made it possible to systematically monitor the educational process of future teachers in the system of "entrant-student-beginner teacher." The author's development has pointed to the main directions of adjusting the professional training of students based on the individualization of the educational process with a different contingent of students entering the pedagogical institute. As a result, an original model of an individual trajectory of vocational training has been developed to improve the quality of a graduate of a pedagogical profile.

A fundamentally new result has been obtained in the work in the strategy for planning the increase of student employment indicators in the educational system of the region and the country as a whole through the implementation of the author's model. The introduction of the author's model will allow to solve the problem of "double negative selection" when not the best school graduates go to the pedagogical institute and not the best graduates of the pedagogical profile go to the educational system. The study has identified new scientific data on the processes of systemic modernization of the educational process and the laws that exist in the pedagogical science under study on this issue. What ultimately, may be one of the key conditions for improving the quality indicators of professional training and the overall effectiveness of the training system for future teachers. The model developed in the study and the technological aspects of its implementation in the region will open a new direction for the development of research in pedagogical science and will help to increase the professional growth indicators of teachers within the framework of the introduction of the Federal Projects "Teacher of the Future" and "Success of Every Child".

Thus, the study has proved that the high score for the Unified State Examination for an applicant is not always an indicator of the high quality of the graduate for the system of general and additional education in the future. The considerations we propose, of course, require further development and testing at several institutes and universities of a pedagogical profile. Nevertheless, the author's study was carried out with a specific purpose: to justify the position that the concept of selection for pedagogical institutes and the quality of professional training of a future teacher should reflect the tendency to switch from standardization to individualization of the process at all levels: "entrant-student-beginner teacher". In a practical aspect, the further implementation of an integrated authoring development in all its model areas in the region will be significantly more effective in educational activities. Namely, without increasing budget funding and material social investments, it is statistically significant to reduce the shortage of "quality" teaching staff in the organizations of educational, additional, pre-school, physical education, sports, creative areas of the region and lower the number of young teachers leaving the profession during the first 3-5 years.

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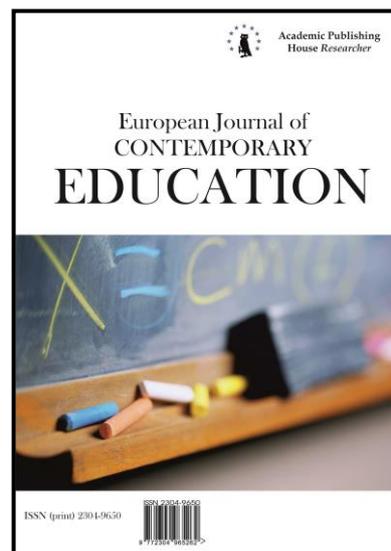
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## Many Social Problems in Vietnam Stem from the Communication Problems among High School Students While No School Counseling Support is Provided – the Urgent Need of Forming School Counseling Model for Vietnamese High School Students

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### Abstract

Many social problems in Vietnam stem from communication conflicts among high school students. Over the years, teachers, educators, and school counselors have been working hard to solve this problem, but it has not been effective. On the other hand, Vietnam does not yet have a general school counseling model that can solve these communication problems. By using the questionnaire, as well as conducting interviews with participants (students and teachers), we found that the communication problems of high school students are primarily based on the weakness in emotional management and overexpressing personal ego. Besides, gender, education, and family background also have some impact on communication problems and the need for communication problem counseling. This result is an essential basis for Vietnamese to build a school counseling model to effectively support the reduction of social problems where perpetrators and victims are high school students.

**Keywords:** communication problems, school counseling, school counseling model, Vietnamese high school students.

### 1. Introduction

In high school age (including both lower and upper secondary school age in Vietnam), communication problems (CP) at teenagers have always been interested by many researchers (Hoag, Burlingame, 1997; Lapan, 2001; Lefevre, 2017; Oanh, 2006; Rizzo et al., 2019). Moreover, the main activities at lower secondary school students are socializing and making friends (Son,

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2011b); this strengthens, even more, the role of communication activity throughout their personality formation and development.

Many types of research showed that students were facing many mental difficulties in communication in selecting for the values of the time, in socializing relationships (with family, friends, society) and also difficulties formed within the psychological development of age. Therefore, the need for help and orientation to solve mental problems in communication at students was very high (Binh, 2016). Also, common social problems in Vietnam today, such as school violence (Son, 2015), cyberbullying (Le et al., 2017), body shaming (Nguyen, Nguyen, 2017) and anesthesia (Nguyen, Kieu, 2017) mainly occurred in high school age. According to author Son (2018), the causes of these social phenomena stemmed from the communication conflicts that arose in students, thereby creating disagreements and violence. Besides, Cornell's study also showed that the limitations and lack of respect in communication were the leading causes of high school students (HS) who were prone to school violence and bullying problems (Cornell, 2017). In this study, the authors pointed out the need for a school counselor as a companion, giving psychological support, and guiding students to practice effective communication. However, in Vietnam, school counselors were still unfamiliar with this field and did not have appropriate assistance due to the lack of a school counseling model and the school counseling's career qualification (Hong et al., 2018).

School counseling (SC) is the process of mentally helping, supporting students, parents, or teachers for self-awareness, discovering their potentials and how their behaviors affect others (Chi, 2011; Duc, 2009), simultaneously helping them choose the ultimate solution in the developmental orientation plan when needed. SC about CP is one of the main SC tasks carried out in lower and upper secondary schools (Duc, 2014). There were many issues worth concerning about communication to Vietnamese school counselors between HS and their family, school and the society, as mentioned in research by author Son (2017): conflicts in communication leading to self-destructive behaviors of lower secondary school students; by author Huy and Thao (2016): school violence due to lack of communication knowledge; by author Thien, Hoang and Vu (2018): self-isolating behaviors because failing to communicate with others. Although the Vietnamese school counselors knew about this reality, they could not support students in thoroughly solving the problems. The current Vietnamese school counseling only stopped at the filtering and prevention level (Thi, 2017), and could not be deeply intervened due to the shortage of human resources as well as the insufficient professional capacity of the school counselors and the inconsistencies in school counseling model (Hong et al., 2018).

Therefore, the study on CP and the need for communication counseling (NCC) at HS has been processed based on practical and theoretical evidence about the main activities of their age. These findings served as evidence for the need to focus on counseling about communication problems at high school age to prevent and intervene the continuing social problems when forming school counseling models (SCM) carried out across Vietnam.

### **The standard communication problems of high school students**

Vietnamese HS includes two age groups as lower secondary school students (12-15 years old, 6<sup>th</sup> grade to 9<sup>th</sup> grade) and upper secondary school students (16-18 years old, 10<sup>th</sup> to 12<sup>th</sup> grade) (Son, 2011a). Communication is a vital activity of these two ages because this is the period of puberty; students become more 'adult,' more independent, do not want to be dependent on their family, and tend to be 'near to friends, faraway from parent' (Nga, 2014). Their ego and personal viewpoints are gradually strengthened and formed (Royster et al., 2015). Not only that, but their emotional life is also incredibly erratic and precarious (Erford, 2016). Therefore, it is easy for them to disagree and conflict with surrounding relationships if lacking the right orientation from family and school.

According to Drury et al. (1998), there were three main target groups in adolescents' communication: family members, friends, and non-family adults (professional or official). Adolescents often communicated very well with friends and non-family members, who neglected the family relationships. They tended to communicate more to the satisfaction of outsiders, and that reduced the quality of family relationships.

Williams and Garrett's study found that with different communication groups such as peers, young adults, and elderly adults, adolescents had reasonable adjustments in cognitive, emotional, and behavior inappropriate communication with each group (Williams, Garrett, 2012). This result

reflected that in adolescent communication, contradictions and conflicts could always occur, but if adequately adjusted and supported by the education forces, it could be solved entirely.

In Vietnam, author Son (2011b) had studied and found that Vietnamese HS often had difficulty expressing their emotions and using language/non-verbal language appropriate to the context when communicating with different people from family, school, and society. Especially in communication with peers, many social problems such as school violence and body shaming have arisen when problem-solving skills and school behavior communication have not been paid attention in the educational program, as well as the SC activities.

Taking an communication perspective, this study inherited and extended previous researches about the common communication problems of high school age into 15 problems:

- Controlling the state of emotion during communication (P1);
- Controlling verbal and non-verbal language during communication (P2);
- Calmly claiming point of view (P3);
- Cooperate with friends (P4);
- Establishing and maintaining relationships with friends (P5);
- Starting a conversation and attracting friends during communication (P6);
- Confident and comfortable during communication with others (P7);
- Making a good impression during communication (P8);
- Understanding others during communication (P9);
- Courtesy in behaviors, dressing, and speech (P10);
- Proper greeting for each social relationship (P11);
- Knowing how to communicate with siblings and younger acquaintances (P12);
- Showing care towards other family members (P13);
- Proper communication with family members (P14);
- Understanding parents' expectation (P15).
- 

### **3. Methodology**

#### **Research Hypothesis**

H<sub>01</sub>: HS in Vietnam did not have any CP (H<sub>01a</sub>). HS's communication problems were within acceptable levels and easily adjusted. Therefore, Vietnamese HS did not need to counsel about CP (H<sub>01b</sub>).

H<sub>02</sub>: There was no correlation among gender in students' CP (H<sub>02a</sub>) as well as the NCC (H<sub>02b</sub>).

H<sub>03</sub>: There was no correlation among the education level in students' CP (H<sub>03a</sub>) as well as the NCC (H<sub>03b</sub>).

H<sub>04</sub>: There was no correlation among living conditions (family background) in students' CP (H<sub>04a</sub>) as well as the NCC (H<sub>04b</sub>).

H<sub>05</sub>: There was no correlation between the CP and the NCC of HS.

#### **Study design**

To find the current situation of CP and the NCC of HS, the primary method was using questionnaires. The questionnaire met the following survey criteria:

- The questionnaire needed to have under 30 items for the situation survey, to avoid excessive length and information.

- Participants were HS from 6 grade to 12 grade (13 to 18 of age), including both genders.

- Participants had to commit participation until the end of the research to guarantee the data's consistency.

The designed questionnaire included:

Participant's information, including questions about necessary information: gender, year of birth, school, level, grade, and the people they were currently living.

The questionnaire contains a system of questions to collect data about the current situation of CP and NCC of HS. Questions about the current situation of CP of HS included 23 items; questions about the current situation of NCC of HS included 22 items. After the pilot survey, 15 items that did not match the communication problems of Vietnamese HS were eliminated; the final questionnaire was established with 30 items with the reliability  $\alpha = .865$ . Answers for all items were designed as a 5-point Likert scale (Boone, Boone, 2012) for students to choose.

Besides, in-depth interviews were also conducted in this study to learn about the seriousness of social problems arising from communication conflicts and HS' NCC. We interviewed HS, teachers (T), school counselors (SCor), and educators (E) about HS' CP and NCC issues. These participants were also selected randomly from the above participating schools. The collected quotes were used to make more precise and prove the urgent need to form SCM in Vietnam.

**Sample selection**

Participants were selected randomly from 4 lower secondary schools and three upper secondary schools in Vietnam, with a total of 1565 students. After removing unsatisfactory responses, the total number of participants was 1200, which was distributed as shown in the below table (see Table 1):

**Table 1.** An overview of participants

	Content	N	%
Gender	Male	449	37.4
	Female	751	62.6
Education level	Lower secondary	726	60.5
	Upper secondary	474	39.5
Living condition (Currently living with)	Both father and mother	1026	85.5
	Father	35	2.9
	Mother	52	4.3
	Relatives/Others	87	7.3

**Data analysis**

Answers for questions were examined on a 5-point Likert scale and coded as following: Point 1=1, point 2=2, point 3=3, point 4=4, point 5=5. The points were determined, as shown in the below table (see Table 2):

**Table 2.** Collected data coding

Range	Data coding
1 to 1.80	Not hard at all/ Unnecessary
1.81 to 2.61	Slightly hard/Unnecessary
2.62 to 3.42	Moderate /Optional
3.43 to 4.23	Very hard/Necessary
4.24 to 5	Extremely hard/Absolutely necessary

**4. Results**

**The worth concerning the situation of Vietnamese HSC's CP**

The result in surveying the participant about the communication-related problems of Vietnamese HSC was presented in Table 3 below:

**Table 3.** The CP and the NCC of Vietnamese HS

Items	Levels										M		SD		R		
	CP <sub>1</sub>	NCC <sub>1</sub>	CP <sub>2</sub>	NCC <sub>2</sub>	CP <sub>3</sub>	NCC <sub>3</sub>	CP <sub>4</sub>	NCC <sub>4</sub>	CP <sub>5</sub>	NCC <sub>5</sub>	M <sub>CP</sub>	M <sub>NCC</sub>	SD <sub>CP</sub>	SD <sub>NCC</sub>	R <sub>CP</sub>	R <sub>NCC</sub>	
P <sub>1</sub>	N	301	218	161	208	496	252	150	294	92	228	2.64	3.09	1.201	1.378	4	2
	%	25.1	18.2	13.4	17.3	41.3	21.0	12.5	24.5	7.7	19.0						
P <sub>2</sub>	N	263	170	256	246	389	313	191	271	101	200	2.68	3.07	1.217	1.289	1	3
	%	21.9	14.2	21.3	20.5	32.4	26.1	15.9	22.6	8.4	16.7						
P <sub>3</sub>	N	274	202	225	166	446	359	143	301	112	172	2.66	3.06	1.217	1.278	3	4
	%	22.8	16.8	18.8	13.8	37.2	29.9	11.9	25.1	9.3	14.3						

P4	N	468	313	160	175	484	330	55	261	33	121	2.19	2.75	1.091	1.323	13	12
	%	39.0	26.1	13.3	14.6	40.3	27.5	4.6	21.8	2.8	10.1						
P5	N	368	277	247	232	458	258	82	286	45	147	2.32	2.83	1.093	1.348	10	10
	%	30.7	23.1	20.6	19.3	38.2	21.5	6.8	23.8	3.8	12.3						
P6	N	251	202	327	195	347	303	211	314	64	186	2.59	3.07	1.154	1.309	5	3
	%	20.9	16.8	27.3	16.3	28.9	25.3	17.6	26.2	5.3	15.5						
P7	N	309	228	189	166	403	274	191	313	108	219	2.67	3.11	1.264	1.371	2	1
	%	25.8	19.0	15.8	13.8	33.6	22.8	15.9	26.1	9.0	18.3						
P8	N	288	231	273	198	399	269	148	332	92	170	2.57	3.01	1.197	1.334	6	6
	%	24.0	19.3	22.8	16.5	33.3	22.4	12.3	27.7	7.7	14.2						
P9	N	358	174	210	247	401	315	140	280	91	184	2.50	3.04	1.239	1.277	7	5
	%	29.8	14.5	17.5	20.6	33.4	26.3	11.7	23.3	7.6	15.3						
P10	N	410	314	200	213	432	229	109	298	49	146	2.32	2.79	1.153	1.385	10	11
	%	34.2	26.2	16.7	17.8	36.0	19.1	9.1	24.8	4.1	12.2						
P11	N	410	337	224	212	437	245	60	250	69	156	2.30	2.73	1.156	1.399	11	13
	%	34.2	28.1	18.7	17.7	36.4	20.4	5.0	20.8	5.8	13.0						
P12	N	440	299	220	225	413	330	76	235	51	111	2.23	2.70	1.138	1.288	12	14
	%	36.7	24.9	18.3	18.8	34.4	27.5	6.3	19.6	4.3	9.3						
P13	N	350	287	270	215	442	221	86	295	52	182	2.35	2.89	1.102	1.407	9	8
	%	29.2	23.9	22.5	17.9	36.8	18.4	7.2	24.6	4.3	15.2						
P14	N	403	326	219	171	433	247	106	281	39	175	2.30	2.84	1.120	1.422	11	9
	%	33.6	27.2	18.3	14.3	36.1	20.6	8.8	23.4	3.3	14.6						
P15	N	322	275	250	202	440	211	101	363	87	149	2.48	2.92	1.179	1.371	8	7
	%	26.8	22.9	20.8	16.8	36.7	17.6	8.4	30.3	7.3	12.4						
<b>M<sub>x</sub></b>											<b>2.45</b>	<b>2.93</b>	<b>0.911</b>	<b>1.125</b>			

(CP: 1 = Not hard at all; 2 = Slightly hard; 3 = Moderate; 4 = Very hard; 5 = Extremely hard; NCC: 1 = Absolutely unnecessary; 2 = Unnecessary; 3 = Optional; 4 = Necessary; 5 = Absolutely necessary; M = Mean; SD = Standard deviation; R = Rank)

$M_{X-CP} = 2.45$  – corresponding with the ‘slightly hard’ level. Out of all 15 items of CP, the top five with the highest means ranking from 1<sup>st</sup> to 5<sup>th</sup> are: P2 (M = 2.68), P7 (M = 2.67), P3 (M = 2.66), P1 (M = 2.64), P6 (M = 2.59); all were at ‘moderate’ level. This could be concluded that Vietnamese HS had some communication problems (not serious, but risk able) in their life, or hypothesis  $H_{01a}$  was rejected.

$M_{X-NCC} = 2.93$ , corresponding with the ‘optional’ level, which meant it would not matter if they received school counseling about communication or not. Out of all 15 items, the top five with the highest means ranking from 1<sup>st</sup> to 5<sup>th</sup> are P7 (M = 3.11), P1 (M = 3.09), P6 (M = 3.07), and P2 (M = 3.07), P3 (M = 3.06), P9 (M = 3.04). This result reflected that HS needed to be counseled about CP, but it depended on their choice. The hypothesis  $H_{01b}$  was rejected.

With  $H_{01a}$  and  $H_{01b}$  were rejected,  $H_{01}$  was rejected. This meant Vietnamese HS had CP, they could not solve the problems effectively by themselves, and they need to be counseled about this problem at school.

Viewing the percentage in Table 3, it was found that there was a large number of students who felt ‘very hard’ and ‘extremely hard’ in communication, and they needed to be counseled about this with ‘necessary’ and ‘absolutely necessary’ levels. A difference test is processed for factors of gender, education level, and family context towards CP and NCC of HS.

**Table 4.** ANOVA test for factors of gender, education levels and family context towards CP and NCC of HS

Sources		M		ANOVA test			
		M <sub>CP</sub>	M <sub>NCC</sub>	F <sub>CP</sub>	F <sub>NCC</sub>	p <sub>CP</sub>	p <sub>NCC</sub>
Gender	Male	2.56	2.84	21,47	1,28	.002	.064
	Female	2.38	2.97				
Education Level	Lower secondary	2.56	3.16	9,08	12,51	.001	.001
	Upper secondary	2.38	2.77				
	Both father and mother	2.45	2.90				
Family context (living with)	Father	2.20	3.57	5,61	12,70	.365	.002
	Mother	2.54	3.11				
	Relatives/Others	2.42	2.77				

For the gender factor,  $p_{CP} = .002$ , it was possible to claim a statistical difference of CP between male and female students; hypothesis  $H_{02a}$  was rejected. The intensity of facing CP was different between male and female students. Male students faced more CP than females at the same age.  $p_{NCC} = .064$ , there was no statistical difference between NCC of students with different genders. Hypothesis  $H_{02b}$  was accepted. Thus, it was only accepted that male students faced more CP than female students, and the NCC of both genders was the same.

For the education level factor,  $p_{CP} = .001$ , there was a significant difference of CP between lower and upper secondary school students, or hypothesis  $H_{03a}$  was rejected. Upper secondary school students face more CP than lower secondary school students.  $p_{NCC} = .001$  proved a significant difference between the NCC of both education levels, or hypothesis  $H_{03b}$  was rejected. Upper secondary school students have higher needs for counseling about communication problems than lower secondary school students. Therefore, we rejected the hypothesis  $H_{03}$ .

For the family context factor,  $p_{CP} = .365$ , it meant no significant difference of CP among family contexts was found. Therefore, despite living in different conditions of families, HS shared similar CP. In other words, CP of HS did not depend on their family context and the hypothesis  $H_{04a}$  was accepted.  $p_{NCC} = .002$  showed a significant difference among the NCC of students with different family context. Students with different CP coming from different family contexts would have different needs and different difficulties associated with when they were counseled. Hypothesis  $H_{04b}$  was rejected. With these results, it is found that CP was not the cause of arising NCC, but the influence from the family (mainly family CP) was the leading cause of creating the HS' NCC.

#### A Positive Correlation between CP and NCC of HS

Pearson correlation between CP and NCC of HS gave  $p < .05$  as seen in [Table 5](#):

**Table 5.** Correlation between common problems and needs for counseling about the communication of students

	CP	NCC
CP	1	.579**
NCC	.579**	1

\*\* . Correlation is significant at the 0.01 level (2-tailed)

There was a strong and positive correlation between CP and NCC. The more HS faced problems in communication, the higher their needs for counseling were. This finding was noteworthy when building communication competence for students not only in their educational environments but also in their lives. This result rejected our null hypothesis ( $H_{05}$ ).

### **Perceiving factors affected the CP and NCC of Vietnamese HS**

Collecting in-depth interview data from the participants and also from teachers, school counselors, and educators, we found some data could be supported for making clearer the factors affected the CP and NCC of Vietnamese HS.

*Students: Excessive self-expression and inadequate capacity to control emotions when communicating*

Vietnamese HS tended to show excessive ego when communicating with their peers, so it could easily lead to conflicts of life perspective, as well as the value system. Since then, conflicts have formed and negatively impacted on their social relationships. The interviews with a lower secondary student (HS1) and an upper secondary student (HS2) confirmed this information very clearly:

HS1: ‘...The idea of modern dance to celebrate the first day of my school year was unique, but when voting in front of the class, my classmates strongly opposed my idea. They think this is a bad idea. Some others suggested acting and singing solo songs. I was distraught when my idea was criticized so badly in the class, so I quarreled with the whole class. In the end, my class could not perform because we did not agree with each other ...’

HS2: ‘I am always confident about my communication ability, but do not understand why others do not like to associate with me? At school, I always ranked first in the class for academic achievement. In competitions, I always lead to achievement. I make friends with almost all the students from the whole school. However, I always feel like my friends are not honest with me; they only come to me when they need it. I feel hurt. Recently, I have almost no interest in any relationship. I am good alone and enough.’

*Teachers: The Impotence in traditional-educated problem-solving measures with communication conflict*

Many teachers shared that the emotional management capacity of HS today is deficient, especially lower secondary students. They could hardly control their emotions when a disagreement arose in communicating with friends. Therefore, students tended to behave aggressively and yield to each other even in school. This has led to increased school violence in Vietnam over the years.

The interview with a lower secondary school teacher (T1) helped us recognize a lot of essential data:

T1: ‘The current phenomenon of profanity and swearing among students has greatly increased. Communication problems in school are always a problem for me... I've always tried to solve it, but these situations kept happening. Most of my educational measures and advice cannot affect students' psychology. Discipline from the teacher seems to be ineffective when dealing with communication conflicts of students.’

Another teacher (upper secondary teacher, T2) also stated this moral decline in the communication of HS:

T2: ‘...90 % of the violence in my school stems from students having conflicts in communication. They do not control their emotions and often solve problems with violence. Education and disciplinary measures from the school are no longer effective in solving these problems... We need a school counselor, but it still seems not feasible in the current educational context...’

This result reflected the need for the role of a school counselor to support CP for students in their school life to prevent related social problems.

*School counselors: The Expected effort in assisting students with CP*

We continued to interview school counselors in Vietnam and received many valuable comments on HS' CP, as well as the NCC as follows:

A school counselor in a lower secondary school (SCor1) shared the experience when counseling for students with school violence and body shaming behavior that:

SCor1: ‘Conflict in communication is the cause of increased school violence in Vietnam, followed by a decline in interaction within family and school, which causes many students to lack emotional safety support... Just a small misunderstanding in communication such as using slang, or inappropriate body language, or just a small joke about the body can lead to conflict and violence. Besides, the self-esteem need for students this age is always the top priority in

communication. It is the inability to give in or accept each other's opinions that cause many students to act abnormally to attract attention from others.'

An upper secondary school counselor (SCor2) also agreed with the opinion that communication conflicts caused many social problems for students.

SCor2: 'HS often runs away from home and fall into social vices because they do not receive empathy from their families. Most of the students complained to me that they were upset when their parents could not understand their aspirations and always wanted to force them to do as they pleased. Children are more likely to find empathy from outside relationships than family and school. In particular, some students also shared with me that they would love to join disruptive groups (gangsters) to prove themselves, as well as try to attract the attention of friends and parents.'

Another school counselor (part-time specialist, SCor3) expressed the difficulty in counseling students with CP:

SCor3: 'I have no formal training in psychology or school psychology. I only advise students as an experienced person. I realize that without understanding the students' psychology, as well as the psychological mechanisms of conflict and how to resolve conflicts, it will not be possible to support them in this regard. Therefore, my students only come to the SC office when forced; almost no students come voluntarily.'

These data showed that even though the school counselor's qualification is still limited, SC in Vietnam have been developed, although they have only stopped at the situation and initially intervened, but have shown the potential if having a right orientation.

*Educators: The process of counseling on CP is necessary when operating the school counseling model in Vietnam*

From a macro perspective, Vietnamese educators brought us different perspectives on CP, social problems, as well as SC.

'It is not possible to give full responsibility to students because of the changing psychology of puberty, which leads them to behave independently and wants to assert themselves. It is the teachers and the family that are two important forces that affect the personality education for students. If families and schools educate their children's personality and skills well, social problems, as well as communication conflicts, will be greatly reduced.' (E1)

Disagreed with E1, E2 discussed his opinion:

'Students themselves must be responsible for their actions and thoughts. By adolescence, children are aware of the problem and can make decisions independently. Their overexpressing in ego, or behave (including negative behaviors) to attract the attention of others, ultimately stems from their own needs.' (E2)

E3 analyzed the situation with a neutral opinion that:

'Cannot blame those who are right and who is wrong. The problem here is to understand the inner sources of social problems that HS currently faces. If conflicts arise from communication, there must be a specific handling process. If stemming from the abnormal psychology development of students, there must be its mental support process... However, there is no SCM that specializes in CP or mental health support for students in Vietnam. Thus, the problem remains in its place.' (E3).

The multidimensional evaluation of educators has helped us realize that the need to develop a SCM to support students' mental health, as well as to handle the HS' CP, NCC, and social problems, is urgent.

## 5. Discussion

The collected data showed that Vietnamese HS were facing CP and holding needs for counseling about CP. These were the critical problems that need to be solved to help HS communicate effectively to enhance their academic efficiency and also reduce the social problems stemmed.

**Vietnamese HS were facing many CP, but the current SC activities were not practical, and this caused many social problems to stem from**

Research on SC by Kirkbride (2018) showed that teenagers (13 to 18 of age) often faced CP when standing in front of a crowd (needed to be more confident), when communication with others who give them sexual affections (needed to be more impressive and attractive), when expressing their opinion or point of view to parents, teachers or friends (needed to know what and how to say),

when dealing with conflicts caused by themselves (needed to solve misunderstandings and disagreements and to control their emotions). The ranks of CP between Kirkbride's and the findings were not very different. However, according to Kirkbride, at Britain schools, students always came to counseling offices when they needed help; they were not shy or reserved, but they understood the missions and functions of school counselors were to help them feel safe and comfortable to share about their problems. This was opposite from the NCC of Vietnamese HS, which was optional. The most reasonable explanation for this difference was that SC in Vietnam had yet to prove specific efficiency to gain trust from students, or the counselors had yet clarified the missions of school counseling offices for students. This practical problem called for school counselors to propose more effective methods and planned to upgrade SC activities, as well as for managers and trainers to prepare for counselors with more professional skills and opportunities to help them get their jobs done productively.

Despite the aforementioned assessed mean, the result showed that a large number of students held the needs for NCC at necessary and absolutely necessary levels. This number was noteworthy to school counselors to figure out the block for students from coming to counseling offices despite their needs. Is it because of the quality or the skills of the counselors, or is it because of the ineffective SCM? Besides, students who needed and came to the counseling office were reliable resources to spread the word about the missions and the efficiency of SC for others. Therefore, school counselors needed to be careful in their work and keep upgrading their skills to prove the quality and efficiency of SC activities.

In-depth interview quotes also showed similarities in this situation. For students, they clearly showed us the CP we are concerned about (excessive self-expression, and lack of moderation in managing emotions). With teachers and counselors, they all knew their inability in the current context. They were aware that the source of social problems in the school today was partly due to the communication conflicts, but they could not support students to solve these problems thoroughly. Notably, school violence was widespread in Vietnam then. According to Son's research, school violence in Vietnamese lower secondary schools in recent years was showing signs of increase, and the level of occurrence was getting worse. More than 80 % of victims of school violence fall into a state of psychological trauma and obsessive disorder, which severely affected their lives (Son, 2015). To educators, they recognized that HS faced a lot of CP, and this might be the main reason for the increase in social problems in Vietnam. However, it was not possible to assume all responsibilities for students; it must be questioned for the education of parents and schools.

#### **Considerate factors when forming a SCM which have processes to counsel CP for Vietnamese HS**

It was found that HS especially needed counseling about confidence, comfortability during communication, or about controlling verbal and non-verbal language. Moreover, the development of different SCM in the world allowed online counseling to be employed, and there had been reliable and positive outcomes. Students came to school counselors more actively, and school counseling had been carried out more effectively. This online SCM was designed, especially for shy and timid students (Glasheen et al., 2016). It is noticed that international SCM has stated their concern about students' communication. If students were confident and needed direct counseling, they can come to counseling offices, but if they were shy and timid, they could use online counseling to receive support from counselors about their problems, including CP.

Gender, education level, and family context were the essential factors when forming a counseling process for students with CP.

Female teenagers often shared with their mothers, sisters or female teachers about menstruation problems, as well as asking for help and knowledge from their mothers, female school counselors about sexual activities and birth control methods, while male teenagers tended to learn by themselves or from their friends and they rarely shared or asked for help when they needed (Jaccard, Dittus, 2012). The research by Clark and Clark (2016) about communication ability at teenagers (13 to 16 of age) showed that male teenagers tended to be more introverted, with rarer communication and sharing with friends or relatives about their problems than female teenagers, as female teenagers often gathered to share their problems in order to find someone to understand or just to listen. Therefore, compared to previous researches, Vietnamese HS shared similarities about their CP at the same age in the gender perspective.

Different educational levels led to different CP and NCC. Our result was matched the previous findings by Vietnamese researchers. Tu et al. (2016) found that lower secondary school students liked sharing their opinions, talking about their problems with their friends, and sometimes parents and teachers; therefore, their needs for counseling about communication were always neutral. Nevertheless, upper secondary school students were under more pressure (from studying, career orientation, change of studying environment), so they became more reserved and tended to solve their problems on their own to prove themselves and their characteristics. However, solving all their problems on their own was impossible. Because of their lack of experience and understanding to ask for help and support others, and their arrogance and ego, they were shy from asking for help from others, especially from school counselors despite their needs. Due to this internal conflict, their needs for counseling were always too high or too low, leading to the delta, but they tend to be “shy despite needing for counseling” (Son, 2011a).

Comparing to research by Park, Chira, Miller, and Nugent (2015) about the influence of family context on American teenagers’ mental health, we found some differences. Their results showed that students living with both father and mother faced fewer mental problems (cognitive, emotional, behavioral disorders) than those living with only father or mother. Peterson and Zill’s (1986) research about the influence of divorce on behavioral problems at children showed that children would become isolated and avoidant towards communication and counseling support or intervention. Kalmijn’s research on children’s mentality in a divorced family, happy family and family with stepmother/stepfather, showed that in happy families, children expressed their needs for sharing and socializing and were more confident in seeking for help than those living in divorced families and families with stepmother/stepfather; they would become socially isolated and tended to display violent and anti-social behaviors and refuse any support (Kalmijn, 2015). Our result was consistent with many around the world about the relationship between children and their families.

Besides, improving teachers’ pedagogical communication skills, positive disciplinary methods, enhancing teaching and practice of soft skills for students, as well as enhancing the implementation of educational-oriented activities for personality education is a necessary condition to minimize social problems stemming from HS’ CP.

### **Limitations**

The limit of this study was stopped at the factual research. The questionnaire results, as well as the interview data, only reflected the status of CP and NCC of Vietnamese HS. It had been not gone into researching essential factors to form a counseling process for CP in the SCM.

Besides, it was only presented the differences in testing between gender, education level, and family context to HS’ CP and NCC. It had not been yet gone into the analysis of the factors, as well as pointed out the differences in CP and NCC from different family backgrounds.

Given these limitations, it was expected the following studies to refer to and continue to develop this idea.

### **6. Conclusion**

HS was facing CP and hold the need for counseling about those problems. There was a positive correlation between CP and NCC of Vietnamese HS. The more problems they faced, the high their needs for counseling were. However, SC in different cities and provinces in Vietnam had not yet been consistently carried out, SCM that had just been developed mostly in Hanoi City and Ho Chi Minh City (Vietnam) still hold many limitations, including absence for suitable counseling models and properly trained counselors with professional skills.

The findings served as a piece of evidence to update the literature and the emergency for a counseling model suitable for an education facility, for example, a workshop, a training to enhance the professionalism of school counselors to plan for filtering, prevention, help, and intervention for CP at lower and upper secondary school students. Moreover, SC activities needed to be strengthened at schools to help students organize proper communication, to enhance their efficiency in studying and reducing the social problems stem from.

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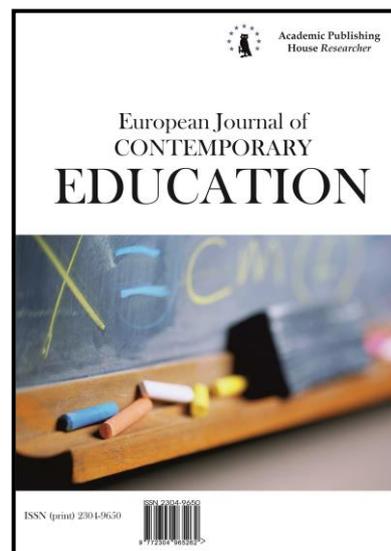
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## A Case Study of Graduate Quality: Subjective Opinions of Participants in the Sphere of Education

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### Abstract

The article considers the problem of graduate quality assessment from the perspective of various participants of the educational sphere. The research features the current state of education. It focuses on the national specifics that affect a particular model of education during its implementation. Modern education is characterized by interaction of several local educational environments and the adoption of innovative features of one national education system by other countries. The authors compared various national education systems and pointed out the following common traits: transformability, modelability, openness, and adaptability. As for the education of the early XXI century, it appeared to include the following characteristics. First, educational institutions satisfy people's needs for educational services. Second, the informative capacity of classes is increasing. Third, educational institutions are involved in the ranking process.

The study features the opinions of employers, students, and professors regarding the quality of training of social specialists in the spheres of education, healthcare, and social protection. The paper describes advantages and disadvantages of various national education models. The authors stress the need for the development and implementation of a Russian national education model and formulate its key guidelines. They assessed the efficiency of the current education model via opinions of employers, students, and professors on the formation of professional competencies in students of Bachelor and Master Programmes. The opinions of the three groups of respondents underwent a comparative analysis. According to the employers, the level of professional training was higher in Masters than in Bachelors. The professors demonstrated a more critical attitude to the level of Bachelors and evaluated it as average. The students appeared more positive in their assessment of Bachelors, but they also evaluated Masters as more skilled than Bachelors. The obtained data can be used to develop technologies that could facilitate the educational process and improve the graduate quality in higher education institutions.

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### 1. Introduction

The issues of modern education are a combination of events, conditions, and relationships shared by all subjects of the education process. Many researches describe the state of modern education as complex and controversial (Isaeva, 2009).

Taking into consideration the current challenges, education has to improve the development strategies of its content and structure. In the process of transformation, education acquires new content and elements, thus producing new models.

A theoretical analysis made it possible to state the procedural nature of the development of the modern education system, as well as its transformability and modelability. Its systemic characteristics are getting more variable. This provides a larger and a more individualised set of educational offers and services, the ultimate goal of which is to allow every individual to master desired competencies during one's entire lifetime.

We agree with A.M. Mitina (Mitina, 2005) in that a varied reform of education is taking place worldwide as a result of the challenge to make lifelong education accessible to all.

For instance, in Thailand, human resource development problems triggered the growth of corporate universities and partnerships between corporations and universities. Corporate partnerships in the sphere of education are quickly adapting to the needs of industry and are becoming increasingly popular, thus complementing traditional higher education (Crocco et al., 2017).

The Latin American macro-university is considered a highly productive model: it is a state-controlled type of higher education that combines the ideals of democratisation, high revenues and meritocratic models of selection and access (Fischman, 2018).

According to N.A. Korneeva (Korneeva, 2007), open education, as a learning system, is based on the principles of flexibility, modelability, parallelism, asynchrony, and continuity. Open education implements the learning process via an active use of specialised information technologies and teaching aids.

According to O.Yu. Vlasova, the modern education system should be adaptable (Vlasova, 2015). Broadly speaking, adaptation means that the system adapts to some changing conditions. A system is considered adaptive if it can adapt to changes under internal and external conditions. The criteria of adaptability include a certain variety of characteristics of education, the flexibility and variability of the dual response of elements, and a feedback. Thus, education model is considered adaptable if it ensures people's right to education in a certain range of changing conditions. The wider this range, the more adaptive the model.

Modern education has to provide necessary conditions to satisfy the needs of the individual in educational services. We agree with N.A. Korneeva (Korneeva, 2007) that the difference between the need for educational services and the need for education is that the former results in one's professional development, mastering a trade, professional or social growth, as well as the formation of key competencies.

Modern education is also characterised by an increasing information flow, which, in its turn, inevitably leads to an increase in the informative capacity of classes and a constant improvement of the educational process (Kondratenko, 2015).

Another feature of contemporary higher education is its involvement in the ranking. According to William Yat Wai Lo (Yat Wai Lo, 2011), the emerging global university rankings are important soft power resources that have the potential, as a management tool, to change the global landscape of higher education.

Therefore, education system is a set of elements integrated as various models, whose functioning ensures maximum efficiency.

The problem of the graduate quality deserves special attention. According to G.A. Paputkova (Paputkova, 2015), the current state of the economy determines a high interest to the problems of graduate quality improvement as a leading competitive advantage of a university.

The essential characteristics of education quality have acquired different interpretations that depend on both the historical process and the country of the research.

According to L.D. Maslova (Maslova, 2012), Russian higher education demonstrates a more developed external quality assessment, which is focused on standards and performance indicators. The main elements of this system include standardisation, licensing, certification, and accreditation, as well as a comprehensive ranking of educational institutions and individual specialties. Effective mechanisms and assessment procedures involve a point-rating system (Shmonin, 2012) or an independent social and professional accreditation (Mustafayev, 2015).

According to the analysis of independent assessment procedures for graduate quality in Europe and Asia conducted by T.V. Tretyakova (Tretyakova, 2019), there is a wide variety of approaches to the establishment of governing bodies of the system of assessment and monitoring the education quality. T.V. Tretyakova sees an advantage in the combination of an external assessment conducted by independent commissions and a self-examination conducted by the educational institution.

Foreign practice shows that the procedures for the independent assessment of graduate quality are associated with the processes of certification of qualifications and are often a mandatory initial stage in confirming the professionalism of a graduate. An independent assessment of graduate quality in a particular discipline or field of training significantly increases confidence in assessing the results of professional education, since it separates educational service from its assessment.

In the United Kingdom, academic achievement and professional qualifications are evaluated by qualification organisations that are independent from both educational institutions and the government. Assessment of knowledge and professional competencies is based on professional standards and conducted by independent experts. In China, an independent assessment of graduate quality is carried out by employers acting on behalf of coordination councils for cooperation between educational organisations, enterprises, and related departments.

A Malaysian research team (Rajadurai et al., 2018) traced the gap between the key attributes of graduates of technical universities and their actual efficiency in getting a job. All elements related to the personality dimension were placed in the "keep up the good work" quadrant (high importance/high performance). The knowledge aspect was placed in the "focus here" quadrant (high importance/low productivity). Skills (soft skills and hard skills) and intellectual abilities were placed in the "low priority" quadrant. Physical abilities were the only aspect placed in the "possible excess/ bust" quadrant. The data obtained prove that competitiveness of graduates should be ensured by the development of their personal qualities. Similar results were obtained by the studies on the problems of project education (Chen, 2019), emotional and social learning (SEL) (Corcoran et al., 2018), issues of assessing the formation of competencies (Hwang, 2019), and the applicability of visualisation tools in metaprojecting of the educational environment (Zakharova et al., 2019).

To optimise the process of graduate quality assessment, it is compulsory to perform a comparative analysis of the positions of key participants in the educational sphere, i.e. students, professors, and employers.

## **2. Materials and methods**

The present research featured opinions of participants of the educational process regarding the level of professional competence of Bachelors and Masters.

Information was obtained by questionnaire method, which presupposed written answers to a system of standardised questions.

We developed three types of questionnaires: for employers, for students, and for professors.

The results were analysed both quantitatively and qualitatively.

The experimental data were processed using Microsoft Excel and Matchcad.14v.

The statistical data analysis included the following methods. The mean values were compared using Student's t-test for dependent samples, when analyzing the opinions of respondents regarding the quality of education of Bachelors and Masters in groups of students, employers, and professors. Student's t-test was also used for independent samples, which made it possible to identify significant differences in the opinions of representatives of different groups.

When developing questionnaires, we relied on the opinion expressed by J. Raven, N. Chomsky, R. White, N.V. Kuzmina, A.K. Markov, V.I. Baidenko, and A.V. Khutorskoy. The questionnaires were also based on the Dublin group identifier of qualifications awarded to

students, which mean completion of a short cycle of higher education. The structure of the questionnaire included 20 competencies assessed on a ten-point scale.

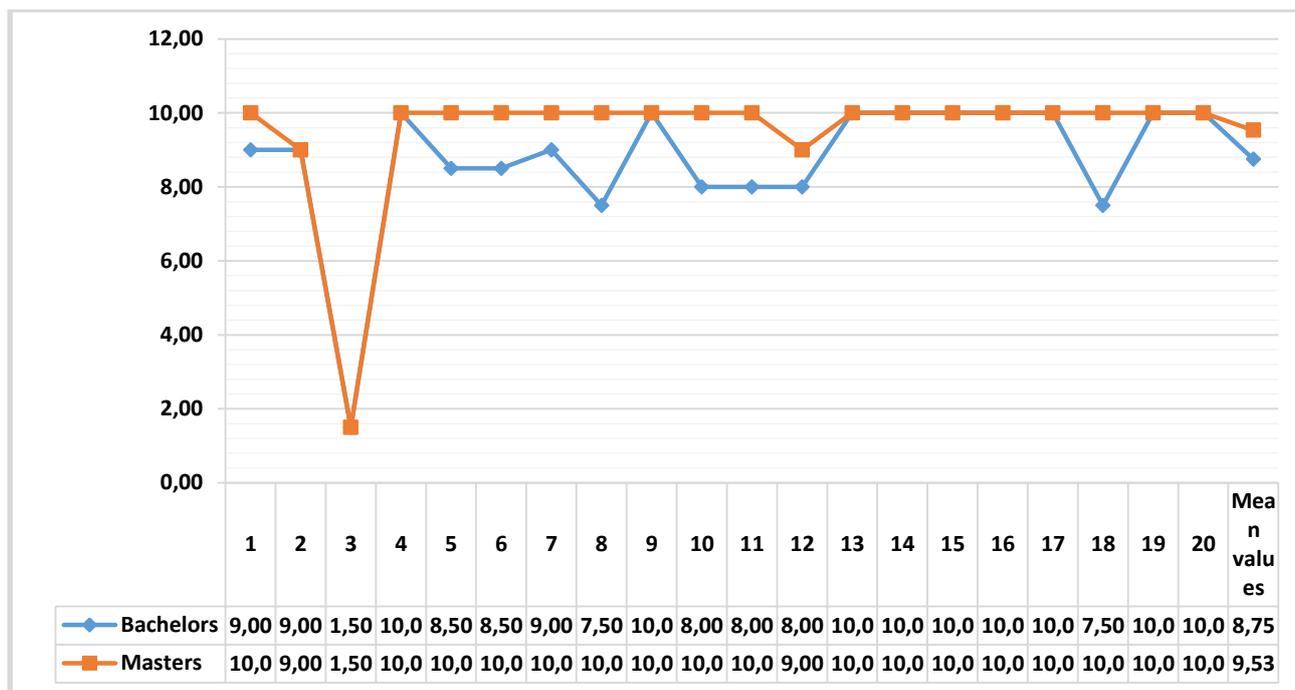
1. The ability to put knowledge into practice;
2. Teamwork;
3. Leadership;
4. Quality awareness;
5. Counseling and preventive work in the social sphere;
6. The ability to establish business contacts with specialists of various services and organizations;
7. Willingness to demonstrate a humanistic approach to people;
8. The ability to purposefully and effectively implement modern technologies of social work;
9. Computer skills;
10. Time management;
11. The ability to develop programs to be implemented in various areas of social policy;
12. Readiness for effective communication when organizing work on social protection of the population;
13. The ability to prevent professional burnout;
14. Eloquence;
15. Multitasking;
16. The ability to gain the trust of customers and colleagues;
17. The ability to resolve conflicts and mitigate differences;
18. Willingness to engage in organizational and public planning;
19. Reliability and responsibility, an adequate response to socio-economic changes in society;
20. The ability to generate new ideas (creativity).

Institutes of the Kemerovo State University served as experimental base for the research. The study involved 248 people: graduate students (90), professors (80), and specialists (78) from various services and organisations, e.g. Department of Education and Social Welfare, Department of Culture and National Policy, etc.

The selection of subjects was conducted out in such a way that the sample population reflected the trends of the total population. Quality representation was planned so that that all elements of the total population were represented in the sample population. All groups had an equal gender ratio. The comparable age of the subjects ensured the homogeneity of the sample. The groups of employers and professors included specialists with 10–20 years of professional experience. The rationale for the sample size was made using methods of mathematical statistics. The total population of students was 1,100. For a simple random sample of 1,100 units, the maximum statistical error (with a 95 % confidence probability) is 9.9 % (Larina, 2015). The number of respondents in the representative sample was 90 people. The sample size was also calculated for groups of employers and teachers.

### **3. Results**

Figure 1 illustrates the attitudes of the employers towards the formation of competencies demonstrated by Bachelors and Masters.



**Fig. 1.** Mean values of the formation of competencies in Bachelors and Masters according to the employers

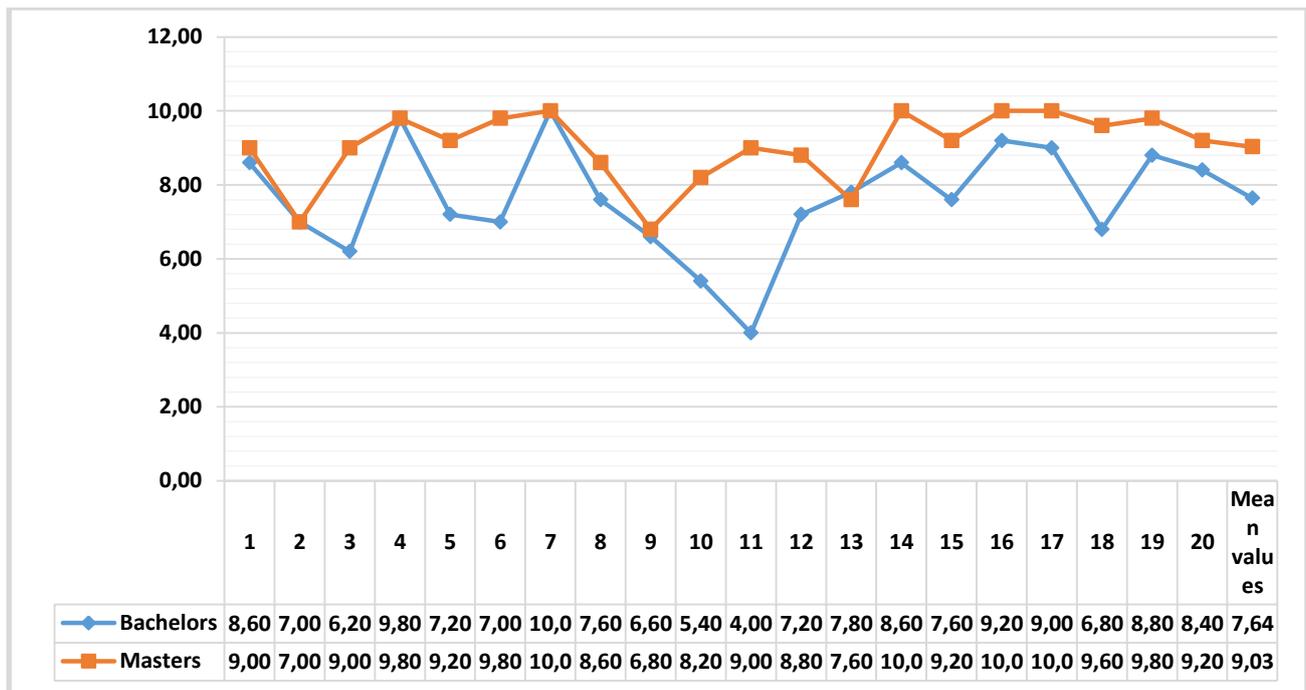
The obtained data suggest that the average score given by the employers to Masters was higher according to all 20 competencies ( $t = -2.16$ , number of degrees of freedom = 77, at  $p = 0.07$ ). Thus, according to the employers, the general level of professional training of a Master is not significantly higher than that of a Bachelor.

As for the most significant competencies of both Bachelors and Masters, the employers mentioned quality awareness, computer skills, ability to prevent professional burnout, ability to resolve conflicts, reliability and responsibility, and creativity. According to the employers, Masters have to possess all the abovementioned competencies. However, leadership scored only 1.5 points, both for Masters and Bachelors. Not only was the average score for Masters higher than for Bachelors, but none of the Bachelors' competencies was scored higher than that of the Masters.

Significant differences between the formation indicators were obtained for two competencies: "ability to implement modern technologies" ( $t = -6.55$ , number of degrees of freedom = 77, at  $p < 0.01$ ) and "willingness to engage in organisational and social planning" ( $t = -6.55$ , number of degrees of freedom = 77, at  $p < 0.01$ ). According to the employers, Masters possessed the maximum indicator of formation, while Bachelors had a score that indicated an average level of formation. A smaller gap in the formation indicators was revealed for such competencies as "ability to develop programmes to be implemented in various areas of social policy" ( $t = -5.17$ , number of degrees of freedom = 77, at  $p = 0.01$ ) and "time management and planning" ( $t = -5.17$ , number of degrees of freedom = 77, at  $p = 0.01$ ).

Therefore, the employers evaluated the level of competency formation as above average and saw no difference between Bachelors and Masters.

Figure 2 illustrates a comparative analysis of the mean values of students' opinions regarding the formation of the competencies in Bachelors and Masters.



**Fig. 2.** Mean values of the formation of the competencies in Bachelors and Master according to the students

The obtained data showed that the average score given by the students to Masters was higher for all 20 competencies ( $t = -3.16$ , number of degrees of freedom = 89, at  $p < 0.05$ ). Thus, the students believed that the level of professional training of a Master was higher than that of a Bachelor. As for individual professional competences, students assessed willingness to demonstrate a humanistic approach to people as the most important competency for both Bachelors and Masters. It was the only competency that received the highest score (10 points).

Masters did not score low for any of the competencies, unlike Bachelors. The students gave the latter only 4 points ( $t = -9.36$ , number of degrees of freedom = 89, at  $p < 0.01$ ) for "ability to develop programmes to be implemented in various areas of social policy".

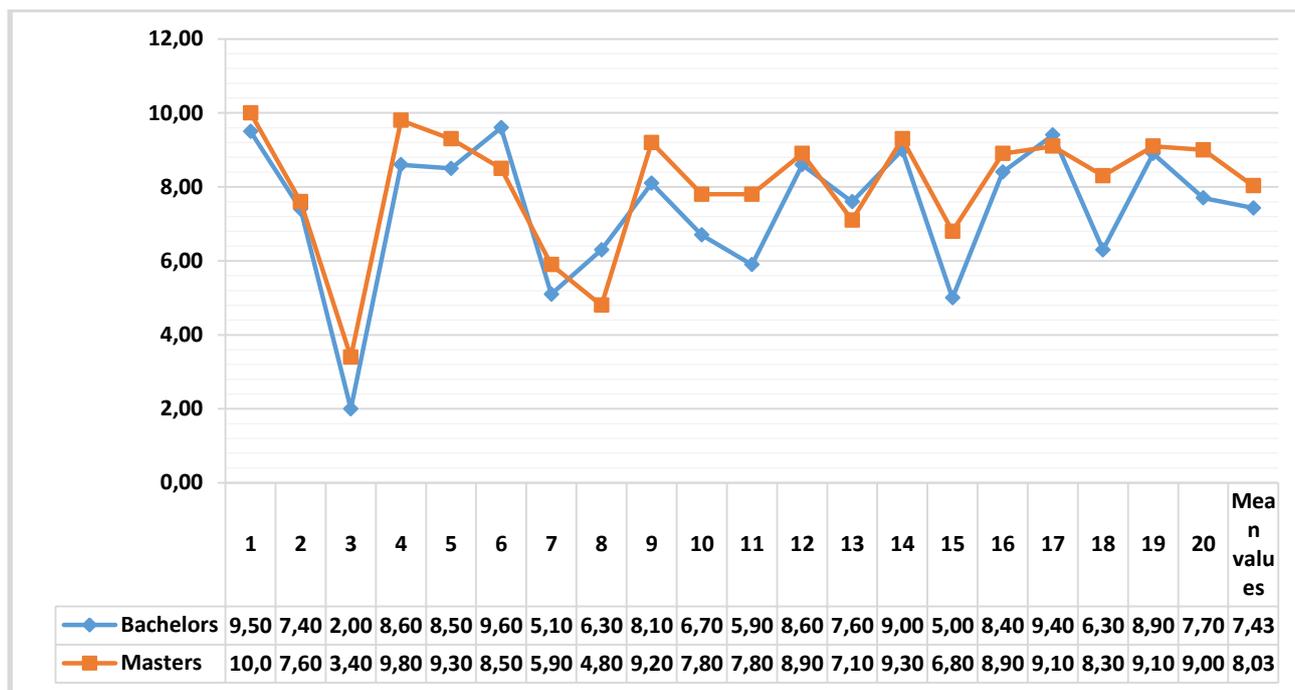
Almost all assessed indicators demonstrated differences with different levels of confidence. There was a certain degree of subjectivity in the grades given by the students to Bachelors and Masters. According to the students, Masters had all competencies formed at a higher level. This subjective position might be explained by the fact that, when designing their own individual educational trajectory, the students considered Master's degree as an obligatory stage in obtaining higher education.

Significant differences between the formation indicators were obtained for the following competencies: "leadership" ( $t = -6.55$ , number of degrees of freedom = 89, at  $p < 0.01$ ), "time management and planning" ( $t = -6.55$ , number of degrees of freedom = 89, at  $p < 0.01$ ), "ability to establish business contacts with specialists of various services and organisations" ( $t = -6.55$ , number of degrees of freedom = 89, at  $p < 0.01$ ), "willingness to engage in organisational and public planning" ( $t = -6.55$ , number of degrees of freedom = 89, at  $p < 0.01$ ), and "ability to develop programmes to be implemented various areas of social policy" ( $t = -9.36$ , number of degrees of freedom = 89, at  $p < 0.01$ ).

According to the students, not only did Masters have a higher mean score, but also no competency given by them to Bachelors received more points than the same competency assessed for Masters.

Therefore, when assessing graduate quality, the students paid more attention to the problems of interaction in professional groups and organisational structures. They also noted significant differences between Bachelors and Masters in the field of social interaction management.

Figure 3 illustrates a comparative analysis of the mean values of professors' opinions on the formation of the competencies in Bachelors and Masters.



**Fig. 3.** Mean values of the formation of the competencies in Bachelors and Master according to the professors

The obtained data showed that the average score given by the professors to Masters was higher according to all 20 competencies ( $t = -3.63$ , number of degrees of freedom = 79, at  $p < 0.05$ ). Moreover, the professors proved the most critical group. The professors demonstrated a more critical attitude to the Bachelors and evaluated their graduate quality as average.

However, almost all competencies showed no differences with a high level of reliability ( $p < 0.01$ ) between the formation indicators.

Significant differences were obtained only for such competence as "willingness to engage in organisational and social planning" ( $t = -5.17$ , number of degrees of freedom = 79, at  $p = 0.01$ ). According to the professors, the fact that a graduate mastered all levels of educational programmes did not mean that this competency was well-formed.

Surprisingly, the "leadership" competency received a low score ( $t = -3.16$ , number of degrees of freedom = 79, at  $p < 0.05$ ). Thus, the professors did not believe that this ability can be developed at university.

Unlike the students and the employers, the professors gave Bachelors higher scores for "ability to implement modern technologies" than to Masters ( $t = 3.63$ , number of degrees of freedom = 79, at  $p < 0.05$ ).

A higher level of formation in the absence of differences with a high level of reliability ( $p < 0.05$ ) was identified for such competencies as "ability to prevent professional burnout" ( $t = 2.06$ , number of degrees of freedom = 79, at  $p = 0.08$ ) and "ability to establish business contacts with specialists from various services and organisations" ( $t = 2.24$ , number of degrees of freedom = 79, at  $p = 0.06$ ). Therefore, the professors evaluated these competencies as average at both levels of education.

The obtained data indicated that all three groups of respondents gave Masters higher mean values of competencies. The employers and the professors also demonstrated significant differences in the mean values of the general level of competency formation in Bachelors ( $t = 3.06$ , number of degrees of freedom = 156, at  $p < 0.05$ ). This trend persisted in their assessment of the general level of competency formation in Masters ( $t = 3.29$ , number of degrees of freedom = 156, at  $p < 0.05$ ).

When assessing Masters, all respondents noted the maximum sufficient level of formation of ten of the competencies. Therefore, Masters demonstrated a high level of formation in 50 % of the competencies proposed for assessment.

As for Bachelors, only five competencies were given a high score, which is 25 %.

Some competencies received different opinions from the professors, the students, and the employers. Thus, we detected statistically significant differences by comparing the mean values given to Bachelors by the employers and the professors for the "teamwork" competency ( $t = 5.56$ , number of degrees of freedom = 156, at  $p < 0.01$ ). This trend persisted in the scores given to Masters ( $t = 4.86$ , number of degrees of freedom = 156, at  $p < 0.05$ ).

In addition, significant differences were detected in the mean values given by the employers and the professors for the competency "ability to implement modern technologies" to both Bachelors ( $t = 3.06$ , number of degrees of freedom = 156, at  $p < 0.05$ ) and Masters ( $t = 9.36$ , number of degrees of freedom = 156, at  $p < 0.01$ ), with the professors being even more critical of Masters.

The mean values of the level of formation of "time management and planning" competency also demonstrated a statistically significant difference. This competency demonstrated significant differences in the mean values given by the employers and the students to Bachelors ( $t = 5.67$ , number of degrees of freedom = 166, at  $p < 0.01$ ) and in the mean values given by the employers and the professors to Masters ( $t = 5.56$ , number of degrees of freedom = 156, at  $p < 0.01$ ). Only the employers awarded this competency in Masters with the highest score; other groups of respondents assessed this competency as average.

The opinions of the employers also differed from other groups in their evaluation of the "multitasking" competency.

Significant differences were detected in the mean values given to Bachelors for this competency by the employers and the teachers ( $t = 9.36$ , number of degrees of freedom = 156, at  $p < 0.01$ ), the employers and the students ( $t = 5.67$ , number of degrees of freedom = 166, at  $p < 0.01$ ), as well as to Masters by the employers and the professors ( $t = 7.86$ , number of degrees of freedom = 156, at  $p < 0.01$ ). The employers gave the highest score for these competencies to both Bachelors and Masters. The professors and the students assessed these competencies as average both in Masters and Bachelors.

Both employers and students gave Masters and Bachelors high scores for "ability to gain the trust of clients and colleagues". The professors gave Bachelors fewer points for this competency. The students and the professors assessed "creativity" in Bachelors as average. For this competency, significant differences were detected in the mean values given to Bachelors by the employers and the students ( $t = 3.63$ , number of degrees of freedom = 166, at  $p < 0.05$ ) and the employers and the professors ( $t = 5.56$ , number of degrees of freedom = 156, at  $p < 0.01$ ). All respondents gave Masters a high score for this competency.

#### **4. Discussion**

The obtained data made it possible to analyse opinions of professors, students, and employers on the formation of the competencies in graduates with Master and Bachelor degrees.

Subjective opinion of participants in educational practice has remained in the focus of attention of scientific community for a remarkably long time. For instance, L. Harvey made a comprehensive assessment of approaches to the quality of higher education at the turn of the XX – XXI centuries. The author emphasized that, despite the growing uniformity of approaches to quality monitoring, the studies of this phenomenon in the context of higher education still remain insufficient (Harvey, 1998).

The results of our study contribute to the ongoing discussion of education quality assessment (Thornton, 2010). The data indicate that a competitive university graduate meets the requirements of the profession, i.e. personal and professional potential, as well as the ability to use modern effective methods, techniques, and technologies in professional activities. A competitive graduate brings into the professional activity an individually-creative, innovative component and consciously develops his or her own personal and professional personality. An analysis of the subjective students' opinions made it possible to ascertain the presence of a conscious attitude to their future, which is consistent with the data obtained in the study performed by A. García-Aracil, S. Monteiro, L.S. Almeida (García-Aracil et al., 2018). The present study revealed that students are aware of the problems of interaction in professional groups and organizational structures. This find was comparable with the authors' point of view: ample learning experience, which contributes to the development of methodological and practical competencies, if combined with collective

experience related to career and employment skills, can help graduates make a seamless transition from learning to work.

Talking about the need to determine the subjective opinion of participants in the educational process regarding the education quality, one should mention the data obtained by S.W. Hwang and Y.A. Kwon. They proved that diagnosis should use a tool to measure one's own competence as a condition for improving the educational program (Hwang, 2019).

Our data on students' positive attitudes toward the study programs are comparable to those obtained by E. Mustafa, N. Mohd Ariffin, A.H. Mohd Arshad, 'A.M. Mohamad, and N.A.H. Hanafiah (Mustafa et al., 2019), who showed that most students are satisfied with the academic and non-academic university programs.

Hence, the ultimate goal is to teach future specialists to competently integrate the knowledge, values, and skills of their profession into their practical activities.

Our position does not contradict the data obtained by F. Trede and D. Jackson on the engagement of participants in the process of becoming effective professionals (Trede, 2019).

Although some researchers argue that for the development of a specialist it is important to be able to transfer practical skills into the real context of professional activity (Sutin, 2018), the results of our study showed that the employer does not see significant differences between the competencies of Bachelors and Masters. Remarkably, these difficulties are present in competency assessments conducted by J. Strijbos, N. Engels, and K. Struyven (Strijbos et al., 2015).

In assessing competencies, the employers, the students, and the professors gave absolutely different scores to one and the same competence, i.e. there was not a single competency that received the same score from all three groups of respondents. However, the respondents demonstrated a more consistent position when assessing Masters.

R. Decker, M. Garcia, A. Kelly & H. Mulrooney revealed that employers value personal qualities of a graduate. At the same time, the quality of teaching and learning, feedback and relationships are highly rated by both staff and students.

Students, while being quite positive about teaching and learning methods, expressed uncertainty about the quality of education they receive (Dicker et al., 2019).

L. Bunce and M. Bennett believe that it is not enough to take into account only the opinion of students. They showed that a stronger consumer identity, as an indicator of the presence of a Bachelor's degree as a purchased product to increase future incomes, is associated with lower academic performance (Bunce, 2019). The educational organizations should take into account the revealed relationships when advertising their academic proposal.

Our analysis showed that it is the employers who should assess the level of practical training of a university graduate, as well as his or her willingness to perform professional functions. This is only logical because the employers are the final consumers of the product in the field of professional education. This circumstance predetermines a need to develop a system of interaction with employers, which will increase the competitiveness of graduates in the labor market.

## **5. Conclusion**

For centuries, education has maintained its status of one of the most important areas of human activity. This sphere of human life is one of the largest and most extensive worldwide. A large number of people are involved in this sphere during their entire lives. The demand for education can be traced at almost every stage of human life. Currently, all members of educational process are demonstrating less and less satisfaction with its result. The present research suggests that serious changes are taking place, and a new education system is on its way.

In modern education, various local educational environments interact actively. As a result, specific features of one national innovative environment are adopted by the educational space of other countries.

The general characteristics inherent to most national educational systems include transformability, modelability, openness, and adaptability. The specific characteristics of education of the early XXI century include the following traits: first, educational institutions satisfy people's needs for educational services; second, the informative capacity of classes is increasing; third, educational institutions are involved in the ranking process.

The paper also gave an outlook of modern interpretations of independent assessment procedures of graduate quality, which are aimed at improving the quality of educational services. The approaches to the organisation of the assessment procedure proved variable.

The present research featured various national educational models, their advantages and disadvantages, with the focus on the problem of the development and implementation of a national education model for this country.

We analysed opinions of employers, students, and professors on the efficiency of the current Russian model represented by the formation of professional competencies in Bachelors and Masters. According to the employers, Masters have a higher level of professional training. The professors turned out to express a more critical attitude to Bachelors, whose level of competency formation was assessed as average. The students were more loyal in assessing the competencies of Bachelors, while assessing the level of Masters as superior.

Most of the proposed competencies (14 out of 20) received different opinions from the three groups of respondents. The remaining six competencies received relatively similar opinions, i.e. the scores were different, but they fit in the same numerical segment defined as high, medium, or low. Masters had higher mean values than Bachelors, with the exception for three competencies: the abilities to establish business contacts with specialists of different services and organizations, to implement modern technologies, and to resolve conflicts. There, professors gave a higher score to Bachelors than to Masters.

The obtained data can be implemented in developing various technologies that can be used to organise the educational process and improve the graduate quality in higher education institutions.

The research results can be used in developing new educational technologies and building an effective national model of education.

The targeting of education is changing from the current operational function to the one focused on the development of creative potential. Thus, the new education model should help to satisfy the diverse needs of the individual. However, it is not enough to provide people with favourable conditions for receiving or continuing education. It is also necessary to encourage them to take advantage of the provided opportunities. Otherwise, the "educational indifference syndrome" is inevitable. The need for education must be consciously and purposefully shaped by the society, who should be ready to satisfy the need of its members in obtaining the desired education within suitable terms, contents, methods, levels, etc. For this, the society should demonstrate a developed desire to make efforts to get education.

One's need for education is integrative in nature, for it combines one's social, spiritual, and material needs. The stimulation of education involves the development and enrichment of the prospects of the individual. Education should receive the status of a social value that allows one to comprehend all other values that society can offer.

Expanding the boundaries of cooperation can open up new opportunities, for instance, for Russian students and young scientists, without "losing face". A new national system of education should combine the historical Eurocentric tradition with the Russian intellectual potential, national identity, and cultural experience; then it has every chance of maintaining a "golden mean" in its development.

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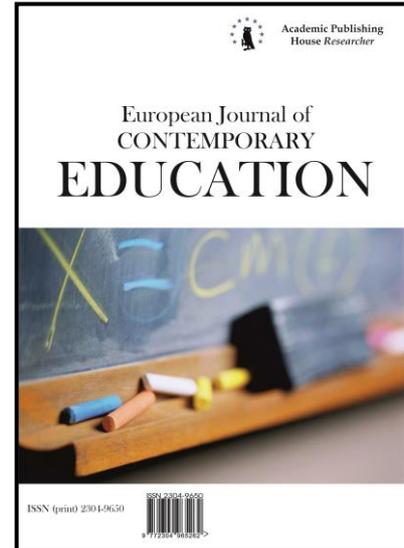
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## Financial Literacy Level on College Students: A Comparative Descriptive Analysis between Mexico and Colombia

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### Abstract

This main objective of this study is the measurement of financial literacy in college students from Mexico and Colombia, using an instrument that was designed based on the available literature review and which was applied to a sample of 224 students. It was possible to find slight differences between the two countries, but the results as a whole were concerning as they showed a low level of financial literacy in the analyzed population, specifically in the topics of retirement planning, inflation, credit (credit card usage), savings and investment and risk diversification. This paper also proposes a questionnaire considering seven financial topics which measures the level of financial literacy and can be replicated in other study populations.

It is important to point out that college students are an important opportunity to focus the efforts on financial literacy, since they are in a crucial stage of their lives when they are beginning to get into the work force or will do so soon, which is why this information can be used in a near future and by having it they can use financial instruments in a proper manner and for their benefit, helping them to achieve their financial goals and avoid financial problems during their life, contributing to their future wellbeing and society in general.

**Keywords:** financial literacy, college students, retirement planning, numeracy, saving and investment.

### 1. Introduction

Currently, financial literacy has gained more relevance than before due to the accelerated growth of capitalist financial markets and an increase of the number and complexity of financial products and services. Because of the former, people require the knowledge that allows them to

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have an adequate level of financial literacy, which can in turn help them to better use financial products and services, as well as made good financial choices.

Financial literacy can be taught and promoted in college institutions, since students are at an age when they are already in the work force or will soon be getting a job and besides, they are old enough to purchase different financial products and services in the market, such as bank accounts, credit cards or insurance, among others.

Worldwide, it is possible to find economic recessions, inflation, unemployment and decrease of purchasing power (Taft et al., 2013), which is why people need a knowledge and a set of skills that allows them to manage their finances properly. Furthermore, they need to take a larger responsibility regarding their financial wellbeing, specially because of the increase of financial products that are increasingly more complex, such as credit card conditions, mortgages, loans and credit lines (Lusardi, Mitchell, 2014), since even though they provide better opportunities for consumers, they present bigger risks for those people lacking the necessary financial knowledge too (Mandell, Schmid-Klein, 2009).

The work by Chen & Volpe (Chen, Volpe, 1998), explains that the ability to manage personal finances is becoming more important in today's context. Moreover, they state that people must plan their investments in a long-term for retirement and the education costs of their children. Another issue they must make decisions about is their short-term savings and loans, a house credit, a car loan and other costly expenses, besides handling their own medical needs and life insurance.

For the reasons stated above, the subject of financial literacy emerges with the aim of measuring the level of understanding about the information required by a person to make responsible financial decisions, although it must be taken into account that people introduce values, wrong perceptions, fears and shared goals to the decision making of financial matters (Holden, 2010).

College students have been a common population of study because of the importance of financial literacy in young people (Danes, Hira, 1987; Armstrong, Craven, 1993; Chen, Volpe, 1998, 2002; Hayhoe et al., 2000; Staten, Barron, 2002; Lawrence et al., 2003; Lyons, Hunt, 2003; Johnson, 2005; Murphy, 2005; Cude et al., 2007; Borden et al., 2008; Sabri, MacDonald, 2010; Robb, 2011; Lusardi, Wallace 2013; Moreno-García et al., 2013), since higher education is a moment in people's lives when they must or at least, begin to enter the financial system as citizens with enough age to access financial products and services available in the market and so, the decisions they make will cause repercussions in their economical wellbeing.

Lusardi & Wallace (Lusardi, Wallace, 2013) state that young people usually have a low level of financial literacy and are commonly the group with the lowest level of financial literacy in the United States and in other countries, as well as having poor financial behavior. As such, young people are one of the most vulnerable populations and thus, financial literacy most emphasize a quantitative practical component.

College students have been the subjects of study in financial literacy research, being one of the first studies on the matter the one by Danes & Hira (Danes, Hira, 1987), who analyzed the college students' knowledge about credit cards, insurance, personal loans, record keeping and financial management in general, finding that men know more than women in several topics, married students know more than those who are single and students of senior years know more than those in junior years, but their most important finding was that college students have a low level of financial knowledge.

The seminal study by El Chen & Volpe (El Chen, Volpe, 1998) analyzed financial literacy of college students and found that the level of financial literacy of young people is very low, limiting their ability to make informed financial decisions. Additionally, it was found that college students enrolled in management related careers have a higher financial literacy level than the ones in other programs.

Avard, Manton, English & Walker (Avard et al., 2005) applied a multiple-choice test to determine the financial literacy level of junior college students, proving that this population has no knowledge about financial topics of daily life and so, they propose the possibility of including the subject of financial literacy in the general curriculum due to its high importance

Another example of financial literacy research in college students is the study by Cude et al. (Cude et al., 2006), where the aim is to investigate how college students acquire their financial literacy and the behaviors and factors related to higher risk for students. Furthermore, the studies

by Sabri in Malaysia have been analyzing other elements relation to the financial literacy of this population, such as the variables related to the financial wellbeing of college students, including their childhood experiences, financial socialization and financial literacy (Sabri et al., 2012), as well as the relation between saving behavior, financial problems and financial literacy of college students (Sabri, McDonald, 2010).

Again in Malaysia, Ibrahim, Harun & Isa (Ibrahim et al., 2010) emphasize the importance of financial literacy for college students, focusing on the context, financial attitude, financial knowledge and family. By analyzing the obtained data using the software SPSS 12, they found that most students do not put into practice the necessary skills for financial management, which is why the authors expect measures will be taken to solve this issue.

De Bassa Scheresberg (De Bassa Scheresberg, 2013) examined financial literacy and behavior of young adults, finding that most of them lack basic financial knowledge and even though some demographic groups like women, minorities and people with low income and low schooling level have a particularly low financial literacy level, a high schooling level is not a guarantee of having good financial literacy. The surveyed population with higher financial literacy or higher confidence in their mathematics and personal finance knowledge obtained better financial results: they have a lesser probability of using high-cost loans and are more likely to save for retirement and save money for emergencies.

Specifically in the Latin American context, the work by García, Grifoni, López & Mejía (García et al., 2013) is a relevant effort to analyze the current situation and perspectives of financial literacy in Latin America and the Caribbean, using data gathered by evaluation exercises worldwide and surveys applied by the INFE (International Network of Financial Education)/OECD, Bank of the Republic, Fogafin (Financial Institutions Guarantees Fund) and CAF (Andine Cooperation of Promotion), the latter one carried out in 16 countries of Latin America, including Mexico.

The results of the former study are concerning, since they show a "generalized ignorance among the population" regarding basic financial concepts, such as inflation, interest rates, relation between risk and profitability or the operation of the capital market; also, women have, in average, a lower level of financial knowledge than men and in Colombia and Peru, those with higher income have more knowledge on financial matters (García et al., 2013).

Likewise, Raccanello & Herrera (Raccanello, Herrera, 2014) discuss the particular case of Mexico, highlighting that in said country, the process of financial inclusion is ongoing and mention that despite the initiatives regarding financial literacy, the financial knowledge of the population is insufficient, which can harm the wellbeing of Mexican people and their families.

Also in Mexico, Arceo-Gómez & Villagómez (Arceo-Gómez, Villagómez, 2016) made a research about the financial literacy level of high-school students aged 15 to 18 years old, using for this purpose an instrument designed by themselves, based in the methodology by the OECD and Lusardi & Mitchell. The results of this study showed low levels of financial literacy in the country; however, 57 % of the surveyed population got a high score in financial behavior, while 70 % showed positive financial attitudes. Other relevant findings include the fact that gender differences were not found and it was the same case for public and private schools or by household income.

Considering high-school students as the population too, Zamora-Lobato, García-Santillán, Moreno-García, López-Morales & Ramos-Hernández (Zamora-Lobato et al., 2017) analyzed the perception of 401 Mexican students on variables related to financial literacy: saving, investment, pensions, credits, debts and expenses and budgets, finding that mostly, the students have a positive perception of financial institutions and the products they offer.

In the Mexican context it is possible to find studies about the financial literacy level of college students, such as the research by Moreno-García, García-Santillán & Gutiérrez-Delgado (Moreno-García et al., 2017), which targeted a population of college students enrolled in economic-management careers, assessing their knowledge on topics like interest rate, inflation, savings, credit card use and budgeting; the results showed that this young people have the knowledge and habit of making a budget about their expenses, although their financial literacy level is very low with regard to the other variables.

Another example is the work by Moreno-García, García-Santillán & Munguía Tiburcio (Moreno-García et al., 2013), who measured the financial literacy level of college students enrolled in the Accounting program of a public institution, also taking into account the variables of age, gender, socio-economic status, personal preferences and learning styles.

Using factorial analysis methods with component extraction, Pearson lineal correlation, T test and Z test, these authors found that there was a poor financial literacy level among the studied population, which was contrary to expectations taking into consideration the career they were studying and so, the authors consider that this is due to a lack of proximity to the formal financial system since an early age or the lack of information received by the people around them, which is caused by a general ignorance of the population regarding financial instruments.

On the other side, there are few empirical studies in Colombia about financial literacy, although there is information from international surveys, such as the PISA tests of 2012, where the country obtained the last place of financial literacy among the selected countries.

Recently, the Center of Research for Development ([Centro de Investigaciones para el Desarrollo, 2016](#)) researched the students of the Economy Faculty of the National University in Colombia, as well as the Faculty of Finances, Government and International Relations of the Externado University in Colombia, considering three elements: financial knowledge, attitudes and behavior, finding that college students have average level of financial capability.

Among the most important findings of this study, it is possible to find the fact that young people have serious deficiencies in the knowledge of basic saving and credit products, interest rates and value of money over time; regarding attitudes, they are interest in saving but in the short-term to buy recreation products, clothes or home appliances even though they need better skills for future planning, have more proximity to the financial system and be more informed about the economic conditions of their environment.

The research of Carvajal, Arrubla & Caicedo ([Carvajal et al., 2016](#)) is another of the few examples in Colombia about financial literacy level in college students and their results show that most students are not making a financial planning due to the lack of knowledge they have about finances and the lack of information on the subject, which lead them to excessive indebtedness and no retirement planning or savings for the future.

In this study, the aim is to determine the level of financial literacy of college students and thus, the research question is: what is the financial literacy level of college students?

According to the former, the work hypotheses are the following:

H<sub>0i</sub>: The financial literacy level of college students is not low.

H<sub>1i</sub>: The financial literacy level of college students is low.

## 2. Design and method

The present study is non-experimental because it was carried out without manipulating or modifying in any way the independent variables (X) in the attempt to alter the effects (variables Y). Furthermore, it is a transversal study since the instrument was applied in a determined period (during the months of September to November 2017).

The subjects of this study are college students, who have been the population used by a number of financial literacy studies, due to the fact that this young people have already reached adulthood legally and are therefore capable of buying financial products and services, starting to insert themselves in the economical market. The sample was made up by 224 college students from Mexico and Colombia, enrolled in higher education institutions, both public and private.

It is important to mention that financial literacy studies have used different variables for measure, usually basic financial topics like cash-flow management, savings, credit, investment, insurance, interest rates, inflation or numeracy, to mention the ones that are more common ([Chen, Volpe, 1998](#); [Hilgert, Hogarth, 2003](#), [Lusardi, Mitchell, 2008, 2011](#); [Huston, 2010](#); [Lusardi, 2013](#)).

In the particular case of this research and considering the empiric information on the subject, the following financial topics were chosen to determine the financial literacy level of college students:

- **Retirement planning** ([Lusardi, Mitchell, 2011](#))
- **Inflation** ([Lusardi, 2013](#))
- **Numeracy** ([Lusardi, Mitchell, 2007](#); [Lusardi, 2012](#))
- **Insurance** ([Huston, 2010](#))
- **Credit** ([Huston, 2010, 2012](#))
- **Saving and investment** ([Volpe et al., 1996](#); [Chen, Volpe, 1998](#))
- **Risk diversification** ([Lusardi, 2011, 2013](#))

Taking into account these financial topics, mini-cases were established with four possible answers, one correct and three incorrect, which is measured quantitatively by setting the value 1 for wrong answers and 2 for the right answer. Therefore, the maximum score that can be obtained from the mini-cases about financial literacy is 18 points, while the lowest score is 9 points. The following measurement ranges were set for the financial literacy level of college students:

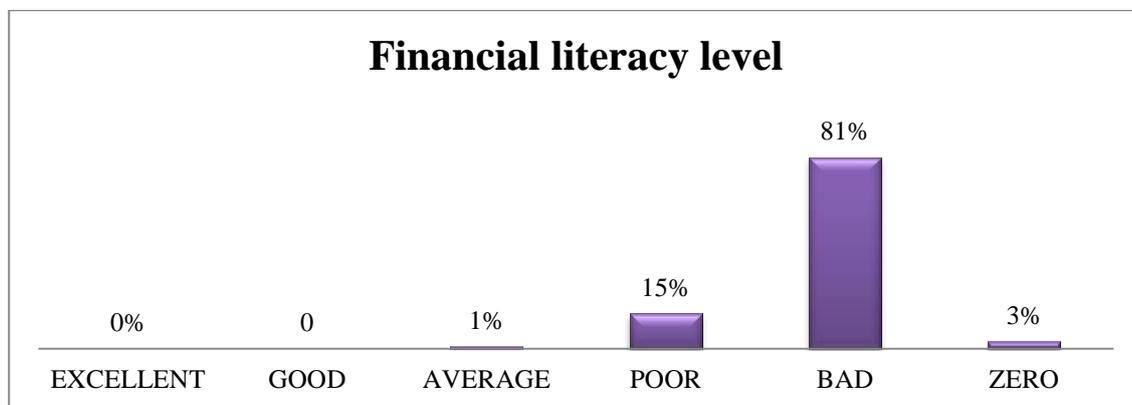
Excellent: 18 points, Good: 17 points, Average: 16 points, Poor: between 14 and 15 points, Bad: from 10 to 13 points, Zero: 9 points.

Considering all the information stated before, the results obtained in this study are presented below.

### 3. Results

It was possible to measure the level of financial literacy of college students by considering the results on the mini-cases about financial topics included in the designed instrument and so, it was possible to observe that college students do not have a high level of financial literacy.

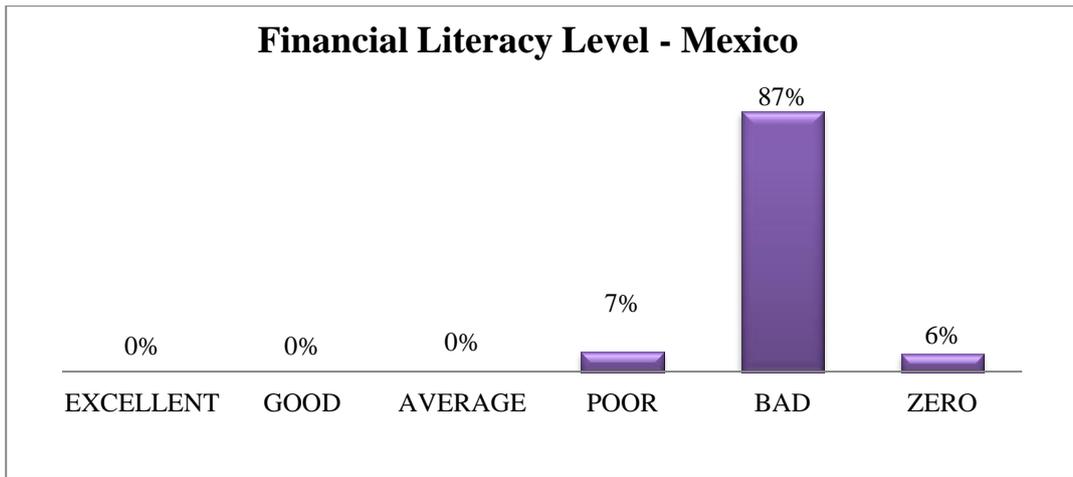
Firstly, in the next figure presents the level of financial literacy of the entire population considered in this research, which includes college students from the countries of Mexico and Colombia.



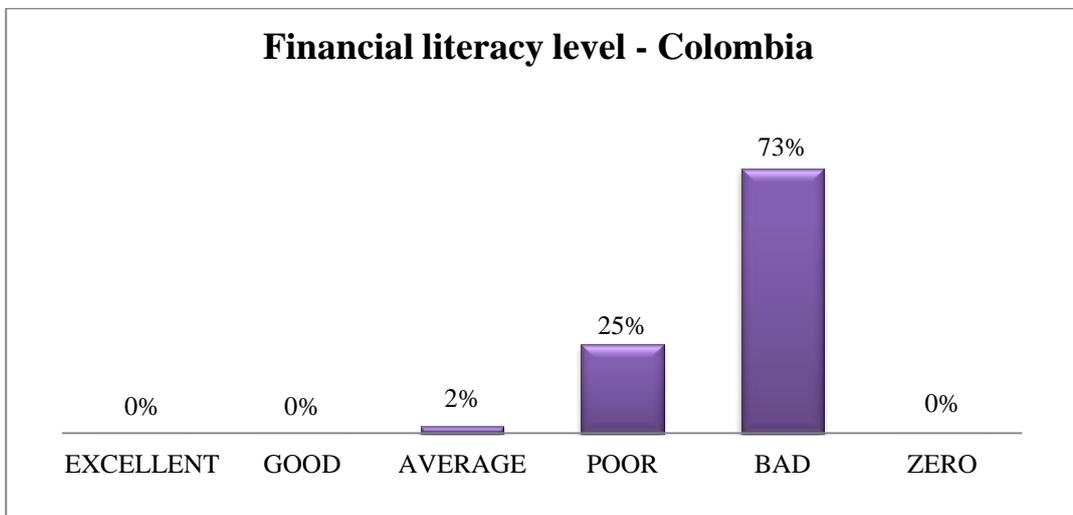
**Fig. 1.** Financial literacy level

In this first figure it is shown that most of the population (81 %) have little notion about the financial topics considered in the 9 mini-cases presented in the instrument, answering correctly between one and four cases (bad), while 15 % knows something (poor) about these financial topics with 3 or 4 correct answers and 3 % did not manage to provide a single right answer (zero). It is important to point out that none of the surveyed students were able to correctly solve all the mini-cases and only 1 % got an average score (7 right answers) in financial literacy.

Next, there are the figures of the financial literacy level of college students in Mexico and Colombia considering each of the countries separately so it is possible to observe the differences between both countries.



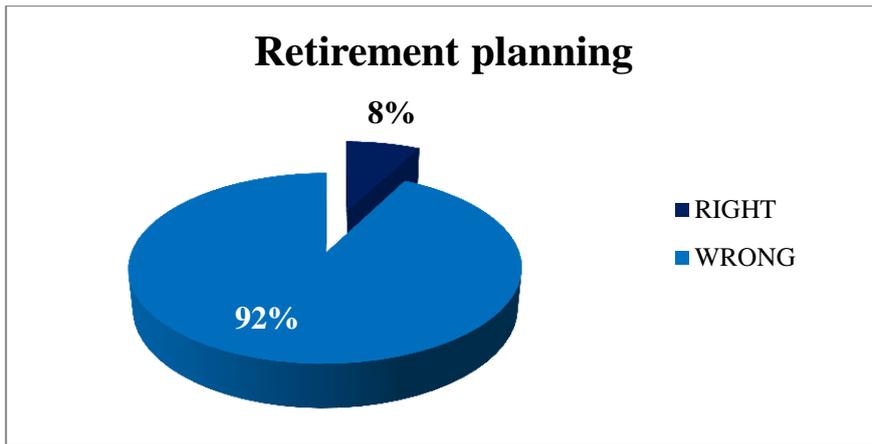
**Fig. 1.1.** Financial literacy level in Mexico



**Fig. 1.2.** Financial literacy level in Colombia

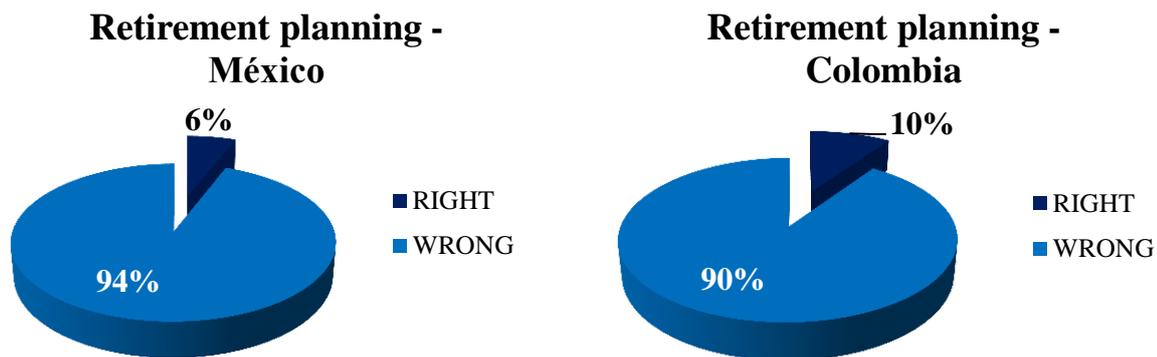
Generally, it is possible to observe that college students from Colombia obtained better results on their financial literacy level, in comparison with Mexican students, since there is a larger number of Colombian students with average (2 %) and poor (25 %) levels; furthermore, none of them failed all the answers while none of Mexican students attained an average level and on the contrary, a small percentage (6 %) failed all the mini-cases.

The research also allows to know the financial literacy level considering each of the topics in particular, by measuring each of the cases and next the results of each of the financial topics used in the instrument will be discussed.



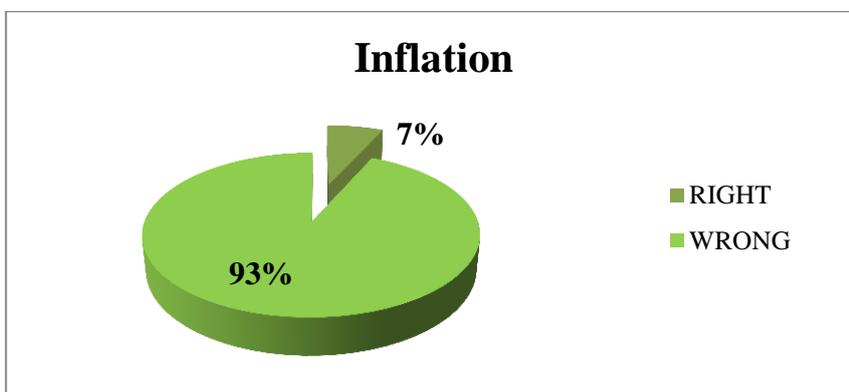
**Fig. 2.** Retirement planning

In retirement planning, most students provided the wrong answer (92 %), which indicates that they don't know about the actions they need to do to plan for the future, being this cause for concern since they are about to enter the work force and this lack of knowledge can cause economic problems during after retirement.



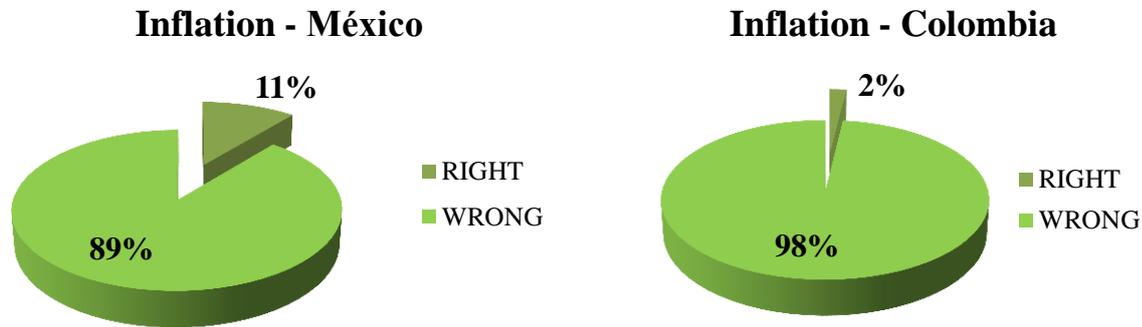
**Fig. 2a.** Retirement planning – Mexico – Colombia

Almost the entire population of both countries chose the wrong answer in this mini-case but it is important to point out that even if the results were similar, Mexico got lower results (94 % of wrong answers').



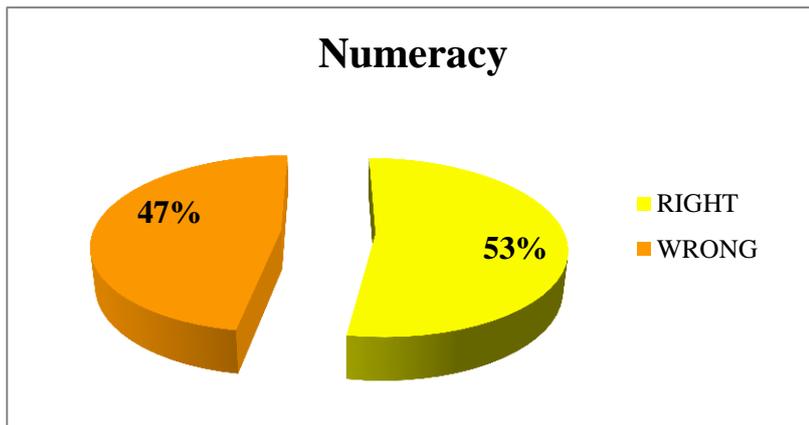
**Fig. 3.** Inflation

With regard to inflation, results shown in Figure 3 prove that almost all college students (93 %) don't understand the effects of inflation in their purchasing power, being from developing countries where the effects of inflation are visible.



**Fig. 3a.** Inflation – Mexico – Colombia

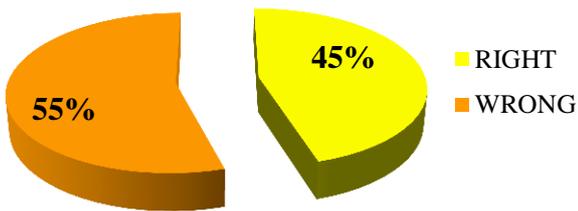
A significant part of college students in Mexico (89 %) and almost all of the ones from Colombia (98 %) failed to provide the right answer about inflation, Mexico being the one with better results.



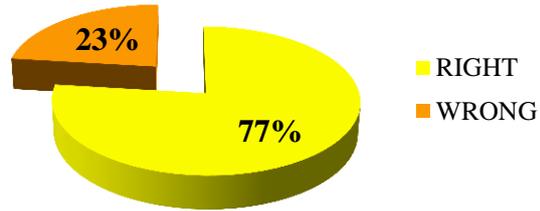
**Fig. 4.** Numeracy

Regarding this financial topic, more than half of Mexican and Colombian students Colombia (53 %) were unable to do a correct calculation of interest rate, while 47 % lacks the math ability needed to perform a simple calculation for a concept that should be understood in order to adequately use several financial instruments such as credit cards, investments or loans, to mention a few.

**Numeracy - México**

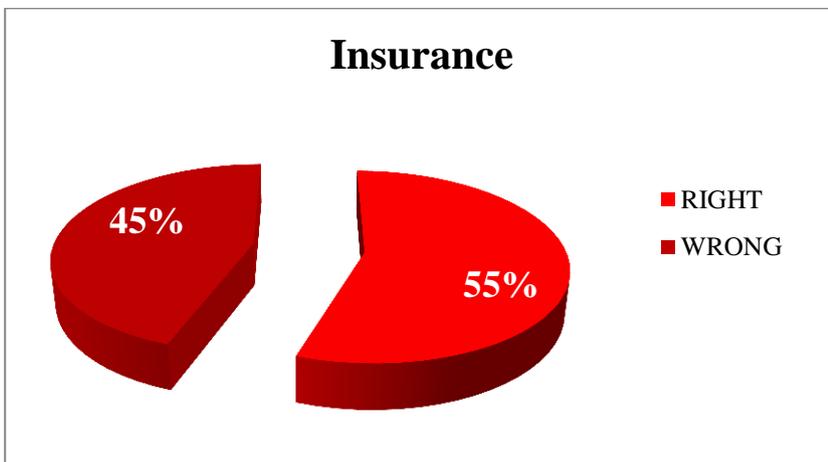


**Numeracy - Colombia**



**Fig. 4a.** Numeracy – Mexico – Colombia

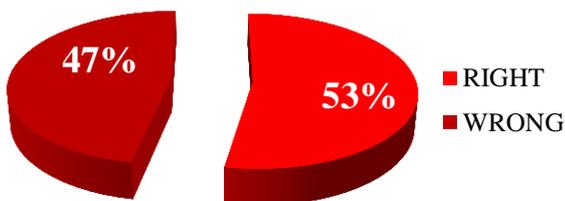
Even though the results are similar in both countries, since Mexico and Colombia got 55 % and 61 % of right answers respectively, there is a larger number of correct answers in Colombia.



**Fig. 5.** Insurance

More than half of students (55 %) responded correctly in the mini-case about insurance, meaning that they do know their function, regardless of having hired insurance or not. However, 45 % is a significant percentage of students who don't know what insurance is used for and thus, in case of a loss or a situation that requires an important amount of money to confront, they will not be ready to face it, affecting their financial wellbeing.

**Insurance - México**



**Insurance - Colombia**



**Fig. 5a.** Insurance – Mexico – Colombia

There is a slight difference regarding the topic of insurance, being Colombia the one with better results than Mexico with 58 % against 53 % of correct answers.

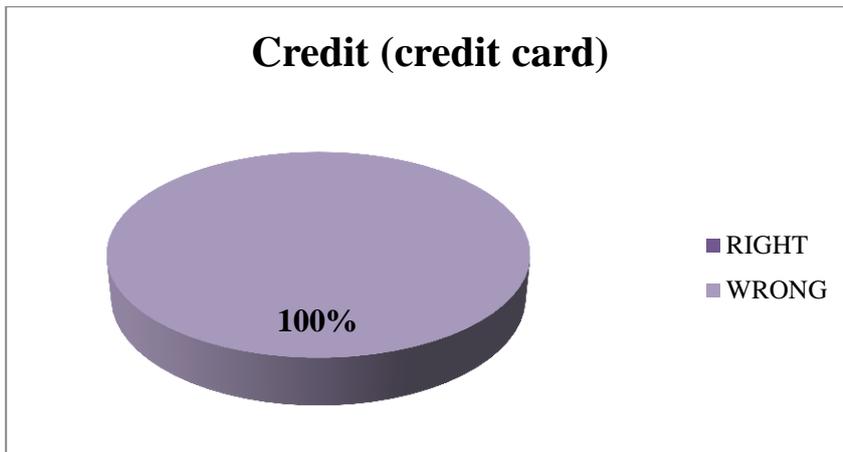


Fig. 6. Credit (case 1)

Regarding the topic of credit, there were mixed results according to the two different kinds of credit instruments considered in this research; in the first case, it can be seen in Figure 6 the case about credit cards and all the college students (100 %) do not know how they work, even when they already have the necessary age to have a credit card, which could cause a poor use of these financial products and cause indebtedness.

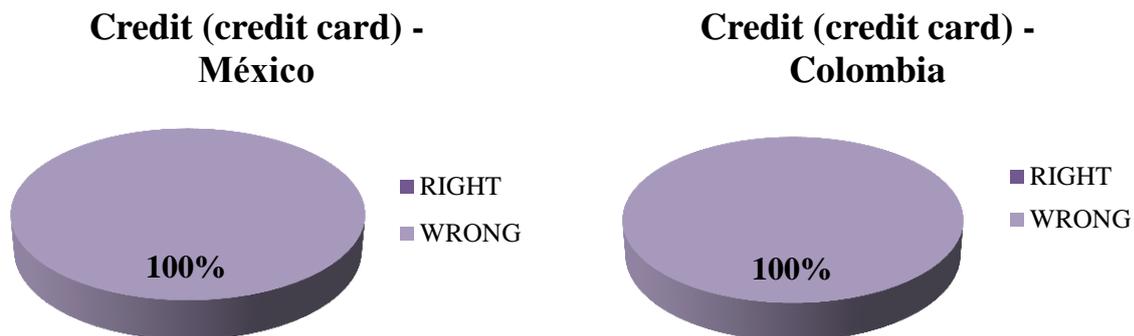
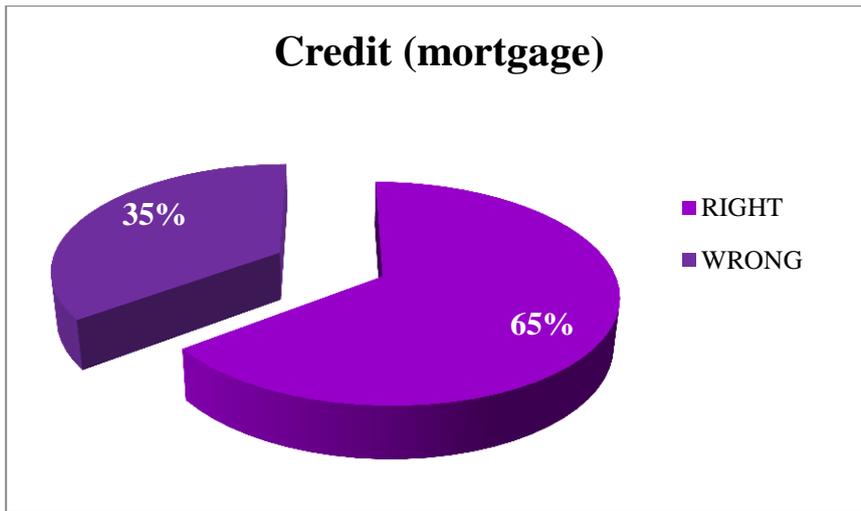


Fig. 6a. Credit – Mexico – Colombia

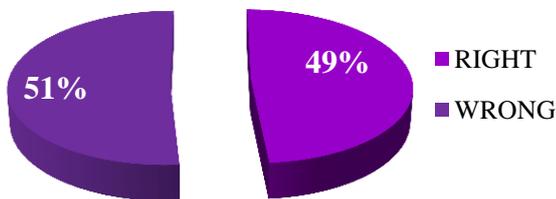
It is possible to see that the results in both countries were exactly the same because all of the students from Mexico and Colombia were incapable of answering the mini-case on credit cards correctly.



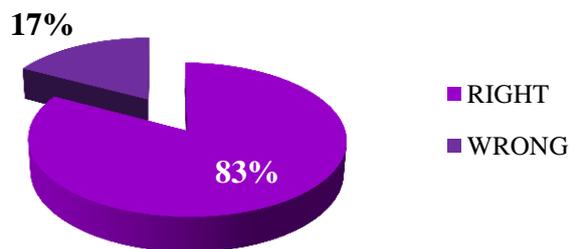
**Fig. 7.** Credit (case 2)

On the contrary, in the mini-case about a mortgage credit (Figure 7), there was a larger number of correct answers since almost two thirds of the surveyed (65 %) understand what the most convenient option for a mortgage credit, which in a near future will be useful for them when they have to buy a property.

**Credit (mortgage) - México**

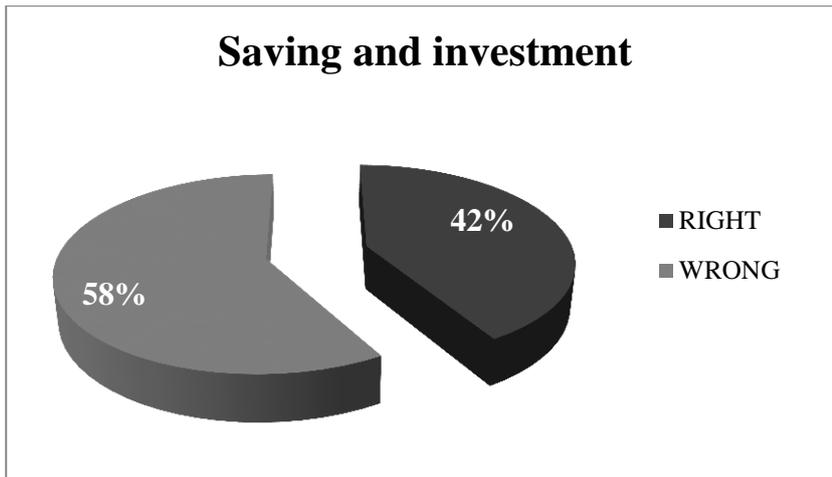


**Credit (mortgage) - Colombia**



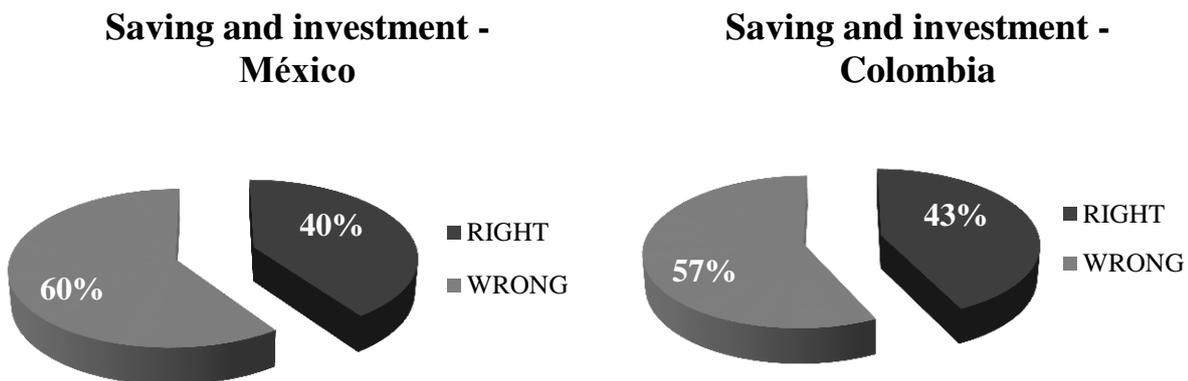
**Fig. 7a.** Credit – Mexico – Colombia

With regard to mortgage credit, the differences are significant between both countries, as Mexico obtained almost half (49 %) of correct answers while most of Colombian students (83 %), provided the right answer.



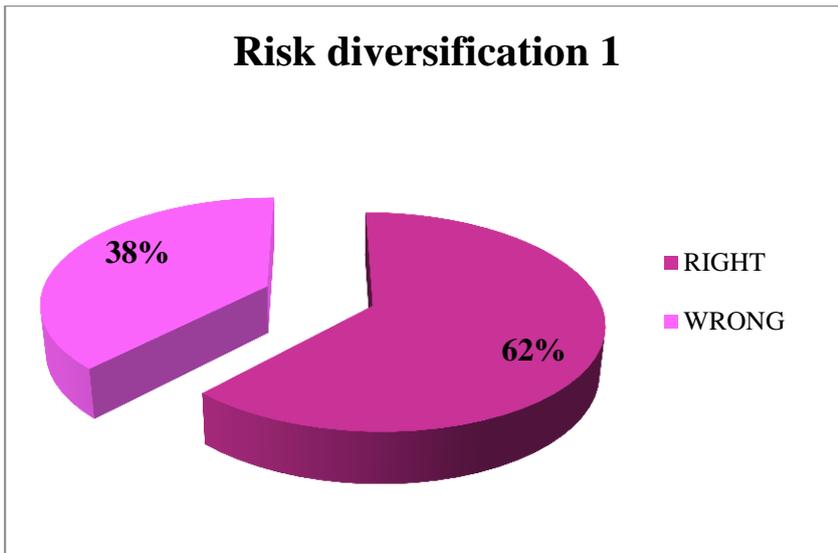
**Fig. 8.** Saving and investment

Less than half of the surveyed students (46 %) answered correctly the question about saving and investment, even though these are financial products that hold a significant importance for the creation of a patrimony, as well as facing unforeseen circumstances or greater expenses. The resources held in saving and investment can be used to acquire assets, pay bills in case of need, solvent an emergency or set up a business, to mention some relevant examples, and despite this, students lack knowledge about this issue.



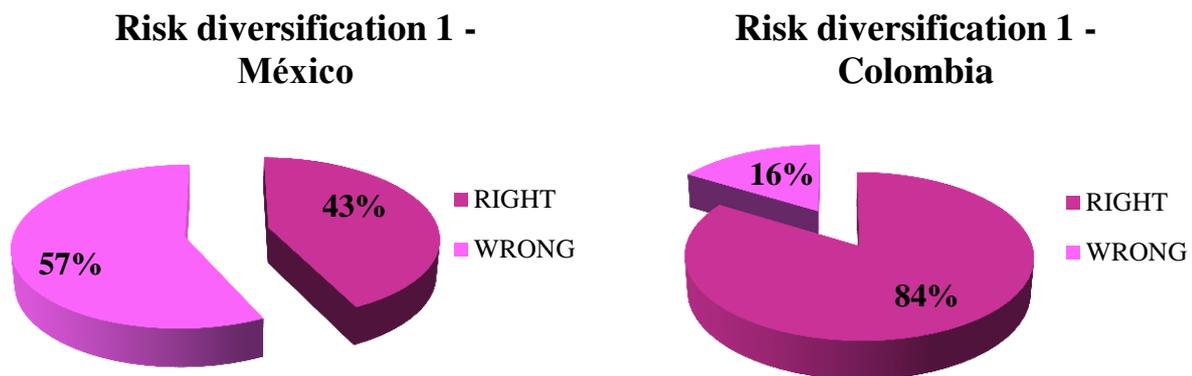
**Fig. 8a.** Saving and investment – Mexico – Colombia

Regarding the mini-case about saving and investment, results were similar in Mexico and Colombia, although more Colombian students answered correctly (43 %) compared to Mexican students (40 %).



**Fig. 9.** Risk diversification (case 1)

Again there were differences in the results of the mini-cases about the subject of risk diversification and in the first case, a good portion of the surveyed students (62 %) do recognize the advantages of having a risk diversification strategy in order to reduce the possibility of losing money in the investments, as it is shown in the former [Figure 9](#).



**Fig. 9a.** Risk diversification (case 1) – Mexico – Colombia

It is possible to see that in the topic of risk diversification, results were profoundly different in both countries; less than half of Mexican college students (43 %) provided correct answers for this mini-case while the majority of students from Colombia (84 %) were able to give the right answer.

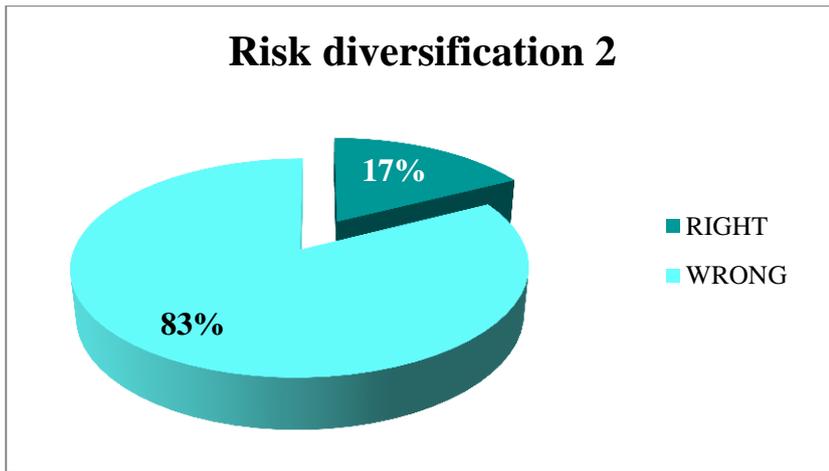


Fig. 10. Risk diversification (case 2)

Despite the previous results, most college students (83 %) do not know what to do in order to carry out a risk diversification strategy and so, in case they decide to make investments in high-risk financial instruments, they are incapable of making the pertinent decisions to reduce the risk.

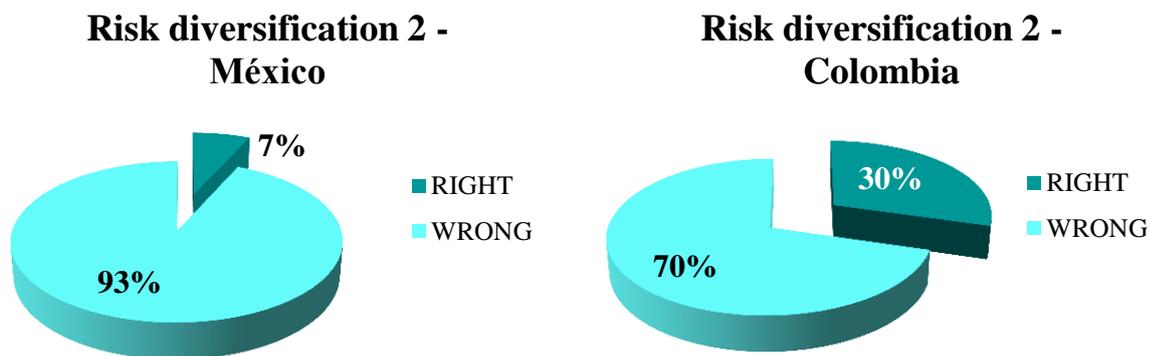


Fig. 10a. Risk diversification – Mexico – Colombia

The differences are evident in the second mini-case on risk diversification, since even though both countries provided the wrong answer, Colombia had a larger percentage of right answers (30 %) than México (7 %).

#### 4. Conclusion

It is important to highlight that this research presented a new instrument to measure financial literacy, considering the following topics: retirement planning (Lusardi, Mitchell, 2011), inflation (Lusardi, 2013), numeracy (Lusardi, Mitchell, 2007a; Lusardi, 2012), insurance (Huston, 2010), credit (Huston, 2010, 2012), savings and investment (Volpe et al., 1996; Chen, Volpe, 1998) and risk diversification (Lusardi, 2011, 2013).

The results obtained from both of the countries considered in this study were similar but some differences were found in general and for each specific topic, being Colombian students the ones who mostly got a larger number of correct answers, proving that this population of college students had a higher financial literacy level than the Mexican students in this research. The financial topics of risk diversification (both mini-cases), credit (mortgage) and numeracy were the ones where the differences between Mexico and Colombia are evident, being the latest the country that got better results.

For both countries, the obtained results were concerning due to the low level of financial literacy shown by students and likewise, it was possible to observe each of the financial topics specifically, finding that the topics most students answered wrongly and therefore, do not know

about, are: retirement planning, inflation, credit (credit card), savings and investment and risk diversification (case 2); on the other hand, the topics were they got the right answers were: numeracy, insurance, credit (mortgage) and risk diversification (case 1).

Thus, it was proven that in the seven financial topics considered in the nine mini-cases of the instrument, college students were capable of correctly solving an interest rate calculation, know the usefulness of insurance, know the best option for a mortgage credit and realize that making several investments allows for risk diversification.

These results coincide with a large amount of studies on this subject, where measurements of the financial literacy levels were made and low levels of financial literacy were found in college students (Danes, Hira, 1987; Chen, Volpe, 1998; Avard et al., 2005; Mandell, Schmid Klein, 2007; Lusardi et al., 2010; Lusardi, Wallace, 2013).

Additionally, research made in the countries of this study found a low level of financial literacy among the population too, especially in college students (Moreno-García et al., 2013, Moreno-García et al., 2017 in Mexico and Carvajal et al., 2016 in Colombia).

Considering the low levels of financial literacy shown by the students considered in this study, the findings match the ones by De Bassa Scheresberg, Lusardi, & Yakoboski (De Bassa Scheresberg et al., 2014), who found that even though *millennials* (the same generation of the population considered in this research), believe they have a great ability in the management of financial issues, these is a contrast with the financial literacy levels shown by them by answering a series of questions about financial topics where they showed a low performance.

It is important to point out that college students are an important opportunity to focus the efforts on financial literacy, since they are in a crucial stage of their lives when they are beginning to get into the work force or will do so soon, which is why this information can be used in a near future and by having it they can use financial instruments in a proper manner and for their benefit, helping them to achieve their financial goals and avoid financial problems during their life, contributing to their future wellbeing and society in general.

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## Appendix

### Financial Literacy Test

Gender: ( ) Male ( ) Female      Marital status: ( ) Single ( ) Married ( ) Common law  
 Currently working: ( ) Yes ( ) No      Career or major:

Country: \_\_\_\_\_ College: \_\_\_\_\_

1. Assuming you are already working, what actions would you take to plan for the future?

a) Get a loan to buy a house
b) Get a loan to buy a car
c) Save 10% of my salary for retirement
d) Make additional payments to my 401 (k) plan

2. Imagine that the interest rate on your savings account was 1 % per year and inflation was 2 % per year. After 1 year, how much would you be able to buy with the money in this account?

- |                     |
|---------------------|
| a) More than today  |
| b) Exactly the same |
| c) Less than today  |
| d) Do not know      |

3. Suppose you had \$ 100 in a savings account and the interest rate was 2 % per year with monthly capitalization. After 5 years, how much do you think you would have in the account if you left the money to grow?

- |  |
|--|
| a) More than \$110.00                                  |
| b) Exactly \$110.00                                    |
| c) Less than \$110.00                                  |
| d) It is impossible to tell from the information given |

4. The main reason to buy insurance is:

- |  |
|--|
| a) Protect you from a loss recently incurred.          |
| b) Provide you with excellent investment returns.      |
| c) Protecting you from sustaining a catastrophic loss. |
| d) Protect you from small incidental losses.           |

5. Suppose you owe \$3,000 on your credit card. You pay a minimum payment of \$ 30 each month. At an Annual Percentage Rate of 12 % (or 1 % per month), how many years would it take to eliminate your credit card debt if you made no additional new charges?

- |                          |
|--------------------------|
| a) Less than 5 years     |
| b) Between 5 y 10 years  |
| c) Between 10 y 15 years |
| d) Never                 |

6. Suppose you get a house credit in a financial institution, in which of the following options would you make a higher monthly payment but would pay the least amount of interest?

- |                |
|----------------|
| a) 10 years    |
| b) 15 years    |
| c) 30 years    |
| d) Do not know |

7. Considering a long time period (for example 10 or 20 years), which asset described below normally gives the highest return?

- |                    |
|--------------------|
| a) Savings account |
| b) Stocks          |
| c) Bonds           |
| d) Do not know     |

8. When an investor spreads his money among different assets, the risk of losing a lot of money:

- |                   |
|-------------------|
| a) Increases      |
| b) Stays the same |
| c) Decreases      |
| d) Do not know    |

9. What action would you take if you made a high risk investment?

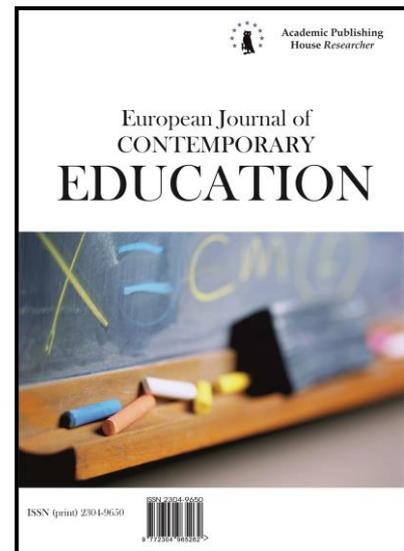
- |   |
|---|
| a) Be attentive to the inflation change   |
| b) Hire a medical expenses insurance  |
| c) Exert a coverage or <i>swaps</i> coverage option.                                    |
| d) None of the former and better to be aware to withdraw the investment when necessary. |

**Thank you.**



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## Students' Social-Perceptive Attitudes toward the Chosen Pedagogical Profession and the Correlation between these Attitudes and their Personal Characteristics

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### Abstract

This paper provides the findings from an integrated diagnostic assessment of first-to-fourth-year pedagogics students' social-perceptive attitudes toward the chosen profession and their personal characteristics linked with those attitudes. The authors have explored students' understanding of the reasons behind the choice of the profession and some of the key factors for the profession's attractiveness and unattractiveness and traced the dynamics of the intensity of their professional orientation. The work has investigated the correlation between pedagogics students' social-perceptive attitudes toward the pedagogical profession and their personal characteristics such as self-efficacy assessments, self-attitude, self-organization, perfectionism, tolerance of uncertainty, and perception of the time perspective.

The authors have found that among the key reasons behind students' choice of the pedagogical profession are their childhood dream to become a pedagogue, the profession's alignment with their character, and their pursuit of self-actualization goals through it. Their realization of the reasons changes from their childhood dream (first year) to alignment with their character (second year), to pursuit of self-actualization goals (third year), and to opportunity to spend their time usefully and understand better what they want to be (fourth year). That is, many high school graduates are not fully prepared for making a conscious, responsible choice of the pedagogical profession and tend to start conceptualizing the made choice only in their graduation year.

Among the key factors for the pedagogical profession's attractiveness are opportunity to self-improve, opportunity to work with people, and alignment with one's potential and character. The unattractiveness factors include low pay, emotional and physical strains, and the job's low social status.

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The degree of future pedagogues' professional orientation gradually increases from first to third years and decreases by fourth year.

There is a positive correlation between a high level of orientation toward the pedagogical profession and the following personal characteristics of students: a sense of their own self-efficacy; belief in the world's benevolence; realization of responsibility for their own actions in life and their personally significant choices; other-oriented perfectionism; tolerance of uncertainty; positive perception of the past and hedonistic and fatalistic perception of the present; global self-attitude (self-respect, self-affection, and self-interest); high degree of self-organization (goal-orientedness, perseverance, and orientation toward the present).

The study's findings indicate that school students ought to be purposefully prepared for the choice of the pedagogical profession. During the period of college preparation of pedagogues, special attention ought to be devoted to organizing on-the-job and pre-graduation practical training in the graduation year. Classes and practical sessions ought to incorporate training sessions on boosting self-efficacy and self-organization, fostering a positive self-concept and a positive perception of the world, and cultivating the ability to anticipate and relieve emotional tension.

**Keywords:** students' social-perceptive attitudes toward the pedagogical profession, reasons for the choice of the pedagogical profession, factors for the attractiveness of the pedagogical profession to students, future pedagogues' professional orientation, correlation between students' social-perceptive attitudes toward the pedagogical profession and their personal characteristics.

### **1. Introduction**

At present, a relevant issue in Russia is a lack of pedagogues in schools and kindergartens, while the nation's colleges are turning out large numbers of graduates with a Bachelor's degree in education. This is associated with a range of reasons both of a social (e.g., low pay, tough psychological working conditions, and the pedagogical profession' declining social status) and personal (e.g., one's involuntary choice of pedagogical disciplines when entering a college, one's unpreparedness to cope with the difficulties inherent in the pedagogical profession, one's inflated expectations with respect to pay) nature.

Oftentimes, prospective college students choose pedagogical areas of study "residually" (e.g., because they did not score sufficient points on the State Unified Exam required to enroll in a more prestigious field of study), based on parental advice, or because some of their classmates or buddies did.

Higher learning programs related to the Education and Pedagogical Sciences integrated group of training areas are oriented, for the most part, at theoretical preparation and do not teach students how to adapt their acquired theoretical psychological-pedagogical knowledge to real pedagogical situations, act under conditions of uncertainty, regulate their emotional states, relieve mental fatigue, and effectively organize themselves and their time. Little attention is devoted to fostering a positive self-concept, positive attitudes toward themselves, the world around them, children, and the pedagogical profession.

As a result, nearly half of all graduates from state-financed openings in Russian pedagogical colleges do not go on to work in schools after finishing college. Statistically, each year around 73,000 young pedagogues enroll in state-financed openings. The same number of students graduate, but only 30,000–34,000 end up working in a school ([Vasil'eva soobshchila..., 2019](#)). The nation is witnessing the aging of its pedagogical workforce, with young pedagogues (aged below 29 years) accounting for just 5.5 %. There is currently a shortage of pedagogical personnel (10–11 %).

Many young pedagogues leave the school after working there for a short period of time. This is due to not only low pay and psychologically challenging working conditions but also the fact that many college graduates turn out to be unprepared to cope with many of the issues they get to face during the period of adaptation in the school. For the most part, these are issues of a psychological, rather than methodological, nature.

Among those who continue to work in schools and kindergartens, many young pedagogues experience dissatisfaction with their professional choice, which may lead to professional deformations, emotional burnout, frustration, and health problems.

In this regard, of relevance is the study of the following aspects: key reasons behind high school graduates' choice of pedagogical areas of study in college; change in their realization of their

choice in different years of study; key factors for the attractiveness of the pedagogical profession to prospective pedagogics college students and graduates; change in the professional orientation of future pedagogues during the course of their study in college; students' personal characteristics that are positively correlated with a high degree of orientation toward pedagogical profession and how developing these characteristics can help boost their professional orientation and increase the share of pedagogics graduates who get employed in their college major and are satisfied with their professional choice. To explore these aspects, the authors conducted an integrated study of students' social-perceptive attitudes toward the pedagogical profession to identify some of the key correlations between these attitudes and students' personal characteristics. This paper provides a review of the study's progress and findings.

## **2. Discussion**

Professional self-consciousness (with students' social-perceptive attitudes toward their future profession and professional future forming an indispensable part thereof) is viewed in Russian research as a key factor for one's professional and personal development (Klimov, 1996; Derkach, Orban, 1995).

The period of study in college is a crucial component in the process of professionalization. This is a time when future specialists, aspiring to become a true professional, acquire the necessary knowledge, abilities, and skills and evaluate their Real Self and Ideal Self in the context of their future professional activity. This is when they develop the image of their future profession, the image of themselves in that profession, and a plan for actualizing their professional image.

The Russian literature offers a variety of approaches to defining the term 'image of a profession', including the following:

- a system that is comprised of intercomplementary components (Klimov, 1996; Platash, 2011);
- a personal education that develops as part of the process of one's professional making and development (Ziborova, 1999; Rybnikova, 2008);
- the way a person pictures their profession (Sosnovskaya, 2005; Kurbet, 2007).

Researchers tend to have the image of a profession incorporate the following two major components:

- cognitive, as the image cannot emerge without certain knowledge about a particular profession (Ziborova, 1999; Kurbet, 2007; Platash, 2011);
- motivational, which determines the mindfulness of a person's choice of the profession and their notions of the professional (Ziborova, 1999; Rybnikova, 2008; Platash, 2011).

A lot more rarely does the structure of this image incorporate the creative, emotional, and social components (Solodovnikov, 2004; Kurbet, 2007).

The role of professional notions and attitudes as regulators of professional activity has been explored in a study by T.V. Kudryavtsev and V.Yu. Shegurova (1983), a paper by L.M. Mitina, L.M. Brendakova, and I.V. Vachkov (2004), and several other works.

A number of works (e.g., Buyakas, 2005; Bykova, 2007; Klimov, 1996) present an argument that students' professional notions have a substantial effect on their professional development.

The image of a profession, including the pedagogical profession, has been a subject of interest for researchers around the world. Some of this research involves content analysis of the image of the profession in young teachers (Curry et al., 2016). Certain researchers have explored the effect of students' reading of critical literature in terms of shaping their personal world, the world of a beginning specialist (Saunders, 2012).

Researchers have not only explored beginning teachers' image of the profession but have brought forward various ways to develop and adjust it through counseling (Bickmore, Curry, 2013), improve the psychological climate in the school, conduct social-emotional workshops (Collie et al., 2012), and implement mentoring and induction programs for young teachers (Ingersoll, Strong, 2011; Mauer, Zimmerman, 2000; Strong, 2009; Villani, 2009). Programs like these could be adapted to the Russian education system, but this may require first exploring the mechanics of the image of the pedagogical profession in Russian students and beginning teachers.

Having examined a range of categories employed to describe a person's perception of their profession and of themselves in that profession (e.g., professional image, professional notions,

professional attitudes, Professional Self, professional orientation, and motives for professional activity), the authors drew the conclusion that the concept of one's social-perceptive attitude is what is aligned with the purposes of this study best.

In Russian science, the concept of one's social-perceptive attitude has been explored in-depth by T.D. Dubovitskaya (2016). Possessing high heuristic value, this concept calls for expanding the subject field for its application – more specifically, being taken out of the confines of interpersonal relationships and utilized to gain insight into and explore an individual's attitude toward a spectrum of social objects, including their profession and professional future.

### 3. Materials and methods

The authors carried out an integrated study of students' social-perceptive attitudes toward the pedagogical profession and the correlations between these attitudes and their personal characteristics. The study was conducted at Sochi State University. It engaged 178 first-to-fourth-year students ages 17–25 pursuing a Bachelor's degree in the following areas: Speech-Language Pathology, Psychology and Social Pedagogics, Foreign Language, Primary Education, and Preschool Education.

To determine students' **social-perceptive attitudes toward their future profession**, the authors employed the following three diagnostic assessment methodologies:

– Choice of Profession Questionnaire, drawn up by the authors based on an analysis of scholarly publications on student motivation for the choice of the profession. The questionnaire reflects the various reasons dealing with the social, material, and personal aspects of one's choice of the profession. The students were asked to list some of the more significant and insignificant reasons behind their choice of the pedagogical profession (a related field of study in college). Respondents were also asked to provide some of the more likely reasons behind the choice of the profession by their peers – this was done in an effort to circumvent the phenomenon of social desirability in answers. It was expected that the students would list certain reasons that they, for some reason, personally rejected or regarded as unacceptable and projected onto their peers.

– Methodology for the Study of Factors for the Attractiveness of the Profession (as modified by N.V. Kuz'mina and A.A. Rean). This methodology, along with factors for the attractiveness of the pedagogical profession, also covers factors related to students' rejection of the profession and its unattractiveness to them. This study treats both groups of factors as components of students' social-perceptive attitude toward their professional future that reflect the positive and negative expectations of future specialists. The methodology covers 11 factors for the attractiveness and 11 factors for the unattractiveness of the pedagogical profession.

– Methodology for Diagnostic Assessment of Students' Professional Orientation, developed by T.D. Dubovitskaya (Dubovitskaya, 2004), designed to assess the intensity of future pedagogues' professional orientation based on its levels (low (1–4 points), medium (5–14 points), and high (15–20 points)).

To assess the **correlation between students' social-perceptive attitudes toward their future profession and their personal characteristics**, the authors employed the following eight diagnostic assessment methodologies:

– General Self-Efficacy Scale (developed by R. Schwarzer and M. Jerusalem), designed to assess a person's sense of their own self-efficacy – their belief in their ability to behave in such a way that can lead to desired outcomes (success). Research has confirmed that high levels of self-efficacy have a positive social effect (e.g., better health (mental and somatic), greater achievements, and better social integration). The authors assumed that a high level of self-efficacy should facilitate boosts in the intensity of future pedagogues' professional orientation.

– Basic Beliefs Scale (adapted and re-standardized by M.A. Padun and A.V. Kotel'nikova), designed to gain an insight into an individual's implicit, global, and sustainable notions about the world around them and about themselves which influence their thinking, emotional states, and behavior (e.g., attitude toward the world's benevolence and people's kindness; attitude toward the degree to which the world is conceptualized, i.e. the degree to which events can be controlled and are fair; beliefs regarding a person's own value and their ability to manage events and control their luck). All of this is, one way or another, linked with a person's notions about themselves, their future, and their chosen profession,

which is aligned with the purposes of this study. In addition, as suggested by R.B. Burns, a positive self-concept is one of the key factors for a teacher's professional success.

– Multidimensional Perfectionism Scale (developed by P.L. Hewitt and G.L. Flett; as adapted by I.I. Gracheva), designed to measure the following three types of a person's perfectionism traits: self-oriented perfectionism, other-oriented perfectionism, and socially prescribed perfectionism. The authors assumed that students with high levels of orientation toward the pedagogical profession are characterized by all the three types of perfectionism, particularly self-oriented perfectionism.

– Tolerance and Uncertainty Questionnaire (developed by T.V. Kornilova). It is worth noting here that factors such as the acceleration of various processes in today's society, the continual modernization of education, the stochastic nature of pedagogical knowledge, and the need to adapt it to each specific pedagogical situation and each specific group of participants in educational relationships are raising the significance of tolerance of uncertainty for a present-day teacher. In foreign research, tolerance of uncertainty is construed as a person's ability to cope with the conflict and tension that may arise in a situation of duality, withstand the incoherence and discrepancy of information, face the unknown, and deal with uncertainty. Russian research has viewed tolerance of uncertainty as an integral personal characteristic that is reflected in a person's psychological resilience, their system of personal and group values, and their personal attitudes. The version employed in this study incorporates both construals.

– Zimbardo Time Perspective Inventory (as adapted by A.V. Syrtsova, E.T. Sokolova, and O.V. Mitina), aimed at assessing the system of an individual's attitudes toward the time continuum. In present-day society, which is increasingly characterized by larger timeframes required to receive an education, a crucial aspect in terms of choosing a profession is the time spent on mastering it. If, as evidenced by statistics, only half of all pedagogics graduates go on to work in a school, it turns out that many do not attach a lot of value to the time spent on mastering the profession. Alternatively, some may plan on employing the acquired knowledge and competencies in some other professions and areas of activity. Of interest is whether pedagogics students with a more intensive professional orientation tend to value personal time more and have a higher level of time self-organization.

– Self-Organization of Activity Questionnaire (as adapted by E.Yu. Mandrikova), designed to assess how students self-organize their time and gain an insight into characteristics of their activity such as conformity with the plan, goal-orientedness, perseverance, fixation, self-organization, and orientation toward the present.

– Self-Attitude Questionnaire (developed by V.V. Stolin and S.R. Pantileev), designed to explore three key types of students' self-attitude (a person's global, differentiated, and conative attitudes toward their Self) and their characteristics that are aligned with those. More specifically, the global self-attitude is characterized by self-respect, self-affection, self-interest, and a positive attitude expected of others. The authors assumed that a person's self-attitude, as a component of their social-perceptive attitude toward their professional future, determines the various aspects of that attitude.

Detailed descriptions of the above methodologies are provided in a work by T.D. Dubovitskaya, G.F. Tulinbaeva, and A.V. Shashkov entitled 'A Psychodiagnostic Methodology for Assessing One's Social-Perceptive Attitude: The Psychometric Characteristics and the Mechanics of Its Use' (Dubovitskaya et al., 2017).

The stimulus material was styled using Google Forms. It has been made available online at [https://docs.google.com/forms/d/e/1FAIpQLSeNcUoGWWG-p\\_hGbQ3rGuciKlyuo54561MtIr3jsL\\_gvBX-ahQ/viewform?usp=sf\\_link](https://docs.google.com/forms/d/e/1FAIpQLSeNcUoGWWG-p_hGbQ3rGuciKlyuo54561MtIr3jsL_gvBX-ahQ/viewform?usp=sf_link).

The data was processed using methods of mathematical statistics in IBM SPSS v.20. The study employed Student's t-test and Pearson's r correlation coefficient.

## **4. Results**

### **4.1. Students' realization of the reasons behind their choice of the pedagogical profession and the dynamics of these reasons during the course of their study in college**

As the **most significant** reason behind their choice of the pedagogical profession first-year students cited 'having dreamt of working in this professional field since childhood' (M = 0.26). With second-year students, it was 'the profession being aligned with their character' (M = 0.63),

third-year students – ‘intention to reach, through this profession, their personal goals of self-actualization’ (M = 0.32), and graduate students – ‘opportunity to spend their time usefully and understand better what they want to be’ (M = 0.22) and ‘intention to reach, through this profession, their personal goals of self-actualization’ (M = 0.22).

As the **least significant** reason behind the choice of the pedagogical profession first-year students listed the same reason as in the first case – ‘having dreamt of working in this professional field since childhood’ (M = 0.47), as well as ‘material well-being’ (M = 0.1) and ‘parental advice’ (M=0.16). With second-year students, it was ‘parental advice’ (M=0.5), ‘opportunity to spend their time usefully and understand better what they want to be’ (M = 0.18), and ‘status in society’ (M = 0.16). With third year-students, it was “parental advice’ and ‘status in society’ (M = 0.32). With graduate students, it was “feeling equal to the job’ (M = 0.22), i.e. a reason reflecting their personal projection of themselves into the future profession, and ‘failure to score enough points on the State Unified Exam to pursue their desired profession’ (M = 0.22), i.e. an objective reason.

As the **most significant reason behind their choice of the profession by their peers** respondents cited ‘material well-being’ (first year – M = 0.54, second year – M = 0.68, third year – M=1, and fourth year – M=0.44). Among the projected reasons behind the choice of the profession first-year students cited the deliberately rejected reason ‘status in society’ (M = 0.58). With second-year students, it was ‘feeling equal to the job’ (M = 0.5). Third-year students were more radical about it – they felt that their peers’ professional choice was associated not only with ‘material well-being’ but also with ‘status in society’ (M = 0.68), ‘popularity and trendiness of the profession’ (M = 0.68), ‘parental advice’ (M = 0.68), and ‘lack of an alternative in the city’s colleges’ (M = 0.68).

**4.2. Student assessments of factors for the attractiveness and unattractiveness of the pedagogical profession**

With first-year students, the **most attractive factors** were ‘opportunity to work with people’ (M = 0.54), ‘the profession being aligned with their character’ (M = 0.44), and ‘the profession being aligned with their potential’ (M = 0.39). With second-year students, it was ‘good pay’ (M = 0.68), ‘opportunity to self-improve’ (M = 0.65), and ‘the profession being aligned with their character’ (M = 0.55). With third-year students, it was ‘opportunity to continually engage in creative activity’ (M = 0.68) and ‘opportunity to self-improve’ (M = 0.68). With graduate students, it was ‘opportunity to work with people’ (M = 0.44) and ‘opportunity to self-improve’ (M = 0.44).

Next, using methods of mathematical processing (t-test for independent samples) the authors compared the mean values for attractiveness factors for different years. Of particular interest is the comparison of the results for first- and fourth-year students (the start and end of their study in college). [Table 1](#) displays the results from the authors’ comparison of the mean values for factors for the attractiveness of the pedagogical profession to first- and fourth-year students based on Student’s t-test.

**Table 1.** Comparison of the Mean Values for Factors for the Attractiveness of the Pedagogical Profession to First- and Fourth-Year Students

Respondent-specified factors for the attractiveness of the pedagogical profession	Equality of means t-test	
	t	Significance (two-sided)
This profession is one of the most significant in society	-1.404	0.161
This profession provides the opportunity to work with people	1.671	0.096
This profession requires continual creativity	-5.971	0
Working in this profession is not exhausting	8.35	0
Working in this profession pays well (high salaries)	-0.97	0.333
This profession provides the opportunity for self-improvement	-2.138	0.033
Working in this profession is aligned with my abilities	0.938	0.349
Working in this profession is aligned with my character	3.789	0

This profession does not involve long working hours	-1.476	0.141
This profession provides the opportunity to attain social recognition and respect	-0.205	0.838

As evidenced from [Table 1](#), with fourth-year students, unlike their first-year counterparts, the most attractive factor is ‘opportunity to engage in creative activity’ ( $t = -5.971, p = 0.001, p \leq 0.01$ ) and ‘opportunity to self-improve’ ( $t = -2.138, p = 0.033, p \leq 0.05$ ). Fourth-year students appear to be firmly convinced that working in the chosen profession will not be easy, for none of the respondents listed ‘absence of fatigue’ as an attractiveness factor ( $t = 8.35, p = 0.000, p \leq 0.01$ ). Also, these individuals did not consider as attractive the factor of ‘the profession being aligned with their character’ ( $t = 3.789, p = 0.000, p \leq 0.01$ ).

The top three factors for the **profession’s unattractiveness** were ‘unsatisfactory pay’, ‘the job being fraught with fatigue’, and ‘the profession’s little significance in society’. However, the mean values for these factors appear to vary from year to year. First-year students were found to be concerned about ‘the profession’s little significance in society’ ( $M = 0.6$ ), ‘long working hours’ ( $M = 0.4$ ), and ‘considerable emotional and physical strains’ ( $M = 0.34$ ) and that ‘low pay’ and ‘having to work with people’ could have an additional stressful effect on them ( $M = 0.27$ ). With second-year students, it was ‘low pay’ ( $M = 0.72$ ), ‘emotional and physical strains’ ( $M = 0.48$ ), and ‘the profession’s little significance in society’ ( $M = 0.37$ ). With third-year students, who had already gotten a feel of the pedagogical profession via on-the-job training, it was ‘the profession’s little significance in society’ ( $M = 0.68$ ), ‘considerable emotional and physical strains’ ( $M = 0.65$ ), and ‘low pay’ ( $M = 0.35$ ). With graduate students, it was ‘low pay’ ( $M = 0.78$ ) and ‘emotional strains’ ( $M = 0.66$ ).

Using methods of mathematical statistics (the t-test for equality of means for independent samples) the authors compared the mean values for factors for the unattractiveness of the pedagogical profession to first-year and graduate students ([Table 2](#)).

**Table 2.** Comparison of the Mean Values for Factors for the Unattractiveness of the Pedagogical Profession to First- and Fourth-Year Students

<b>Respondent-specified factors for the unattractiveness of the pedagogical profession</b>	<b>t</b>	<b>Significance (two-sided)</b>
Working in this profession is of little significance in society	9.147	0
This profession requires working with people, but I am not good at that, so I am scared to go for it	7.048	0
Working in this profession is exhausting (emotionally and physically challenging)	-5.566	0
Working in this profession pays poorly (low salaries)	-9.377	0
Working in this profession is not aligned with my character	2.809	0.005
This profession involves long working hours	9.415	0
Working in this profession requires frequent contact with people	1.64	0.002

As evidenced from [Table 2](#), graduate students’ choices no longer include several factors which they viewed as unattractive in their first year (‘fear of working with people’, ‘the profession not being aligned with their character’, and ‘long working hours’). By fourth year, there is a decline in the significance of negative factors such as ‘the profession’s little significance in society’ ( $t = 9.147, p = 0.000, p \leq 0.01$ ) and ‘having to frequently come in contact with people’ ( $t = 1.64, p = 0.002, p \leq 0.01$ ). With that said, there is a boost in the significance of factors such as ‘emotional and physical strains’ ( $t = -5.566, p = 0.000, p \leq 0.01$ ) and ‘low pay’ ( $t = -9.377, p = 0.000, p \leq 0.01$ ).

### 4.3. Dynamics of the intensity of future pedagogues’ professional orientation

The authors compared the values for the intensity of professional orientation in students in different years of study ([Table 3](#)).

**Table 3.** Comparison of the Mean Values for the Professional Orientation of Students in Different Years of Study

Year of study	Equality of means t-test	
	t	Significance (two-sided)
First and second years	-9.52	0
First and third years	-11.772	0
First and fourth years	0.548	0.584

As evidenced from Table 3, second- and third-year students differ from their first-year counterparts in a greater degree of intensity of professional orientation (for second-year students  $t = -9.52$ ,  $p = 0.000$ ,  $p \leq 0.01$ ; for third-year students  $t = -11.772$ ,  $p = 0.000$ ,  $p \leq 0.01$ ). Students in their graduation year do not exhibit an expected increase in the intensity of professional orientation compared with their first-year counterparts – on the contrary, there is a decline in the level of their professional orientation. When they enter college, students exhibit a medium level of professional orientation ( $M = 8.39$ ), and as early as their second year they reach the lower limit of the upper level ( $M = 14.57$ ). In third year, the trend of the intensity of professional orientation increasing persists, with students, virtually, exhibiting the maximum level of intensity ( $M = 17$ ). In the graduation year, there occurs a sharp decline in the intensity of professional orientation – from 17 to 7.82 points.

**4.4. Correlation between students’ social-perceptive attitudes toward the pedagogical profession and their personal characteristics**

**4.4.1. Intensity of students’ orientation toward the pedagogical profession and their self-efficacy**

The intensity of pedagogics students’ professional orientation is positively correlated with their self-efficacy ( $r = 0.359$ ,  $p = 0.000$ ,  $p \leq 0.01$ ) (Table 4).

**Table 4.** Correlation between the Intensity of Students’ Professional Orientation and Their Self-Efficacy

Intensity of professional orientation		Self-efficacy scale
Inventory for determining the level of students’ professional orientation	Pearson correlation	0.359**
	Significance (two-sided)	0.000
** Correlation significant at the 0.01 level (two-sided)		

**4.4.2. Students’ orientation toward the pedagogical profession and their basic beliefs**

Students’ professional orientation is correlated with such components of their basic beliefs as ‘belief in the world’s benevolence’ ( $r = 0.356$ ,  $p = 0.024$ ,  $p \leq 0.05$ ) and ‘belief in control over their fate and life’ ( $r = 0.387$ ,  $p = 0.014$ ,  $p \leq 0.05$ ) (Table 5). Students with a high level of professional orientation tend to be convinced that the world is benevolent toward them and that they have every right and all necessary resources to take responsibility for their own actions in life and their personally significant choices.

**Table 5.** Correlations between Students’ Professional Orientation and Their Basic Beliefs

Basic beliefs	Link with the intensity of professional orientation	
Benevolence of the world around us	Pearson correlation	.356*
	Significance (two-sided)	0.024
Fairness	Pearson correlation	0.263
	Significance (two-sided)	0.102
“Me” image	Pearson correlation	0.212
	Significance (two-sided)	0.19

Luck	Pearson correlation	0.294
	Significance (two-sided)	0.066
Beliefs about control	Pearson correlation	.387*
	Significance (two-sided)	0.014
* Correlation significant at the 0.05 level		
** Correlation significant at the 0.01 level		

**4.4.3. Students’ orientation toward the pedagogical profession and their perfectionist tendencies**

Table 6 displays the correlations between pedagogics students’ professional orientation and their perfectionist tendencies.

**Table 6.** Correlations between Students’ Professional Orientation and Their Perfectionism Traits

One’s perfectionist tendencies		Self-oriented perfectionism	Other-oriented perfectionism	Socially prescribed perfectionism
Correlation between professional orientation and perfectionist tendencies	Pearson correlation	0.061	.100*	-.177**
	Significance (two-sided)	0.138	0.015	0
* Correlation significant at the 0.05 level				
** Correlation significant at the 0.01 level				

As evidenced from Table 6, the intensity of orientation toward the pedagogical profession is positively correlated with a variety of perfectionism such as other-oriented perfectionism ( $r = 0.1$ ,  $p = 0.015$ ,  $p \leq 0.05$ ). This means that the greater a student’s desire to be part of and their involvement with the pedagogical profession, the higher their requirements for what people around them do and how they act. Note that the power of one’s intention to become a pedagogue is by no means based on self-oriented perfectionism – most future pedagogues, regardless of the degree of their involvement with the profession, are not inclined to demand of themselves some extraordinary effort and extraordinary quality in terms of their work performance. A curious characteristic was detected in the negative correlation between a student’s orientation toward the pedagogical profession and the effect on them of socially prescribed perfectionism ( $r = -0.177$ ,  $p = 0.000$ ,  $p \leq 0.01$ ).

**4.4.4. Orientation toward the pedagogical profession and tolerance of uncertainty**

Tolerance of uncertainty, picked by the authors as one of the key factors influencing pedagogics students’ social-perceptive attitudes toward their professional future, is directly correlated with their professional orientation ( $r = 0.114$ ,  $p = 0.006$ ,  $p \leq 0.01$ ) (Table 7).

**Table 7.** Correlations between Students’ Professional Orientation and Their Tolerance/Intolerance of Uncertainty

Types of tolerance/ intolerance		Tolerance of uncertainty	Intolerance	Interpersonal intolerance of uncertainty
Correlation between professional orientation and tolerance	Pearson correlation	0.114**	-0.191**	-0.390**
	Significance (two-sided)	0.006	0.000	0.000
** Correlation significant at the 0.01 level				

Intolerance of uncertainty is negatively correlated with professional orientation ( $r = -0.191$ ,  $p = 0.000$ ,  $p \leq 0.01$ ).

Interpersonal intolerance of uncertainty, meaning an individual’s aspiration for clarity and control in interpersonal relationships and the possibility of discomfort arising in the event of uncertainty in relationships with others, is, too, negatively correlated with being oriented toward the pedagogical profession ( $r = -0.390$ ,  $p = 0.000$ ,  $p \leq 0.01$ ).

**4.4.5. Students’ orientation toward the pedagogical profession and their perception of the time continuum**

The authors’ comparison of the results from the Zimbardo Time Perspective Inventory and the methodology for diagnostic assessment of students’ professional orientation revealed a correlation between their positive perception of the time perspective and a high intensity of their professional orientation – the factor of their perception of a positive past is positively correlated with their professional orientation ( $r = 0.255$ ,  $p = 0.000$ ,  $p \leq 0.01$ ) (Table 8).

**Table 8.** Correlations between Students’ Professional Orientation and the Factors of Their Perception of the Time Continuum

Factors for one’s perception of the time continuum	Correlation link between students’ perception of the time continuum and the intensity of their professional orientation	
Factor of one’s perception of a negative past	Pearson correlation	-.206**
	Significance (one-sided)	0
Factor of one’s perception of a positive past	Pearson correlation	.255**
	Significance(one-sided)	0
Factor of one’s perception of a hedonistic present	Pearson correlation	.224**
	Significance(one-sided)	0
Factor of one’s perception of a fatalistic present	Pearson correlation	.213**
	Significance(one-sided)	0

Degree to which one is oriented toward the future	Pearson correlation	-0.011
	Significance(one-sided)	0.393
** Correlation significant at the 0.01 level (one-sided)		

There is, also, a positive correlation between one’s intensive professional orientation and the following two factors: the factor of one’s perception of a hedonistic present ( $r = 0.224, p = 0.000, p \leq 0.01$ ) and the factor of one’s perception of a fatalistic present ( $r = 0.213, p = 0.000, p \leq 0.01$ ). The factor of respondents’ perception of a negative past is negatively correlated with their professional orientation ( $r = -0.206, p = 0.000, p \leq 0.01$ ). The degree of their orientation toward the future was found to have no correlation with their professional orientation.

**4.4.6. Students’ orientation toward the pedagogical profession and their self-attitude**

Table 9 displays the identified correlations between students’ professional orientation, as one of the key characteristics of their social-perceptive attitude toward their professional future, and the components of their self-attitude.

**Table 9.** Correlations between Pedagogics Students’ Professional Orientation and their Self-Attitude

Types and characteristics of one’s self-attitude		Global self-attitude	Self-respect	Self-affection	Self-interest	Attitude expected of others
Correlation between professional orientation and self-attitude	Pearson correlation	0.315**	0.291**	0.275**	0.333**	0.364**
	Significance (two-sided)	0	0	0	0	0
** Correlation significant at the 0.01 level (two-sided)						

As evidenced from Table 9, the intensity of professional orientation is positively correlated both with global self-attitude ( $r = 0.315, p = 0.000, p \leq 0.01$ ) and with its specific components. There is a direct correlation link between professional orientation and self-respect ( $r = 0.291, p = 0.000, p \leq 0.01$ ), self-affection ( $r = 0.275, p = 0.000, p \leq 0.01$ ), self-interest ( $r = 0.333, p = 0.000, p \leq 0.01$ ), and attitude expected of others ( $r = 0.364, p = 0.000, p \leq 0.01$ ).

To substantiate the supposition about a link between the intensity of professional orientation and global self-attitude and its characteristics, the authors compared, using the t-test means comparison method, the data from the Self-Attitude Questionnaire methodology for groups with low and high levels of professional orientation (Table 10).

**Table 10.** Comparison of the Mean Values of the Self-Attitude Scales for Low and High Levels of Professional Orientation

Self-attitude diagnostic assessment scales	t	Significance (two-sided)
Scale S – Global self-attitude	-8.268	0
Scale I – Self-respect	-8.222	0
Scale II – Self-affection	-6.783	0
Scale III – Self-interest	-8.619	0
Scale IV – Attitude expected of others	-11.055	0

As evidenced from Table 10, virtually all components of a person’s global self-attitude have statistically significant differences in students with low and high levels of professional orientation.

**4.4.7. Students’ orientation toward the pedagogical profession and their self-organization of activity (time structuring)**

Table 11 displays the identified correlations between students’ professional orientation and the characteristics of their time structuring (the self-organization of activity test).

**Table 11.** Correlations between Students’ Professional Orientation and their Self-Organization of Activity

Characteristics of time structuring	Correlation link between the characteristics of time structuring and professional orientation	
Conformity with the plan	Pearson correlation	-0.04
	Significance (two-sided)	0.34
Goal-orientedness	Pearson correlation	.273**
	Significance (two-sided)	0
Perseverance	Pearson correlation	.449**
	Significance (two-sided)	0
Fixation	Pearson correlation	-0.015
	Significance (two-sided)	0.718
Self-organization	Pearson correlation	-0,056
	Significance (two-sided)	0.18
Orientation toward the present	Pearson correlation	.214**
	Significance (two-sided)	0
Overall figure	Pearson correlation	.291**
	Significance (two-sided)	0
** Correlation significant at the 0.01 level (two-sided)		
* Correlation significant at the 0.05 level (two-sided)		

As evidenced from Table 11, the intensity of pedagogics students’ professional orientation is positively correlated with such characteristics of time structuring (self-organization of activity) as goal-orientedness ( $r = 0.273$ ,  $p = 0.000$ ,  $p \leq 0.01$ ), perseverance ( $r = 0.449$ ,  $p = 0.000$ ,  $p \leq 0.01$ ), and orientation toward the present ( $r = 0.214$ ,  $p = 0.000$ ,  $p \leq 0.01$ ).

**5. Conclusion**

The study helped draw a set of conclusions, which are outlined below.

Many high school graduates are not fully prepared for making a conscious, responsible choice of the pedagogical profession and tend to start conceptualizing the made choice only in their graduation year. Students’ realization of the reasons changes from ‘their childhood dream’ (first year) to ‘alignment with their character’ (second year), to ‘reaching their self-actualization goals’ (third 3 year), and to opportunity to spend their time usefully and understand better what they want to be (fourth year). The dynamics of consciously rejected reasons for the choice of the field of professional study, too, reveal a change in students’ social-perceptive attitudes toward their

professional future – from ‘fulfillment of a childhood dream’ to ‘pursuit of material well-being’, as the most rejected reasons with first-year students, to reasons more objective and personally motivated, like ‘feeling equal to the job’ and ‘insufficient number of points scored on the State Unified Exam’, with graduate students.

Among the key factors for the pedagogical profession’s attractiveness to students are opportunity to self-improve, opportunity to work with people, and alignment with their potential and character. The unattractiveness factors include low pay, emotional and physical strains, and the job’s low social status.

Future pedagogues’ professional orientation gradually increases from first to third years and decreases by fourth year.

There is a positive correlation between a high level of orientation toward the pedagogical profession and the following personal characteristics of students: a sense of their own self-efficacy; belief in the world’s benevolence; realization of responsibility for their own actions in life and their personally significant choices; other-oriented perfectionism; tolerance of uncertainty; positive perception of the past and hedonistic and fatalistic perception of the present; global self-attitude; high degree of self-organization.

Students with a high level of professional orientation are characterized by increased levels of self-respect, self-affection, and interest in themselves and in their achievements and expect a good (personally positive) attitude toward themselves on the part of others. The positive, emotionally comfortable nature of picturing themselves in the profession and the intensity of their desire for and actions with regard to mastering it are correlated with a good attitude toward themselves and positive feelings toward their own self.

Students with a high level of professional orientation in the context of their social-perceptive attitude are characterized by a pronounced ability to structure time, more specifically an ability to concentrate on the goal (goal-orientedness), an ability and proclivity to exert their will to finish the job and order their activity (perseverance), and a willingness to live “here and now” (being oriented toward the present).

School students ought to be purposefully prepared for the choice of the pedagogical profession.

During the period of college preparation of pedagogues, special attention ought to be devoted to organizing on-the-job and pre-graduation practical training in the graduation year. Classes and practical sessions ought to incorporate training sessions on boosting self-efficacy and self-organization, fostering a positive self-concept and a positive perception of the world, and cultivating the ability to anticipate and relieve emotional tension.

Young pedagogues who are just starting work in a school ought to be invited to participate in mentoring programs and provided with tutoring support and support in resolving all kinds of potential psychological issues associated with the mental and emotional strains inherent in the job.

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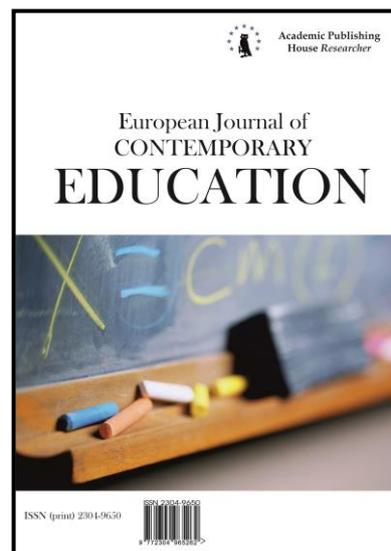
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## Preparing Engineers of the Future: the Development of Environmental Thinking as a Universal Competency in Teaching Robotics

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### Abstract

The problem of the research is urgent due to the need to develop a special style of thinking. This type is based on problem cognitive activity, focused on lean production, resource conservation, and supported by an automated system that provides resources for solving socio-economic problems in the conditions of the fourth industrial revolution and the digital economy formation.

The purpose of the research is to theoretically prove and experimentally verify the need to change methods, tools, organizational forms of teaching robotics for the purposeful development of environmental thinking and lean manufacturing as the demanded competencies of future specialists in the context of digital transformation.

The research methodology is the analysis of psychological and pedagogical work, development strategies, concepts of education; methods of mathematical statistics, methods of psychodiagnostics and survey. The pedagogical experiment is based on the example of assessing the ecological thinking formation and the energy conservation skill in teaching robotics to train engineering, technical and management specialists.

The research results. The study clarifies the concepts “environmental thinking”, “lean production”, and “environmental competence” in the context of training specialists for the digital economy, in particular, engineering and technology. The study substantiates the didactic potential of a robotics course for the formation of environmental thinking as a demanded skill of future engineers. The authors describe didactic principles, a model for teaching robotics in a personalized environment for the formation of environmental thinking as the basis for the introduction of innovations and the challenges of automation, globalization and competitiveness.

The authors conclude that a robotics course with specially organized interdisciplinary design forms of activity supported by appropriate means and training methods is necessary. It will create

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additional conditions for the formation of environmental thinking and lean production skills as key professional competencies in the training of demanded specialists in the digital economy.

**Keywords:** environmental thinking, robotics, energy conservation, lean production, training, professions of the future, digital economy.

## **1. Introduction**

### **1.1. The relevance of the problem**

Technological development in the field of information technology, support of using new digital services in various types of activities is an actual direction of modern science and education (Karakozov, Ryzhova, 2019). The aim of the global digital transformation of the didactic system is to efficiently and flexibly apply the latest technologies in order to transit to a personality-oriented, continuous and non-linear educational process. The digital era requires not only new skills from school and university graduates, but we also need a different approach to organizing the training for the professions of the future (Varshavskaya, Kotyrlo, 2019).

Therefore, famous Russian and foreign researchers (Beliovskaya, Beliovsky, 2016; Asmolov, 2015; Margolis, 2018; Saritas, 2013) justify the need to change the content, methods and organizational forms of educational work. The didactic process in the era of automation and globalization must be focused on solving the problems of socio-economic development of the country in the conditions of the fourth industrial revolution.

According to S.D. Karakozov, N.I. Ryzhova (Karakozov, Ryzhova, 2019), the basis of the digital economy is the synthesis of previously existing material production (new materials, computer design/production) and digital technologies, which support the widespread use of artificial intelligence models and the development of the Internet of things. According to E.A. Aslamova, M.V. Krivov, V.S. Aslamova (Aslamova et al., 2018), K.K. Denschikov, A.Yu. Varaksin (Denschikov, Varaksin, 2019), “smart products” will be usual in a world where intelligent computerized devices (robots) get the opportunity to interact in the preparation and deployment of automated production processes.

The new industrial or technological (digital) revolution (Perelet, 2019) has special demands to the highly qualified specialists of the future. E.Ya. Varshavskaya, E.S. Kotyrlo (Varshavskaya, Kotyrlo, 2019) reasonably conclude that a high level of mathematical literacy, science and humanitarian training will be necessary.

Y. Kuzminov, P. Sorokin, I. Froumin (Kuzminov et al., 2019) focus on the abilities that are called “competences of the 21st century”. They are fundamental theoretical knowledge, technology competencies (creativity, communication, self-organization, initiative, critical thinking, etc.).

E.V. Soboleva, N.L. Karavaev, N.V. Shalaginova, M.S. Perevozchikova (Soboleva et al., 2018) specify that the main task in the digital educational space is to prepare an independent personality through the formation of different types of thinking, including environmental one. Environmental thinking in the new conditions of digital transformation is understood as long-term thinking and here a person always thinks about ecology. There is a practical need to organize activities for the development of environmental thinking among future professionals in order to integrate sustainable development goals into real projects and implement them in science and industry (Tocháček et al., 2016)

Digital transformation of the manufacturing sector is already underway. However, while implementing technological innovations there are problems due to insufficient training of engineering, technical and managerial personnel because of an ecological culture formation, concern for the protection of the natural environment, a responsible attitude to nature, and ecological thinking.

### **1.2. The objectives and tasks of the research**

The objective of the research is due to the need to change the cognitive activity of students in the course of robotics in order to develop environmental thinking and skills of lean production as key competencies of the demanded specialists in the era of global digital transformation.

Tasks of the research are:

–to clarify the terms “environmental thinking” and “lean production” while preparing engineers of the future in teaching robotics to achieve the goals of the country's scientific and strategic development;

–to describe didactic principles of using means and tools of robotics in a personalized environment while forming ecological culture, protecting the natural environment, having responsible attitude to nature, ecological thinking;

–to formulate basic ideas of the approach which reflect the necessary changes in the methods, techniques, organizational forms of teaching robotics for the purposeful formation of environmental thinking as the basis for the introduction of innovations and the implementation of trends in automation, globalization and competitiveness;

–to introduce a personalized model of teaching robotics, focused on the development of a special “green” style of thinking, to support lean production, security, resource conservation and solving problems of a socio-economic nature;

–to experimentally confirm the effectiveness of the proposed changes in order to improve the quality of training, the formation of environmental thinking and lean production skills, taking into account the challenges of the digital economy.

## **2. Relevance**

### **2.1. Literature review**

#### **2.1.1. Russian literature review**

The tools of the new industrial, or technological (digital) revolution, influence all aspects of society. However, the most powerful acceleration of scientific and technological progress has pressure on the interaction "man-man", "man-nature", which leads to the ecosystem and the environment changes. The sharpest contradictions between the technological sphere and the natural environment have led to the threat of a global environmental crisis. To form special, ecological, human style of thinking is of great importance in order to find a balance between the challenges of the digital economy and maintaining the integrity of the biosphere, between the needs of the high-tech industry and of the natural environment.

The term "ecological thinking" was actively used as a scientific term in the 80s of the XX century. The reason for its spread in the socio-economic sphere is due to the formation of environmental information space in Soviet society and to the activation of the environmental aspect of social practice. Therefore, a new goal of the education system is the development of environmental thinking (Turdikulov, 1982; Hromov, 1988). The works of E.A. Turdikulov were significant as he was the first to propose the task of “developing ecological thinking” along with the task of forming environmental knowledge. These ideas were developed by S. S. Khromov, who introduced the concept of “ecological type of thinking, justified the need for targeted pedagogical support for the transfer of environmental knowledge and skills. Later, Russian scientists L.Yu. Chuikova (Chuikova, 2012), V.P. Kalenskaya (Kalenskaya, 1999), I.S. Telegina (Telegina, 2000), V.A. Ermolaeva (Ermolaeva, 2002), L.M. Dautmerzaeva (Dautmerzaeva, 2003) dealt with the problem of environmental thinking formation. Let us underline some of their ideas, which we are taking into account in this research.

I.S. Telegina (Telegina, 2000) believes that environmental thinking should not be considered as a new form, it is “a direction of thinking, a level peculiar to it”. V.P. Kalenskaya (1999) notes that environmental thinking is thinking, characterized by its “creative character”.

L.Yu Chuikova (Chuikova, 2012) presents in details a generalization of Russian studies on the problem of determining the social type of thinking and environmental thinking as its separate branch, distinguishes the concepts “environmental consciousness”, “ecological worldview”, “ecological culture” and proves the importance of environmental education in modern society. We support the author’s position, who considers that the "environmental competence" has some important characteristics. They are: the quality of mental operations aimed to solve situations and problems in the field of ecology and energy; the consistency of getting environmental knowledge; the understanding the integral, systematic and process character of the surrounding world; the ability to predict the final result; the ability to put forward hypotheses and choose the most acceptable option; the ability to establish causal relations.

The last thesis was developed in modern studies by S.I. Gilmanshina, R.N. Sagitova, I.R. Gilmanshin (Gilmanshina et al., 2018), who considered the features of science education. In particular, the authors underline the need for a systematic development of scientific ecological thinking in the structure of environmental competence. They distinguish educational, motivational

and behavioral criteria for the formation of ecological thinking and use a system-activity approach, which involves a research focus and the creative interdisciplinary nature of students' project activities. They also underline the importance of taking into account age-related characteristics, individual styles of cognition in the planning of environmental education.

The provisions of the "Development Strategy for the Information Technology Industry in the Russian Federation for 2014–2020 and for the Prospect until 2025" are the basis for the development of the digital economy as a new concept in the national policy that take into account global trends in globalization and automation. Analyzing the environmental aspects of the digital economy, R.A. Perelet states that achieving strategic priorities is impossible without maintaining a balance between the technosphere and the sociosphere (Perelet, 2019). However, during the transformation of the country's economy, special attention should be paid to the strengthening of the environmental component when training specialists using digital technologies in manufacturing.

According to the Atlas of Future Professions (Cross-professional competences), which registers the main cross-professional competencies demanded by society, government and business for the specialists of the future, it becomes obvious that environmental thinking and the lean production skill are included in the training program for most training profiles. The formation of relevant skills is especially important in the training of engineering, technical and managerial specialists of the future.

Modern industrial production is impossible to imagine without automation of processes in the field of ecology and energy, the use of cyberphysical devices and intelligent systems. In this regard, studies on the potential of the robotics course in terms of training engineers of the future are relevant (Ershov, 2011; Filippov, 2016; Filippov, 2013). Moreover, innovative educators propose projects for the formation of environmental thinking in robotics. For example, D.G. Koposov (Koposov, 2017) presents the project "Franz Josef Land" with the task to create a model of a robot utilizing space debris. N.A. Beliovsky and L.G. Beliovskaia (Beliovskaia, Beliovsky, 2016), in the Ecology block, presents the following environmental project as an example: to design a drone robot to monitor the environmental situation and take samples.

So, robotics has the tools and means to effectively change the situation in terms of reducing the environmental and energy load on the environment. Robotics allows to form a careful attitude to the surrounding nature and man, the ability to apply it in cognitive, communicative, social practice and professional orientation through familiarity with the structure of living organisms in order to create robotic devices. However, all the presented scientific and methodological solutions and approaches are implemented according to traditional didactics, where the teacher plays the leading role in teaching. A. Ponomarev, I. Dezhina (Ponomarev, Dezhina, 2016) state the need to change the content, organizational forms, methods and means of training in the context of the priorities of the digital school. They offer a model for determining the scientific and technological priorities of Russia and consider possible tools and directions for their application.

Among the possible approaches and technologies how to take into account the requirements of global digital transformation, including the orientation of the educational space on personalization, many of the innovative teachers underline a mixed form of training (Karakozov et al., 2018; Soboleva, 2019).

### **2.1.2. Foreign literature review**

Many foreign researchers such as P. White (White, 2009), S. Otto, G. Florian (Otto, Kasier, 2014), P.W. Schultz (Schultz et al., 2004), E.V. O'Sullivan, M.M. Taylor (O'Sullivan, Taylor, 2004), M. Morris (Morris, 2002), U. Beck (Beck, 1999) and others have dealt with environmental thinking. In particular, P. White (White, 2009) notes that the term "environmental awareness" appeared as a new scientific term in the 1970s. Other scientists (E.V. O'Sullivan, M.M. Taylor (O'Sullivan, Taylor, 2004), M. Morris (Morris, 2002), U. Beck (Beck, 1999)) have introduced synonyms of this term: environmental sensitivity, environmental concern. However, most studies understand it as "interchangeable with the ecological self, the ideal state of being, and self-realization" (P.White (White, 2009), S. Otto, G. Florian (Otto, Kasier, 2014), P.W. Schultz (Schultz et al., 2004)).

P. White has formulated the approach, proposing to consider environmental consciousness as an eco-centric moral norm, orienting a person to inner wealth and environmental rights, the value of humanity as part of "nature". P. White separately singles out "the desire for self-

realization, oriented towards meaningful communication with nonhuman others” as “one of the peculiarities of ecological consciousness”.

The position of P.W. Schultz (Schultz et al., 2004) is also interesting in the context of the study. He uses the concept of environmental consciousness to fix psychological factors due to the predisposition of cognitive subjects to participate in “pro-ecological behaviors”.

I. Tilikidou, Y. Zotos (Tilikidou, Zotos, 1999) formulate the provisions of the concept of environmental consciousness. It describes various conditions and characteristics of ecologically-conscious behavior of a member of society (ecologically-conscious consumer behavior). Here scientists emphasize that environmental thinking has 3 components: cognitive, affective and behavioral.

S. Otto, F.G. Kaiser (Otto, Kaiser, 2014) point out the relationship of information about the state of the environment and ecological inclusion of a person. It proves the importance of the cognitive component of ecological thinking in human behavior.

Modern researchers, dealing with environmental education issues, actively study the environmental attitudes of students. For example, M.A. Haşiloğlu, P.U. Keleş, S. Aydın (Haşiloğlu et al., 2011) have analyzed the behavior of students in educational institutions on behavioral and mental aspects and clarified attitudes in several variables. They have introduced a scale of indicators characterizing environmental thinking and environmental behavior. The key conclusion of the scientists was that with the age students were losing orientation towards respect for the environment.

S. Laso Salvador, M. Ruiz Pastrana, J. Marbán Prieto (Laso Salvador et al., 2019) in their studies note that the development of environmental thinking is a priority goal for sustainable human development, an important component of environmental education policy. For the assessment of environmental knowledge, the formation of environmental competence, they propose considering four characteristics: cognitive, conative, affective and active. Their results prove that the quality of environmental knowledge improves after active metacognitive involvement in activities. Thus, they confirm that creative research work and the implementation of projects contribute to the formation of environmental thinking.

As for high-quality engineering training of specialists in demand, we can note works of A.R. Carberry and A.F. McKenna (Carberry, McKenna, 2014). They also point out the importance of project activities in modeling. Crawford R. (Crawford, 2014), D. Tocháček, Lapeš J., V. Fuglík (Tocháček et al., 2016) emphasize that the robotics course has powerful tools for active cognitive activity in the development and management of robots using specific tools.

R. Evangelista, P. Guerrieri, V. Meliciani (Evangelista et al., 2014), Rappitsch, Christoph (Rappitsch, 2015), analyzing changes in society, highlighting the features of digital transformation, underline that "the digital economy is part of the economy, based directly on computer technology." According to Rappitsch, Christoph (Rappitsch, 2015), a significant result is the identification of the environmental aspects of the digital economy and the directions of strategic development: energy, food, health, housing, finance, vehicles.

Thus, the modern model of the digital economy makes people think strategically and focus on the future. New standards and ethics of behavior appear, they give great opportunities for professional activity. Environmental thinking must be seen as an important universal skill that should be taught through problematic creative activity. In the context of digital transformation, such activities should be supported by digital technologies and automated high-tech systems. In addition, training must be focused on the preparing such environmental specialists who can think outside the box in the uncertain future and work in a team.

All of the above-mentioned facts have determined the significance of the research.

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

#### **3.1. Theoretical and empirical methods**

Theoretical methods are the analysis of psychological, pedagogical, scientific and technical literature on the determination of the concepts “green thinking” and “environmental thinking”. It is a special style of thinking, with the potential to maintain a stable balance between the challenges of the digital economy and preserve the integrity of the biosphere, between the needs of high-tech industry and the needs of the natural environment.

According to expert reports, development strategies, concepts of education, the Atlas of Future Professions (Cross-professional competences), the “lean production”, “environmental thinking” are the demanded professional competencies of engineering and technical specialists of the future. The study of the didactic potential of educational robotics in terms of the formation of a “green style of thinking” was carried out by analyzing specific developments of teachers, interdisciplinary projects for the creation of cyberphysical devices for resource conservation and environmental protection.

When studying the practice of including research interdisciplinary design projects in the digital educational environment, we used practical methods to describe, characterize and analyze the methods, means, forms of organization and control. Systematization and generalization of ideas and patterns, principles of didactics in teaching made it possible to formulate a system of principles for personalized education.

A special group includes empirical methods (observation, analysis of the results of students’ research projects) in order to obtain relevant information about the formation of the required personality traits and the lean production skill. Statistical differences in the levels of environmental thinking and the lean production skill were evaluated using the Pearson’s chi-square test.

### **3.2. The base of the research**

A pedagogical experiment evaluated the effectiveness of focused cognitive activity of students. It was organized in a personalized educational environment of robotics and included creative interdisciplinary research projects in order to improve the quality of education. Challenges of the digital economy and the requirements of high-tech industrial production for engineers of the future were taken into account. The experiment involved 148 students (5-7 grades) of schools in Kirov and the Kirov region. The consent of subject teachers and parents of students was obtained. If one of the classes in city schools was included in the experimental group, the second class from the parallel (where the subject was taught by the same teacher) was included in the control group. If a rural school had only one class in parallel, then the control group was the corresponding class from another school in the same district. Thus, the control group was 73 students, and the experimental one was 75 students. The experiment was in specially equipped computer science classes, using the same software.

### **3.3. Stages of the research**

The research had three stages.

The first stage was a stating experiment. We investigated the state of didactic problems of the development of environmental thinking as an important skill for obtaining a demanded profession in a modern digital society. Here, we evaluated the potential of the robotics course in terms of formation lean production skills, resource conservation, and maintaining a balance between the challenges of the digital economy and environmental issues.

The second stage was devoted to the development of didactic principles, the description of a robotics education model in a personalized environment for training engineering and managerial specialists of the future for the formation of environmental thinking as the basis for introducing innovations and responding to the challenges of automation, globalization and competitiveness.

The third stage of the study included the experimental teaching and improvement of the basic ideas of the approach in relation to the identified requirements of the digital economy and the formation of key professional competencies. Teaching was accompanied by constant monitoring of the results of students’ research projects, which allowed to consistently improve the proposed methodological ideas. Results of the study were discussed in journals and at conferences at various levels.

## **4. Results**

### **4.1. Clarifying the basic concepts**

In the present study, we consider the concept “ecological thinking” as a way of thinking, feeling and the actions, which are characterized by belief in the interconnection of all energy, space, geological, biological and social processes; understanding the inextricable integrity of nature and society; high status of environmental values, especially life; overcoming anthropocentrism and selfishness in relation to nature; a sense of personal responsibility for the future of humanity and nature.

We suggest considering the structure of environmental thinking through the integration of the cognitive, prognostic, practice-transforming and motivation-value components. The criteria for the formation of ecological thinking include the following personality traits: knowledge in the field of environmental science, eco-social ingenuity, development of critical thinking, formation of awareness of the relationships between nature, society and personality.

The key idea of the environmental thinking development is the problematic nature of education aimed to form environmental awareness. Moreover, the corresponding cognitive activity should include the solution of educational and practice-oriented tasks, involving several options for resolution. Such multivariance should take into account various priorities and norms of society.

Environmental competence of a specialist demanded by the digital economy is his ability to observe culture and harmony in communication with nature, to understand global environmental ties, and to apply appropriate ethical standards while performing professional activities. The latter fact is especially relevant for the training of specialists in the profession of the future in the field of energy and ecology (designer of energy storage, hydrologist, designer of accessible environment, etc.).

**Lean production** in the broad sense should be considered as management of the production process, based on a constant desire to eliminate all types of losses. It means involving each employee in the process of optimizing the business and maximizing customer orientation. In industrial production and mechanical engineering, lean production involves a careful attitude to the environment and people, the ability to apply appropriate skills in cognitive, communicative, social practice and vocational guidance through familiarity with the structure of living organisms in order to create high-tech devices.

Literature review makes it possible to reasonably conclude that robotics has a powerful didactic potential in terms of the formation of a "green thinking style". Moreover, the educational activity in robotics allows to form this thinking, respect for nature and humans, and it also develops the ability to apply it in cognitive, communicative, social practice and professional orientation through acquaintance with the structure of living organisms in order to create robotic devices.

The study of the fundamental theoretical foundations of the ecosphere is very important in the formation of environmental competence. Therefore, special requirements in the study of robotics should be presented both to the general concept of environmental management, and to the knowledge system in its applied fields. It is especially important to comply with these requirements at the stage of introducing relevant knowledge and skills into practice and transformation activities. The skill of lean production is formed in the classroom of a robotics course during a focused search for the most effective way to solve the problem. For example, solving the task to follow the line, it is necessary to pay attention to the most accurate passage of the route (to minimize deviations from a given trajectory) and at the same time maximize the speed of the device; and to the most accurate movement of the robot, including measuring distance and rotation angles. This problem can be solved only as a result of effective interaction of all team members, as it also implies the possibility of changing the design of the machine, for example, by using a multiplexer, which requires changes to the program.

Particular attention in robotics should also be given to energy conservation. It is recommended each time to draw the attention of students to such moments as the efficient use of battery energy: the ability to turn off the control unit in time, use the engine braking mode (requires more power consumption) only if necessary, increase the speed by using a multiplexer, and not increasing the motor power, sound use of sound signals, etc.

Thus, "green" thinking, focused on solving environmental problems, should include the following components: mental operations aimed to solve problems in the field of ecology and energy; environmental knowledge and understanding of the integrity, systematic and processual environment; ability to predict the final result; the ability to put forward hypotheses and choose the most acceptable one; the ability to establish causal relationships.

The practical application of the listed types of cognitive activities focused on the formation of environmental thinking and lean production skills as demanded professional competencies in accordance with the features of the Atlas of Future Professions (Cross-professional competences) will make it possible to change the pedagogical principles applied to programs in the field of robotics and mechatronics (the base of traditional education):

– the systematic principle implemented through the structure of the program at each level of studying robotics, through the logic of each specific lesson. In the program for each level of

studying robotics, the selection of topics should provide an integrated system of knowledge in the field of cyberphysical systems, including knowledge from foundations of ecology, mechanics, physics and computer science;

- the humanistic orientation of the pedagogical process: programs for each level of study of robotics should be developed taking into account the requirements of maintaining a balance between the digital and the green economy; priority areas of development in the field of technology and the needs of nature, society; the need for self-determination and socialization of the individual;

- the relations of the pedagogical process with life and practice: training at each level of the study of robotics should be implemented in such a way that the process of developing controlled models is preceded by a mandatory (necessary for life in a modern digital society) thinking process. During an interdisciplinary practice-oriented activity, the student masters such intellectual skills as structuring, planning, optimal interaction with the environment, forecasting results (foresight thinking), information retrieval, classification, building inferences, etc.;

- students' consciousness and activity: implies creative problematic activity, when the perception of theoretical fundamental knowledge in ecology is activated, they are comprehended, independently processed and applied;

- holding strength: achieved by repeated (specially methodically organized through a system of techniques and methods) targeted repetition and training to minimize risk to the environment and all users;

- visibility: allows to take into account all individual psychological styles of cognition in the training of engineering and managerial specialists;

- personality education and support for socialization: the assimilation and translation of own norms, rules of behavior in society go along with increasing the motivation-value component, the development of environmental skills, mental and moral qualities in the training of robots, model management;

- the principle of an individual approach to education: it is realized both through building a system of tasks and at the level of individual personal communication between the teacher and the student, at the level of trilateral interaction "teacher – student – robot", at the level of "human-robot-nature".

For the successful implementation of the proposed principles in the formation of environmental thinking in the course of robotics, it is necessary to have a set of organizational and pedagogical conditions. They include: building an educational process based on personalized education technology; the implementation of interdisciplinary research tasks of a problematic nature with environmental content; actualization of the needs of students in obtaining a demanded profession of the future for successful socialization through the practice of competitive activity, teamwork.

Thus, we have obtained the following theoretical results that are significant for the study: described education objectives, i.e. requirements that the state, society and business have to professionals of the future; defined the necessary principles of training which should be taken into account in the course of studying robotics for the formation of environmental thinking.

#### **4.2. The model of training robotics which supports the formation of environmental thinking and takes into account the requirements of the future economy**

We present a model for organizing a robotics course taking into account the orientation of modern education towards its nonlinear continuous personalized nature. As a didactic technology we chose mixed training, in particular the organizational form "flipped classroom". The choice of this form is due to the fact that it allows to combine full participation of the teacher with online learning and involves elements of students' independent control of the trajectory, time, place and pace of learning (Soboleva, 2019).

The organization of the "flipped classroom" model is characterized by a change in the sequence of classical cognitive activities – theoretical material and organization of homework. It suggests that the student independently studies the theory before the lesson. The teacher thinks and includes the possibilities of using the acquired knowledge and skills (completing the task system, interactive tests, project, discussion and other types of educational and cognitive activities).

Let us describe the basic ideas of the methodological approach using the example of studying the line-following algorithm. The expected results are specified in terms of the formation of environmental thinking and lean production skills.

Input conditions for the model (necessary knowledge): color sensor; color sensor operation modes; the ability to design a robot based on a robotic designer without using an assembly scheme; the ability to control the movement of the robot in a software environment, including virtual; the ability to connect a light sensor and read the values of the light sensor; knowledge of basic algorithmic constructions and the ability to use algorithmic constructions of following, conditions and repetitions in a software environment; the ability to download and run the robot control program in the main robot controller.

To reflect the meaningful content of the model, the following stages of the lesson can be distinguished: independent work at home, actualization, experimental research, work in conditions of uncertainty (problem solving), summing up and reflection.

By the stage “independent work at home”, the teacher prepares the theoretical material necessary and sufficient for the students to effectively master the lesson. At the stage “actualization”, the teacher formulates the topic of the lesson, and determines the purpose and objectives of the lesson together with the students. The general formulation of the problem: in the shortest time, the robot, following the black line, must get from the starting point to the finish, it must not lose the line for more than N seconds.

Then it is necessary to organize a discussion of the practical significance of the problem. Here, the teacher draws an analogy between the route of the robot and roads and organizes a discussion of the construction of roads, focusing the students’ attention on the need to minimize the harmful effects on nature and the environment (the formation of environmental thinking).

Further, the teacher offers students to complete a practical task using a computer. At the next stage, the teacher offer students to conduct an independent experimental research, controls the process of assembly, programming and debugging of the robot. Students design a robot, load prepared and adjusted programs into it, debug algorithms for a given path. The most important part of the experiment is to find the optimal combination of the robot design and the program that controls its work. It is necessary to set the motion parameters of the robot in the algorithm so that the robot can not lose the line and can not go off the track, and on the other hand he must pass the track at the highest speed.

When organizing work in conditions of uncertainty, the teacher suggests checking the operability of the developed devices in completely new conditions. Having returned to the general statement of the problem, the teacher can change the usual conditions for the functioning of the robot, check, and, if necessary, correct the behavior of the robot.

At the stage of summing up, the teacher’s activity repeats the general formulation of the problem, the main idea of the algorithm for solving it and organizes the discussion of possible ways of applying the studied algorithm in everyday life. The teacher supports the students’ initiative, directs the course of their creative search, distributes the children into small groups and determines the task for a creative interdisciplinary project implemented in subsequent classes.

Let us describe the organizational and methodological component of the practice of the “flipped classroom” in terms of the formation of environmental thinking. The example is studying the line movement algorithm using a single color sensor for a robot assembled on the basis of the Lego MindStorms EV3 designer. This algorithm is the slowest, but the simplest and most stable.

Students are invited to watch the video prepared by the teacher and write down the general statement of the problem. Then they study the robot as a system: determine inputs and outputs, comply a diagram of its hierarchical structure. An example of a chain of questions for practice-transforming activities focused on the formation of environmental thinking and the lean production skill:

- Draw the trajectory of the robot along the black line. Describe this trajectory.
- What happens if the algorithm interchanges the actions when the condition is met and not fulfilled?
- What does the robot do if it loses the line?
- Choose the optimal motion parameters of the robot. Draw it.

To test themselves, students can be offered to complete interactive tasks prepared by the teacher, for example, with the tools of the LearningApps service. Expected results of the formation of environmental competence (model output) are:

- ability to analyze a robot as a system;
- ability to determine the possible ways of using the robot in everyday life (including resource saving), to develop ways to modify the device with a view to its use in a certain area of environmental protection;
- ability to find a common solution (when working in pairs) while research an environmental problem;
- experience in analyzing the efficiency and energy efficiency standards of the developed device to solve the problem;
- experience in finding growth points in professional activities when searching for new ways to use the developed device to ensure environmental protection;
- experience in resolving conflicts on the basis of coordinating positions and taking into account interests, formulating, arguing, and defending one's opinion;
- experience in predicting possible ways to change the conditions of the problem, the input conditions of the system;
- experience in determining ways of efficient use of energy, ways of energy conservation.

After studying the necessary theoretical material, students were offered interdisciplinary research projects.

- “Development of a drawing robot”. The project goal is to develop an automated device capable of driving across a field by drawing N segments using a fixed marker.

- “Development of a watering robot”. The project goal is to develop an automated device capable of automatic watering of a given area. Create a device that allows the robot not only to control the irrigation process, but also to adjust the irrigation zone.

The specification of the topic does not occur on the teacher’s initiative, which is characteristic of the traditional education system, but is determined by students, taking into account their individual characteristics and interests. 2-4 students take part in the project. It is important to record the progress of the project, for example, in the form of an engineering book containing a fairly detailed description of the stages of work, including a description of the requirements for resource conservation and environmental protection, design and program of an automated device. The development of an engineering book allows to make the project preparation process more scientific, systematic and practice-oriented.

Let us reveal in detail the contents of one of the projects to develop an algorithm for modeling the behavior of a cyberphysical device during cargo transportation, depending on the type, properties and characteristics of the material. At the beginning of the study, three main problems were formulated: how to use a vehicle with one set of tools to solve new and atypical problems; determination of types, properties and characteristics of materials using various types of technical means; making decisions and performing a set of actions depending on the determination of the type, properties and characteristics of the material.

The analysis of the subject area allowed to formulate three main tasks for finding a practical solution – loading a vehicle, unloading a vehicle and finding the optimal trajectory of irrigation. An additional task is handling critical situations. Each task led to the practical minimization of costs. Problem solving can be used both jointly (the activity of a cyber-physical device in real conditions), and independently (finding the optimal load before sending the vehicle for loading).

An experimental model of the conveyor robot was assembled on the basis of Lego MindStorms EV3 robotic designers and additional Lego Education WeDo parts. The movement of the conveyor robot is carried out according to the algorithm of following the black line using two color sensors in the reflected light mode. Loading and unloading algorithms are based on cargo identification. To solve the logistic problem, the program algorithm uses the function of cargo delivery in the order optimal for a practical industrial problem. Correction of the irrigation zone is carried out by controlling the movement of the motor left-right and can vary within the range from 1 to 15 cm. The intensity of irrigation depends on the speed of the robot.

In practical conditions and taking into account the possible dimensions of a real robot, you should pay attention to safety precautions and handle critical cases that are possible in the conditions of production and transportation.

1. Commands are given to the robot by pressing buttons on the control unit. Therefore, it is necessary to put protection on accidentally pressed buttons, confirm actions by double-clicking and cancel actions.

2. The movement of the robot across the territory will occur along a pre-marked line, that is, fully automated. In order to avoid injuries associated with the unexpected appearance of obstacles on the line of movement, it is necessary to use an infrared sensor in the "Approach" mode, which respond to an obstacle on the track.

3. When a power outage occurs, that is, when two color sensors recognize black, the robot must make an emergency stop and wait for a command to the control unit.

Taking into account these situations, using the robot in real conditions is safer. Students reflect all stages in the engineering book.

Thus, the presented personalized model for teaching robotics provides pedagogical support for the formation of environmental thinking in the framework of interdisciplinary research activities of students as future specialists capable of making a breakthrough in modern science and technology.

### **4.3. Experimental evaluation**

#### **4.3.1. The ascertaining stage of the experiment**

At the first stage of the experiment, the students were given a control task to work with information, with the model in accordance with the demanded resource-saving and energy-saving skills. Thus, it was possible to collect experimental data on 148 students of various educational institutions: 70 respondents in the first half of the academic year of 2018, and 78 students in the second half. The reason for this selection is explained by the structure of curricula in various educational institutions, where the corresponding module for the development of research projects is prescribed. Since, as a result of the preliminary control evaluation, almost the same initial level of students – participants in the pedagogical experiment was revealed, we can consider them as a general sample of 148 students. Thus, the experimental (75 students) and control (73 students) groups were formed. The experimental group had 65 % of girls and 35 % of boys.

#### **4.3.2. The forming stage of the experiment**

Classes for students in the control group were conducted according to the traditional methodology of teaching robotics, without special organization of cognitive activity to solve environmental problems and resource conservation. They were active and independent in the research, which was organized in the form of practical work on the design, performing tasks on specific topics. The training of schoolchildren from the experimental group was carried out using the "flipped classroom" technology and included project activities to develop creative interdisciplinary projects with environmental content.

In order to evaluate the effectiveness of the proposed approach, at the end of the educational process, students were offered the test. The test involved the implementation of an interdisciplinary project focused on lean production and supported by an automated high-tech system.

To determine the level of environmental thinking and the lean production skill, we used the criteria "very low", "low", "average", "high", "very high". As it was previously noted, we actually assessed the formation of the conscious component of environmental thinking; environmental literacy (knowledge of fundamental environmental laws, the ability to take these laws into account, forecasting probabilistic events). We determined levels according to the methods of generalization; disclosure of essential features of concepts and their relationships; practical and intellectual actions of the child, directly related to the content of mastered concepts, knowledge and ideas; the ability to make assumptions and choose the most optimal option; the ability to express new innovative ideas.

Levels of environmental thinking:

1. "Very high" level: the ability to whole, causal, probabilistic analysis of environmental situations; independence of hypotheses, the choice of the most optimal option, the ability to accurately predict the final result; the desire to disseminate environmental knowledge and

participate in environmental practices; the ability to express attitude to nature through models, information systems.

2. "High" level: the transfer of individual knowledge to general; comparison on a substantial basis with the definition of two or three reasons, lack of knowledge of terminology, classification according to one or two essential features. Cognitive motivation for solving engineering problems is sustainable. The student offers his own hypotheses, but they do not quite correspond to the modeling conditions; predicts the result of the robot activity, records it in the form of a flowchart; suggests one or two non-standard ideas of model behavior.

3. "Average" level: the ability to answer the question, but with additional help. The student offers more than one traditional idea in modeling behavior or structure, compares an insignificant basis on 2-3 grounds, he is emotionally responsive. He can classify on 1 basis: insignificant features, does not take into account the knowledge of terminology; can simulate a software solution to perform engineering tasks only with the assistance of others; tries to predict the behavior of a model or structure.

4. "Low" level: the allocation of one reason, a comparison of one non-essential attribute. Classification is performed inconsistently, according to an inessential attribute of a model of behavior or structure. The student operates with specific individual knowledge of the environment. The emotional attitude to nature is ambiguous. The hypotheses are put forward with difficulty, using the method of "trial and error", asks for the help of a teacher to model the system.

5. "Very low" level: he cannot abstract, predict, put forward hypotheses, classify, does not have a comparison in the course of cognitive modeling, has a lack of positive emotions towards nature. There is no understanding of how the constructed model will affect energy saving, environmental protection.

To diagnose the input conditions in the model of the pedagogical experiment, we conducted a survey consisting of a series of tasks. Examples of tasks for the input survey:

1. It is known that one discarded battery infects 20 sq. m. of land or 400 l. of water. In 2013, 565 million batteries were sold in Russia. Develop an information model that allows to calculate how many sq. m. of land and how many liters of water would have been contaminated with these batteries if everyone who bought it threw it into the street.

2. Indicate the type of interaction that is most effectively formed in environmental education. Options are: "man – society – nature"; "man – technology – society"; "man – man – society".

3. All batteries have graphite. Pencils are made of graphite. Determine if the statement "all batteries are pencils" is true or false.

4. The company engaged in the processing of packages Tetra Pak, produces "eco handles", clips for bags, corners for furniture, funnels. Currently, 100,000 packages have already been processed. One eco-friendly pen in a recycled cardboard envelope symbolizes the second life of one completely redesigned Tetra Pak bag. 85 thousand pens were sold. Develop an information model that allows to calculate how many bags were processed into clips, furniture corners and funnels.

The survey results were evaluated on a five-point scale in accordance with the criteria described above. The "excellent" mark corresponded to the levels "high" and "very high", "good" for the "average", "satisfactory" for "low level". In all other cases, the mark was "unsatisfactory". A qualitative change in levels in accordance with the results of an independent research project focused on the development of environmental thinking is shown in the diagram (percentage) in [Figure 1](#).

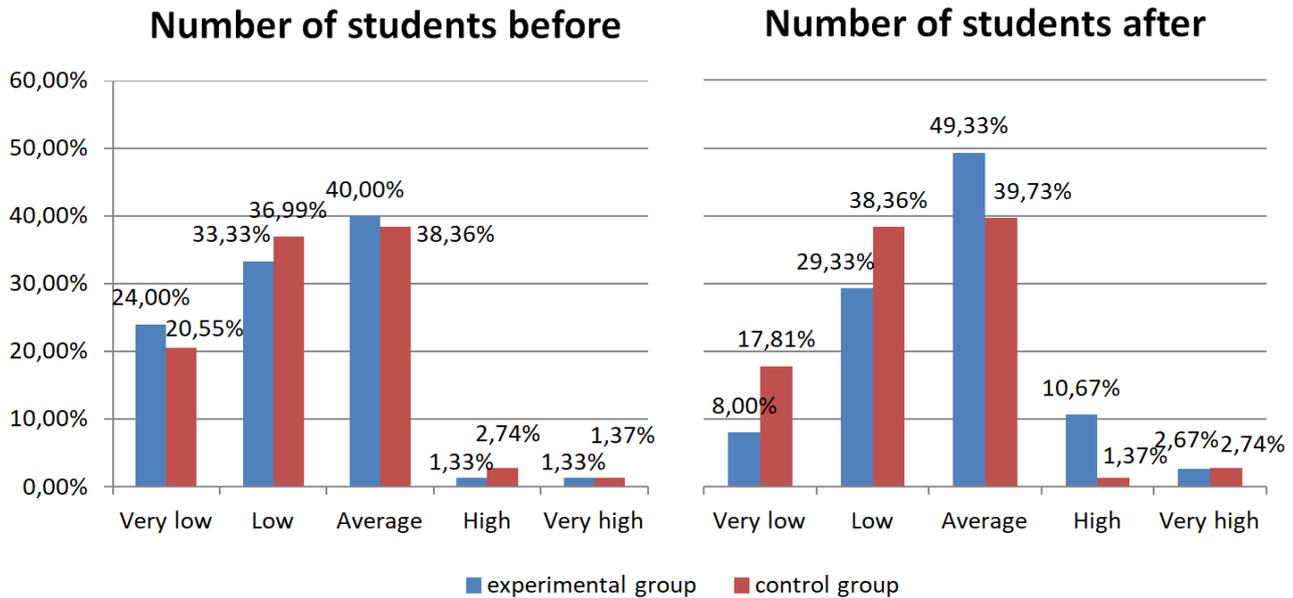


Fig. 1. Test results

Table 1 shows the results of the test before the experiment

Table 1. The results of the test before the experiment

Groups	Mark				
	5	4	3	2	
The experimental group	2	25	30	18	75
The control group	3	28	27	15	73
	5	53	57	33	148

Table 2 shows the results of an interdisciplinary project aimed at energy conservation and environmental protection, information security, means and technological solutions of a robotics course after the experiment.

Table 2. The results of the test after the experiment

Groups	Mark				
	5	4	3	2	
The experimental group	10	37	22	6	75
The control group	3	29	28	13	73
	13	66	50	19	148

Performing a quantitative analysis of the results, we can conclude that after the experiment, 62 % of the students of the experimental group had a high level of the demanded resource-saving skills and energy-saving skills for future specialists (marks 4 and 5), while initially this percentage was 36 %. It means a qualitative improvement of students' outcomes. At the same time, the level of skills in the control group also increased, but not so significantly: after the experiment only 44 % of the students showed good results (compared to 42 % before the experiment). The remaining 56 % had medium and low level of environmental culture.

**4.3. 3. The control stage of the experiment**

Let us accept the following hypotheses: the level of environmental thinking and lean production skills corresponding to cross-professional competencies of future engineers studying in the experimental group is statistically equal to the level of environmental thinking and lean production skills of students in the control group. Hypothesis H1: the level of environmental thinking

and lean production skills, corresponding to cross-professional competencies of future engineers studying in an experimental group is higher than the level of students in the control group.

We calculate the value of the statistic of the criterion before ( $\chi^2_{набл.1}$ ) and after ( $\chi^2_{набл.2}$ ) the experiment, using the online resource <http://medstatistic.ru/calculators/calchit.html>. A significance level is  $\alpha = 0,05$ . In this case  $c = 4$ , which means that the number of degrees of freedom is  $\nu = c - 1 = 3$ . According to the distribution tables  $\chi^2$  for  $\nu = 3$  and  $\alpha = 0,05$ , the critical value of the statistic is 7,82. Thus, we obtain:  $\chi^2_{набл.1} < \chi^2_{крит}$  ( $0,88 < 7,82$ ), а  $\chi^2_{набл.2} > \chi^2_{крит}$  ( $8,13 > 7,82$ ). According to the decision rule, this means that the hypothesis  $H_0$  is true before the experiment, and the hypothesis  $H_1$  is true after the experiment.

## 5. Discussion

Thus, the experimental assessment confirms the qualitative difference in the level of skills of caring for the environment and man, the ability to use environmental consciousness in cognitive, communicative, social practice and professional orientation through familiarity with the structure of living organisms in order to create robotic devices.

Students of the experimental group significantly increased the level of the demanded skills. For solving future professional tasks in the implementation of innovations is very important that the concretization of the content of each interdisciplinary project does not mean the teacher's initiative, which is characteristic of the traditional training system, but is determined by the students. When programming, propaedeutics of working with technical documentation was also carried out.

On the other hand, during the experiment, we had to solve didactic and methodological problems: the manifestation of interdisciplinary knowledge and creativity in the formulation of the project themes; the study of specialized literature on the problems of the ecosphere; the need for a lot of teacher's preparatory work for video clips, interactive resources; insufficient level of language training when working with foreign sources of information; large time and labor costs for the technical execution of the project results.

## 6. Conclusion

The results of the study prove that the new challenges and requirements of society, state, and business to the education system underline the need for the purposeful formation of environmental thinking as a demanded competence of the specialists of the future.

The study clarifies the basic concepts necessary for the implementation of robotics training in a personalized environment while preparing engineers of the future, the principles of environmental education. Analysis of the cognitive performance of students shows that the proposed model allows to qualitatively change teaching methods and means, increase the level of environmental skills, prepare students to master a high-tech profession for the digital economy.

The effectiveness of the proposed approach is confirmed by a pedagogical experiment, during which the result of cognitive activity was evaluated according to a set of criteria that correspond to the essence of the competencies of future professions and the priorities of the digital economy.

The results obtained can be used:

- to solve environmental problems caused by the introduction of high-tech production and the need to maintain a stable balance between the technosphere and the ecosphere;
- within the framework of an ongoing model for teaching robotics to prepare highly qualified professionals in the professions of the future;
- to ensure the personalization of the educational trajectory due to specially organized areas of support for creative, intersectoral, cognitive research activities of students at all levels of robotics studies, focused on their intellectual development (systemic, environmental and foresight thinking), and carried out in the conditions of training future specialists, capable of making an innovative breakthrough in modern science and technology;
- for a qualitative change of participants' interaction in the educational process and the environment, for the formation of environmental competence corresponding to the level of human information culture, determined by the conditions of life in a robotic society.

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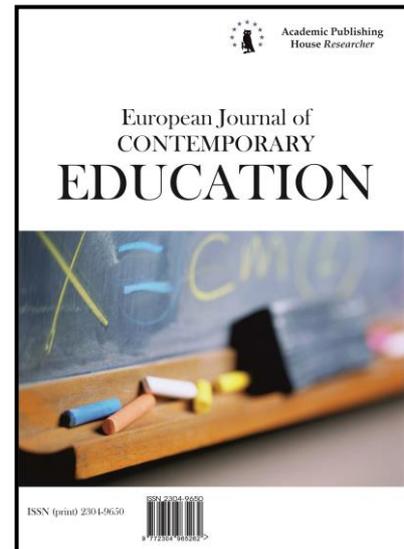
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## **Linguistic Rhetorical Ideal as a Development Factor of Multiethnic, Sociocultural and Educational Space in the Aspect of the Formation of a Professional Linguistic Personality**

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### **Abstract**

The paper characterizes the category of developed Linguistic rhetorical (LR) ideal developed by the authors. The phenomenon is a binding core, the epicenter of the social cultural and educational space (PESCES) and is a powerful factor for the formation of a professional linguistic personality of a specialist working in any field or having different educational specialization. In the first place it is relevant for a future teacher for whom language skills are especially important. In the course of communication with students of all ages educates new generations instilling the norms and requirements of the LR ideal that is timely for this stage of cultural and historical development of the state and its PESCES. In the process of the pedagogical research the experimental work was conducted with the first year students of Sochi State University specializing in history and foreign languages within the framework of the optional course “Basics of speech self-improvement”. The testing results of the theoretical model witness the efficiency of the process developed within the framework of Sochi school continuous Linguistic & rhetorical education. This approach is based on the result-oriented complementary organisation of counter-processes of designing an innovative pedagogical process and self-design of a learner as a strong linguistic personality of a dialogic, democratic and polycultural type (general culture foundation of university training within the framework of Federal State Educational Standards) and professional linguistic personality (specialized foundation of a training program).

**Keywords:** Sochi Linguistic rhetorical (L&R) School, Continuous L&R education, Linguistic rhetorical (LR) ideal, polyethnic social cultural and educational space (PESCES), professional linguistic

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personality, strong linguistic personality of a dialogic, democratic, multicultural type, designing an innovative pedagogical process, self-designing a student in the criterion grid of the LR ideal.

### **1. Introduction**

The goal of the article is to characterize in theoretical and methodological terms the linguistic rhetorical (LR) ideal category developed by the authors, as well as to present the course and results of its practical implementation as a trigger of the university educational process into its pedagogical design, modeling and testing among the student audience.

The conceptual platform of the Sochi L&R School is in tune with the thesis of the French school of neorhetoric that the rhetorical function objectively acts as a transcendent one ([Obshchaya ritorika, 1986](#)). Various aspects of its implementation were systematically presented in the works devoted to epistemologically-oriented communication, primarily scientific ([Druzhinina, Vorozhbitova, 2019](#)) and pedagogical ([Timofeyev, Vorozhbitova, 2019](#); [Yuryeva, Vorozhbitova 2019](#); [Datsun, Vorozhbitova 2018](#), etc.); the concept of continuous L&R education ([Vorozhbitova, Issina 2018](#)) has been developed and repeatedly tested for different stages of education, from preschool to post-university, including bi- and polylingual aspects ([Vorozhbitova et al., 2017](#); [Vorozhbitova et al., 2018](#)).

In the first quarter of the twenty-first century, in fundamentally new conditions of functioning of the post-information society, it is highly necessary to increase the motivation of students to studies, self-improvement, human and professional growth ([Hallgeir 2009](#); [Harackiewicz et al., 2014](#); [Lazareva, 2016](#); [Martins et al., 2010](#); [Montenegro, 2019](#); [Thurston, Travis, 2018](#); [Wurtz, 2014](#)) on the basis of actual socially significant and personally attractive priorities, values, and ideals. In higher education, there is an acute problem of modernizing the educational component of professional training ([Akhmadullina, Valiakhmetova, 2017](#), [Engin, McKeown, 2012](#)), reviving the atmosphere of high culture, morality, spirituality, and intellectuality (see, for example, such works as: [Afzal et al., 2010](#); [Florian, Müller, 2016](#); [Dohnal, 2017](#)).

Thus, according to the Federal state educational standards of higher education of the third generation ([FSES HE 3++](#)) graduates of the bachelor's degree in the direction of "Pedagogical education" are prepared for professional activities of the following types: pedagogical, project, methodological, cultural and educational, organizational, managerial and support. For a master's degree, research is added to the abovementioned types of activity.

All the professional functions of a teacher that are named and traditionally distinguished in scientific literature and presented in various typologies have a communicative function as their integral component. The latter and, accordingly, the rhetorical, or more precisely, integrative LR function does not act as a series of opposites in relation to them, but as a basic function, the others being related to it as derivatives. Accordingly, the category of "LR ideal" proposed as a conceptual reference point allows us to systematize the requirements for the "ideal specialist" and present them at a higher conceptual level by bringing to the forefront the aspect of speech-making culture. In this context, it is appropriate to recall it is not by accident that the historical forerunner of all pedagogical science is a multi-volume work of Quintilian "Education of the speaker".

### **2. Materials and methods**

The materials used were theoretical, research and methodology papers, data obtained during the educational process. The following theoretical methods were used: analysis of scientific, methodological, educational literature, federal state educational standards; 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.

In order to get accurate results we needed to take all measures to make the sampling of the participants in the experimental and control groups as representative of the population statistically as possible. The participants had to belong to the same age group, specialization, and have similar educational background and academic achievements. To further improve the validity of the experimental results instead of using probability sampling and randomly choosing the limited number of participants the experimental research was conducted with all second-year students of the teacher's training faculty who specialized in foreign languages and history. In all there were six groups of second-year students who specialized in foreign languages (2 groups), history (2 groups),

the Russian language and literature (1 group) and primary school teaching (1 group). In order to increase the sample size we decided to make one combined experimental and another combined control group out of the first four groups as they were most suitable for our experiment in terms of the group size.

The experimental work was conducted with 2 groups of students of Sochi State University. One of them was a control group and the other was experimental. The control group (CG) was comprised of 16 first year students majoring in History and 16 first year students specializing in foreign languages. The experimental group (EG) consisted of 16 and 15 first year students who also majored in history and foreign languages respectively. So both combined groups had nearly equal number of students of the abovementioned specializations, they were of the same age, had similar educational background and academic achievements which was confirmed by the initial diagnostics tests (see [Table 1](#)).

To determine the efficiency of the developed pedagogical model a set of diagnostic tools was developed for every indicator of the level of readiness for the process of speech self-improvement which included the following criteria: values, self-assessment, motivational, professional communication) which allowed to determine the achievement level.

The students had special notebooks in which they did written tasks, answered questionnaires, wrote down the results and the marks they received. It was done to materialize the process of professional linguistic personality self-design to make it explicit for the students so that they get true understanding about the level of their skills in the field of their language and speaking skills and also the dynamics of the learning process. At the end of the experiment they were able to compare their initial answers with those that they gave during the final testing and as result of the analysis make individual programs of speech self-improvement for the following years of their studies at the institute.

The probability sampling method was not used as it was not possible for this experiment but the groups of the participants were very similar in terms of age, skills, educational background, specializations and number.

For assessment of students' work a 4 point scale was used, ranging from 2 for a low level of the skill (less than 60 % of correct answers), 3 if the correct responses were within the range of 60 to 75 %, 4 for good (75 to 90 %) and 5 if the student gave 90 and over per cent of correct responses).

To determine whether the participants' results were statistically equivalent in the beginning of the experiment and to ascertain the results of the experimental group were statistically different from the ones of the control group we used the Pearson's chi-squared test.

### **3. Discussion**

The phenomenon of the ideal objectively acts as a "cementing core", the speech-thinking epicenter of the polyethnic-sociocultural and educational space (PESCES) of a particular state and is a powerful factor in the formation of a professional linguistic personality of a specialist of any field and profile of training. First of all, this is relevant for a future teacher, a teacher who acts as a professional linguistic personality and in the course of communication with students of all ages educates new generations instilling the norms and requirements of the LR ideal that is timely for the given stage of cultural and historical development of the state and its PESCES.

In the framework of determining the basic concepts of the research, let us clarify in their mutual relationship two series of related concepts: spatial in nature (sociocultural and educational/informational/discursive/communicative space) and related to processes (information/discursive/communication processes). The terms information space, discursive space, communicative space denote various aspects of consideration, study and formation of sociocultural and educational space (SCES), which acts in relation to them as a general to a more private one. If we consider one nation-state (local aspect), the SCES actually means the ethnic sociocultural and educational space (ESCES). In cases of multinational states, various ethnic and cultural components enter into a complex interaction: with the prevailing role of the state language of a dominant nation, the national languages of the rest of the population contribute to the dynamics and qualitative characteristics of discursive processes. In this case, the object of the research is actually a multi-ethnic-sociocultural and educational space (MESCES). On a global scale, this variety nevertheless

represents the local-state aspect – in relation to the global character of the MESCES of the entire world community.

Drawing on the work (Tyunnikov 1999), we give the following definition: the ethnic sociocultural and educational space is a continuum of material conditions, mental attitudes, typical state, political, financial, economic, ethnicity saving, social, cultural and educational strategies of society and the results of their implementation in the field of reproduction of an ethnic group, culture and statehood in the new generations. Its essential features are purposefulness, transformative nature, internal inconsistency, cumulateness, determinism, different levels, dynamism, spatio-temporal affiliation (see: *Ibid*: 11-12), globalization character. The mechanisms of interaction between culture and education are the structure-forming core of the ESCOP, the remaining structural components are the ethnic base, sociocultural orientation, functions (meaning-forming, cultural, educational, translational, communicative, regulatory, educational, developmental, adaptive, protective, etc.), generating systems (media, educational structures, family, political and social groups, etc.), processes (sociocultural, educational (see: *Ibid*: 12), discursive, communicative.

The category of the LR ideal is the basic component of PESCES and when specified in relation to the teacher's activity it is one of the most important factors in the educational process. We understand LR ideal as a historically formed ethnosocioculturally determined system of requirements to performing linguistic operations, textual actions and communicative activity that corresponds to the relevant for the society typology of speech events, reflects the hierarchy of values of this cultural and educational space and determines the process of the formation of speech and thinking culture of the ethnic community's aggregate linguistic personality and its reproduction with necessary transformations in subsequent generations.

We refer to the essential features of the LR ideal:

- historical and ethnosociocultural conditionality;
- cognitive and communicative nature;
- ideological and axiological status;
- regulatory and prescriptive nature;
- invariant and variable principle of structural organization;
- educational purpose;
- personality forming potential.

The relevance of this category for a pedagogical University that trains a teacher primarily as a professional language personality is due to the following main factors:

1. LR ideal – ethno-socio-cultural conditioned value-motivational base of pedagogical activity as a verbalized process.
2. LR ideal is a cognitive-conceptual and methodological basis for the speech-making culture of a teacher as a professional language personality.
3. LR ideal is the thought-speech basis of professional-pedagogical instrumentation that ensures the optimal accomplishment of teaching functions by a professional language personality in the educational process.

Accordingly, a whole set of functions of the LR ideal in the educational process is isolated, the leading ones being:

- 1) ethnosociocultural and identifying;
- 2) criteria and orientational;
- 3) projective and constructive;
- 4) didactic and technological;
- 5) educational and world outlook forming;
- 6) educational and developmental;
- 7) personal-self-design.

The inclusion of the LR ideal category into the theory of professional development of a specialist allows to systematize the requirements for an “ideal specialist” and present them at a higher conceptual level by highlighting the speech-thinking culture as the leading, system-forming component of their professional activity,

The purpose of the experimental work was the theoretical justification, design and experimental testing of the process of becoming a professional linguistic personality of a future specialist based on the category of the LR ideal.

The study was conducted in the following main areas:

1. Development of the theoretical and methodological foundations of the study of the LR ideal as a pedagogical category and a trigger for the professional development of a future teacher:

- LR ideal as a pedagogical category, its essential features and functions;
- Theoretical elaboration of the problem of the formation of the speech-cognitive culture of a teacher in the aspect of the LR ideal;
- LR ideal as a project basis for the formation of a professional linguistic personality of a future teacher.

2. Design of an innovative pedagogical process to form students' readiness for speech self-improvement on the basis of the LR ideal category:

- Modeling the process of formation of students' readiness for speech self-improvement on the basis of the LR ideal (model blocks: conceptual; goal-functional);
- Design of an innovative pedagogical process (model blocks: informative; structural and logical, instrumental and technological, organizational and managerial);
- Testing the model constructions, description of the course and results of the experimental work.

At the present stage of development of pedagogical science, the design of the educational process is carried out on the basis of its pre-project specification and model description according to the leading project positions that have the appropriate design characteristics: goal and functional, content-based, structural and logical, instrumental and technological, organizational and -managerial.

Chosen as the general goal of the projected pedagogical process, the readiness of students of the pedagogical university for speech self-improvement on the basis of a professionally oriented LR ideal is a basic personal quality which has a character with the integrative and intellectual worldview, motivational and volitional, operational activity features, which serves as the foundation of the teacher's self-concept as that of a professional language personality.

This readiness is a complex psychological formation, including orientation on the values of the national LR ideal and the teacher's speech ideal, adequate self-assessment of the present state of their speech-making culture in the criteria grid of these values, self-actualization as a result of a conscious intention to follow the LR ideal of the teacher and self-realization in everyday speech activity, taking into account the norms and requirements of the LR ideal of the teacher on the basis of an adequate self-concept.

In the pyramid of goals of the projected innovative pedagogical process, the general goal is divided into sub – goals that correlate with the components of the readiness being formed – cognitive, pragmatic, empirical, and motivational, which are further specified at the third level.

The experimental work was performed within the scope of the developed optional course “Basics of speech self-development”. The latter included such sections as:

“Rhetoric. Linguistic rhetorical ideal” (Topics “Rhetoric – eloquence – orator”, etc.);

“Typology of Linguistic rhetorical ideals” (topics “Western mentality: ideology of speech behavior”, “Soviet (propaganda) Linguistic rhetorical ideal”, “Culture of correspondence of the Russian intelligentsia”, etc.);

“Russian national speech ideal in historical perspective” (topics “Speech and personality traits in the Russian proverbial Fund”, “Christian Beatitudes about speech behavior”, “Russian speech etiquette of the 19th century: etiquette rules”, etc.);

“Linguistic rhetorical ideal of the teacher” (themes “Pedagogical speaking skills”, “Genres and samples of pedagogical speech”, “Complex of pedagogical speech skills as an orientation basis of professional linguistic personality”, “Linguistic rhetorical ideal of the teacher: author's model”, etc.).

Analysis of the practice of the educational process at university and school in the aspect of the formation of speech culture of students showed a significant discrepancy between the notions of the “ideal specialist” of students, university and school teachers, insufficient attention to the day-to-day compliance with the requirements of the Federal State Educational Standard to the future specialist in this area by the teaching staff.

The degree of efficiency of the designed process of formation of pedagogical university students' readiness for speech self-improvement on the basis of the LR ideal of a specialist category which is central to the formation of a professional linguistic personality of the future specialist was revealed on the basis of value-orientational, self-assessment, motivational and professional communication criteria.

This allowed to track the dynamics of the formation of cognitive, pragmatic, motivational and empirical components of the readiness in their organic relationship. Diagnostic apparatus of the experimental work included the use of such forms as: "I as a linguistic personality: self-test", "Speech – rhetoric – oratorio", "Investigating speaking traits", "Exploring personality traits", "Exploring the interpersonal communicative space: linguistic personality in the society", etc.

During the formative experiment, the stimulation of students' activity was done using the activation of their interests and needs, the involvement of students in joint creative activities, the use of visual aids, audio and video materials, the use of various types of independent work, creating atmosphere of trust, openness, goodwill, which required appropriate preparation and structuring of educational materials. An important role in this was played by the method of organizing independent creative work that reflects the communicative and ethical issues and allows to track the dynamics of the motivational and requirement sphere, expanding the moral horizons and the formation of students' ideological reference points. Independent creative work was done by them both orally and in writing. Students prepared short reports, wrote mini-essays on given topics.

Thus, in the process of the described work there was a continuous formation of the empirical base of readiness for speech self-improvement, accumulated practical experience of constant reflection in the field of speech actions from the standpoint of the mastered criteria and norms. Joint discussions, search for ways out of all kinds of conflictual pedagogical situations, analysis of ready answers to solve these issues, viewing fragments from feature films, series of "Yeralash" TV show, playing out situations during classes, reading professionally-oriented texts from textbooks and fiction – all this helped to form positive experience of speech behavior among students, significantly improving the level of professional orientation.

#### Limitations

The empirical results reported herein should be considered in the light of some limitations. The first is the use of non-probability sampling. The second limitation concerns the sample size.

It was not possible to use probability sampling of groups in our case as the design of our experiment stipulated that initially we had to perform diagnostic tests and further work with 2 groups of students which had to be as similar in terms of age, educational background and academic achievements as possible. In all there were 6 groups of second-year students who had 4 different specializations mentioned in the Materials and Methods section. In our research we used 4 out of 6 student groups which makes 67 % of the overall number of possible participants. If probability sampling of groups had been used due to the differences among the groups in terms of educational background and other aspects we would have had different control and experimental groups. So we could have a combined experimental group of students who specialized in history and primary school teaching and a combined control group of students specializing in foreign languages which would lead to statistical difference in the initial diagnostic tests.

The sample size can potentially be our other limitation though we tried to use as many participants as possible in our experiment: 63 out of 90 possible participants among the second-year students of the teacher-training faculty. It was not possible to do it with the students who specialized in the Russian language and literature and those majoring in primary school teaching as for that we would have had to split each of those groups into 2 subgroups and work with them separately which was difficult to arrange.

#### 4. Results

The main instrumental and technological support of the developed innovative course allowed us to organize strong and creative mastering of the selected and structured knowledge and skills, to form a productive experience of training communication in simulated speech events of professional orientation on the basis of set samples, criteria, norms and rules governing the communication process from the standpoint of the LR ideal, as well as creative communication of spontaneous nature, realizing the values and norms of the LR ideal, in natural speech situations of educational and extracurricular activities. As shown by the results of experimental work, students actively formed intellectual and cognitive, social and personal motives for working on speech self-improvement. This is the awareness of the social significance of the LR ideal, including the professionally oriented one, as a "supporting structure" of the cultural and educational space; the desire to revive the national LR ideal in new social and political conditions; awareness of the importance of the appropriate level of speech culture of citizens in everyday and professional

communication, the special mission and responsibility of the teacher; the desire to achieve high level of speech culture as a leading component and indicator of personal and professional growth; awareness of the need for everyday reflection about their speech actions in the interpersonal field of communicative interaction, constant self-correction and improvement as the main way to implement a positive self concept.

At the end of the experiment the students' readiness for speech self-improvement on the basis of the LR ideal of a teacher was tested. The tests included specially designed tasks, questions and situations similar to those conducted at the beginning of the school year during the ascertaining experiment, but covering all the material covered. A comparative table of the results is given at the end of the section.

**1. Value-orientation criterion.** Assessing the readiness of students to speech self-improvement in terms of value-orientation criterion, in addition to the orientation of students actually on the values of the domestic LR ideal, we identified as separate components the professional orientation and level of knowledge, representing the conceptual basis of orientation.

The final diagnostics showed the presence of changes in the personal and professional orientation of students, the level of maturity of social motives increased significantly. The focus on the values of the domestic LR ideal dominates in the students' responses. Here are some statements as an example: "I will spend all my efforts for the benefit of the country to make it better and more beautiful. I like to help people, to fight for what is right gives me great joy"; "The task of a rhetorician is to make a creative impact on the audience, have a desire to be positive."

The results of the final survey showed that the students formed an orientation to the values, norms and requirements of the national LR ideal, i.e. a teacher's professional speech ideal. Only 16.1 % of the surveyed participants from the experimental group wrote about the desire to use public speaking abilities for selfish purposes. The professional orientation of students also improved. By the end of the experiment, 83 % of EG students expressed a desire to work according to their specialization.

**2. Self-assessment criterion.** According to this criterion, the readiness of the students was evaluated in the following way. At each stage of the experimental work, we asked each student to put a dot on a graph, indicating in percentage terms, how much they consider themselves a strong linguistic personality, corresponding to the values, norms and criteria of the domestic LR ideal, speech ideal of a specialist (or to estimate how much they approached the LR ideal).

During the intermediate testing, we recorded a slight decline of the levels of self-esteem of the students in the EG and, in contrast, an even greater overestimation of the self-esteem of the KG students, because the EG students evaluated themselves more critically and objectively.

Also, the students' self-esteem was measured in other ways, as mentioned in the description of the final experiment. The assessment of students on a five-point scale of speech qualities, characteristic for the ideal, were compared with the assessment of the teacher. If at the beginning of the experiment the self-assessment in the EG and KG was mostly overestimated, then the intermediate and final diagnostics showed significant changes in the EG as the self-assessment of the students became more objective.

**3. Motivational criterion.** Our main task was to make the students' motivation socially and professionally positive and meaningful. During the testing students were asked questions like: "Why do you need to master the art of public speaking? – Now that I have mastered the art of public speaking, close to the LR ideal, I can...". And if at the beginning of the experiment, the students gave answers, which clearly expressed selfish motivation, and in some cases even antisocial ("I want to control people, make them believe me", "I want to manipulate people, use them for their own purposes"), then after a few sessions, after pedagogical adjustments, it was possible to state positive changes in their mental outlook, which led to a change in the motivation: "I want to use speech to help people", "I want to be useful for the Fatherland". If at the beginning of the experiment only 16.3 % of the EG students had social motivation, the final survey showed an increase in this indicator to 83.9 %.

**4. Professional communication criterion.** The final diagnosis showed that the joint work of students and teachers on the LR ideal of a teacher, independent work with texts of professional and pedagogical orientation, the analysis of numerous statements of scientists and teachers, practitioners, analysis and analysis of conflict pedagogical situations as a result led to a

change in the motivation of students, formed stable professional orientation, the desire to work as a teacher. In addition, the students of the experimental group developed the ability to reflect on their everyday speech activity based on the norms and requirements of the LR ideal of a professional.

As a result, 80,7 % of students gave correct answers when solving problems with the analysis of conflict professional situations.

All indicators of the EG students were much higher in comparison with the control group, which shows the effectiveness of the formative experiment (See Table 1).

The data in the table also confirm that there has been no significant change in the percentage of readiness criteria during the pilot period in the control group. Thus, the comparison of the results of the input and final diagnostics allows us to state the effectiveness of the simulated pedagogical process of formation of readiness for speech self-improvement on the basis of the specialist LR ideal. All of the criteria of readiness for speech self-improvement show qualitative changes.

**Table 1.** Formation of students ' readiness for speech self-improvement on the basis of the LR ideal: comparison of the initial and final testing

Group	persons	Distribution of the EG and CG students								Average score	cI <sub>test</sub>	cI <sub>crit</sub>	
		low		Adequate		good		excellent					
		persons	%	persons	%	persons	%	persons	%				
<b>Initial diagnostics</b>													
Value-orientational													
CG	32	28	87.5	1	3.13	2	6.25	1	3.13	2.25	7.57	7.81	
EG	31	24	77.36	3	9.68	4	12.9	0		2.35			
Knowledge													
CG	32	26	81.25	3	9.38	3	9.38	0	0	2.28	1.66		
EG	31	26	83.88	2	6.45	2	6.45	1	3.23	2.29			
Professional orientation													
CG	32	27	84.38	1	3.13	3	9.38	1	3.13	2.31	3		
EG	31	26	83.88	2	6.45	3	9.68	0	0	2.26			
Motivation													
CG	32	26	81.25	1	3.13	3	9.38	2	6.25	2.4	1.83		
EG	31	26	83.88	2	6.45	2	6.45	1	3.23	2.29			
Self assessment													
CG	32	8	25	6	18.75	7	21.88	11	34.38	3.66	1.02		
EG	31	7	22.58	4	12.9	8	25.81	12	38.71	3.8			
Professional communication													
CG	32	27	84.38	2	6.25	3	9.38	0	0	2.34	0.33		
EG	31	27	87.1	2	6.45	2	6.45	0	0	2.19			
<b>Final diagnostics</b>													
Value-orientational													
CG	32	24	75	3	9.38	3	9.38	2	6.25	2.46	42.5		
EG	31	10	32.26	3	9.68	10	32.26	8	25.81	3.5			
Knowledge													
CG	32	28	8.96	2	6.25	2	6.25	0	0	2.25	91.8		
EG	31	11	35.49	3	9.68	10	32.26	7	22.58	3.41			
Professional orientation													

CG	32	26	81.25	0	0	4	12.5	2	6.25	2.43	88.8
EG	31	5	16.13	6	19.36	8	25.81	12	38.71	3.8	
Motivation											
CG	32	26	81.25	0	0	3	9.38	3	9.38	2.46	91
EG	31	6	19.36	7	22.58	7	22.58	11	35.49	3.38	
Self assessment											
CG	32	6	18.75	6	18.75	8	25	12	37.5	3.81	23.1
EG	31	16	51.62	6	19.36	5	16.13	4	12.9	2.90	
Professional communication											
CG	32	17	53.13	4	12.5	8	25	3	9.38	2.90	13.5
EG	31	6	19.36	6	19.36	14	45.16	5	16.13	3.60	

The validity of the difference of percentage indicators in the experimental and control groups was verified using the Pearson chi squared test. For the significance level of 0.05 and 3 degrees of freedom the critical p- value is 7.81. The initial testing shows that the test values of  $\chi I$  for the value-orientational, knowledge, professional orientation, motivation, self-assessment and professional communication criteria are 7.57, 1.66, 3, 1.83, 1.02 and 0.33 respectively. As it is lower than the critical p-value, the experimental and control groups are statistically equivalent.

The final diagnostics test values of  $\chi I$  for the above-mentioned criteria are 42.5, 91.8, 88.8, 91, 23.1, 13.5 respectively.  $\chi I_{\text{test}}$  is higher than  $\chi I_{\text{crit}}$  for all of the criteria, so the results of the experimental group statistically differ from those of the control group.

In the course of this study, the general psychological and pedagogical algorithm of the educational process is represented by the following stages where we:

- identify the true needs of students, if necessary, adjust them;
- stimulate positive emotional response, cognitive interest;
- provide the necessary knowledge system, operational basis of skills;
- instill the values of the national LR ideal, the speech ideal of the teacher, that have a beneficial effect on the communicative and behavioral stereotypes of future teachers from the socio-cultural, personal and professional standpoint.

The implementation of this algorithm was carried out using a variety of pedagogical tools, which included various methods of research and educational nature (observation, questioning, testing, self-diagnosis, lectures, conversations, explanation, work with a book and text, video method, etc.), learning tools (conflict pedagogical situations, game situations of speech interaction, etc.), forms of organization (lectures, conferences, additional and individual classes, independent work), starting diagnostics, current and final control.

When developing the content of the process of forming students' readiness for speech self-improvement and its instrumental and technological support, we took into account that the speech-making culture of the future teacher is an integrative personal trait and requires a systematic and coordinated approach to its formation within a number of disciplines of general cultural and psychological-pedagogical training.

The structural and logical organization of the pedagogical process consistently lays the foundation for the formation of a professional language personality of the future teacher:

1) the introductory stage begins with a frontal (self)diagnosis of the initial state of personal and speech qualities of first-year students where they also become aware of the theoretical and methodological guidelines;

2) at the main stage, the typology of the LR ideals and the Russian speech ideal is studied in-depth in the dynamics of its formation on the basis of activities which have comparative and analytical and also ethnic-cultural-worldview character;

3) the professional-propaedeutic stage provides a variety of analytical and synthetic work in the field of requirements for pedagogical speech; in conclusion, the final (self)diagnosis is carried out, its results are discussed, and personal programs for further speech self-improvement are created.

## 5. Conclusion

The results of the testing testify to the effectiveness of the approach developed within the scope of the concept of continuing LR education in Sochi school and the proposed hypothesis about the system forming role of the LR ideal in the professional training of the would-be teacher of any specialization. This approach is based on the purposeful and mutually complementary organization of counter processes of designing an innovative pedagogical process and self-design of a student as a strong linguistic personality of a dialogical, democratic, multicultural type (general cultural foundation of higher education in the framework of the Federal State Educational Standards) and professional language personality (specialized foundation of the educational program).

The inclusion of the LR ideal category into the theory of professional development of a specialist allows to systematize the requirements for an "ideal professional" and present them at a higher conceptual level due to highlighting the aspect of speech-thinking culture. The readiness of university students for speech self-improvement based on a professionally oriented LR ideal chosen as the general goal of the designed innovative process, is the basic quality of a specialist's linguistic personality. The process of formation of students' readiness for speech self-improvement, its instrumental and technological support require a systematic and coordinated approach within the framework of a number of disciplines of general cultural, general professional and special training. The structural and logical organization of the pedagogical process (introductory, basic, professional and propaedeutic stages) consistently lays the foundation for the formation of a professional linguistic personality of a specialist. The criteria for the formation of the readiness of a university student for speech self-improvement are: value-orientational, self-assessment, motivational and professional communication. The results of the experimental work, subjected to qualitative analysis and mathematical processing prove the effectiveness of using the LR ideal as the design basis for the process of training a university student as a professional linguistic personality.

Further research is needed to develop detailed incorporation of the relevant material in work programs and methodological developments of related disciplines ("The Russian language and culture of speech", "Pedagogical rhetoric", "Pedagogy", "Psychology", etc.), to ensure the organic relationship of these content and methodological upgrades with their traditional problems. Accordingly, subject-oriented versions of the diagnostic apparatus should be developed, adjustments should be made to methodological developments in the pedagogical practice of students, emphasizing the aspect of the speech culture of professional activity based on the LR ideal of the teacher. This will result in truly integrated nature of the philological, psychological and pedagogical research of the LR aspect of the future teacher's formation as a professional linguistic personality, the results of which will be directly implemented in the educational process of the university and schools – the places of pedagogical practice of future teachers.

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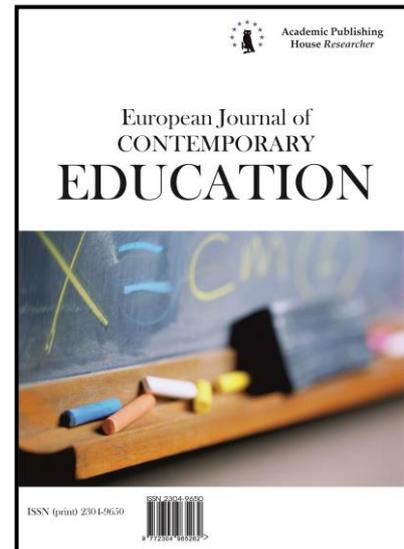
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## **An Investigation into EFL Teachers' Assessment Literacy: Indonesian Teachers' Perceptions and Classroom Practice**

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### **Abstract**

The current study aimed to explore junior secondary school English as a foreign language (EFL) teachers' perceptions of classroom-based assessment and to understand the extent to which teachers' perceptions are reflected in their practice. To this end, a total of twenty two Indonesian EFL teachers from six public junior secondary schools participated in the study where they were surveyed and interviewed. Shim's (2009) survey instrument was adapted to collect data related teachers' perception. A semi-structured interview was conducted with five of twenty-two teachers where were selected randomly. A document study was also conducted to further verify data from the questionnaire and interview. The gathered data included curriculum, syllabus, lesson plans, example of assessment materials and students' work. Quantitative data analysis with t-test was employed to analyse the quantitative data while the qualitative data were analysed using a thematic data analysis. Findings of the current study had suggested that teachers had appropriate knowledge about assessment principles and applied such a knowledge into classroom practice. Although, the discrepancy between teachers' knowledge and its application in classroom practices was identified, particularly in implementation and monitoring stages. Some concerns that influenced teachers' practice of classroom assessment included the local or school policy, teachers' use of non-achievement factors (e.g. students' attendance and attitudes), and parents' involvement in their children education. The findings contribute to a better understanding of teachers' assessment literacy in their particular context, as they make meaning and interact with assessment materials and relevant stakeholders of assessment. Recommendations were offered in reference to the findings.

**Keywords:** classroom-based assessment, literacy assessment, primary educations.

### **1. Introduction**

It has been widely acknowledged that assessing student performance is an essential elements of a teacher's job. Indeed, assessment is an integral part of the teaching and learning process

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(Ashraf, Zolfaghari, 2018), hence teachers spend a significant amount of time engaging in assessment activities (DeLuca, Klinger, 2010). Assessment of language learning is considered not only as a means to monitor students' progress and improve achievement but also to promote learning (Earl, 2003). In other words, assessment serves a variety of purposes (Brown, 2004; Djoub, 2017) and is a crucial aspect of teachers' classroom practice and professional life (Abell, Siegel, 2011; Coombe et al., 2009). Hence, it is essential for teachers to have a sufficient level of assessment literacy to assess students' learning appropriately (DeLuca, Klinger, 2010; Koh et al., 2018; Koh, 2011).

Stiggins (1991) initially perceived assessment literacy as teachers' understanding of underlying principles as well as those skills required to assess student learning. Furthermore, those who are assessment literate know what to assess, how to assess, what the potential problems would be and what to do to alleviate the problems (Stiggins, 1995). 'Assessment literacy' has since become a commonly used term, with researchers and practitioners attempting to conceptualise the meaning of assessment literacy further. For example, Djoub (2017) asserts that assessment literacy means that teachers have the 'knowledge' and 'tools' to know what and how to assess based on particular objectives in addition to knowing what decisions to make in assessing students' achievement. Likewise, Koh et al. (2018) affirms that "a teacher's assessment literacy refers to her or his demonstrated understanding of the principles behind selecting and designing tasks, judging student work, and interpreting and using assessment data to support student learning".

Assessment literacy concepts discussed above reinforce the substantial influence of teachers' assessment practices to the quality of students learning (Coombs et al., 2018). It is argued that literate teachers can integrate assessment with teaching (McMillan, 2003), hence are able to accurately and efficiently draw inferences about students' achievement, as well as to communicate the results of the assessment to the relevant stakeholders (Brookhart, 1999). In short, assessment literate teachers know the appropriate methods to use in collecting reliable data about student performance, how to use assessment to support student learning and how to communicate assessment results effectively and accurately.

Due to the central role of teachers' assessment literacy, there have been an increasing number of studies attempting to measure teachers' assessment literacy, which involves gaining an insight into teachers' perceptions of assessment principles and their practices as what teachers perceive would influence how they approach teaching and conduct assessment.

Studies in different contexts showed a variety of significant findings regarding teachers' assessment literacy (e.g., DeLuca, Klinger, 2010b; Volante, Fazio, 2007). In the general education field, for example, Yamtim and Wongwanich (2014) explored the assessment literacy level of primary school teachers in Thailand using Metlers' (2003) Classroom Assessment Literacy Questionnaire, revealing that teachers had a low level of assessment literacy. In a more recent study, Rahman (2018) researched secondary science teachers' perceptions and practices of classroom assessment, suggesting that teachers perceive classroom assessment as assessment of learning and that what they claimed to practice was not practised in the classroom.

Specific to the English as a foreign language learning (EFL) context, Shim (2009) studied EFL teachers' perceptions and practices regarding classroom-based assessment in Korean primary education using a questionnaire and interview, revealing that although teachers were assessment literate, they did not necessarily implement all knowledge of assessment principles into practice. Similarly, Jannati (2015) found that Iranian ELT teachers were aware of the fundamental principles of assessment, but their practices did not reflect this. Djoub (2017) examined the effect of teachers' assessment literacy on teachers' practices. The data collected from teachers worldwide through an online survey showed that they lacked assessment literacy and this was reflected in their practices. Teachers in this context used assessment mostly for grading purposes, instead of for improving students' learning.

Despite the existence of extensive literature on assessment literacy with different context and focus, limited studies exist on assessment literacy of EFL teachers, especially in Indonesia. It is necessary to understand the different assessment literacy concepts and practice in different settings, as some aspects of assessment literacy are context specific (Edwards, 2017; Willis et al., 2013). Moreover, a teacher's approach to assessment comprising conceptual understanding as well as practical knowledge related to student assessment within the situated context of their classroom teaching (DeLuca et al., 2016). Hence, the current study responds to the call for increased research

in this area of assessment literacy (Edwards, 2017). This study explored how EFL teachers perceive and practice the basic principles of classroom-based assessment i.e., planning, implementation, monitoring, as well as recording and dissemination (Shim, 2009). In the context of the current study, Stiggins' (1991) definition of assessment literacy of focusing on what EFL teachers perceive and practice assessment in their particular context was adopted, thus providing insights into the field of assessment literacy from the perspective of Indonesian EFL junior high school teachers.

## **2. Methods**

This study was aimed to address two research questions: 1) What are EFL teachers' perceptions of assessment? and 2) To what extent are teachers' perceptions reflected in their practice? To this end, a total of twenty-two Indonesian EFL teachers from six public junior high schools who participated in this study were surveyed and interviewed. Most participants were female (N = 18,81 %) aged between 25 and 35 years old with two to more than ten years teaching experience. Consequently, the current study does not represent the view of all EFL teachers in the Indonesian context.

### *Instrumentation*

Data in the current study were collected through multiple methods. A questionnaire was developed and distributed to the teacher participants to help identify their perceptions and practices of assessment. The questionnaire was adapted from Shim (2009) and was composed of the following parts:

1. Personal Information: consisted of seven items that had to be completed by the participant i.e., gender, age, years of experience, and position (EFL teacher, homeroom teacher).
2. General perceptions of language assessment: two essays utilising open-ended questions.
3. Working principles of assessment: consisted of forty items to be addressed using a five-point scale: 5 = Strongly Believe, 4 = Believe, 3 = Neutral, 2 = Disbelieve, 1 = Strongly Disbelieve. The items (40 items regarding perceptions and 40 items related to assessment practices) were divided into four sub-aspects based upon the procedural principles of classroom-based assessment, including teachers' practice of planning, implementation, monitoring, and recording and dissemination. This questionnaire was translated and then back translated for accuracy, before being piloted to six EFL teachers in other schools and revised accordingly. The final version was then piloted to another three teachers.

As Shim (2009) suggests, the questionnaire possesses high internal consistence with a Cronbach's alpha of 0.906 and 0.936.

To follow up findings from the questionnaire, a semi structure interview was conducted with five teachers to confirm their different perceptions and assessment practices. The interview was mainly based on general questions about assessment as well as their responses to the initial questionnaire. Each interview lasted for fifteen to thirty minutes and was audio recorded. In addition, a document study was also conducted to further verify data from the questionnaire and interview. The gathered data included curriculum, syllabus, lesson plans, example of assessment materials and students' work.

### *Data analysis*

As suggested by Shim (2009), quantitative data analysis was applied to analyse the data from the questionnaire using SPSS to calculate the frequency, mean (M), and the standard deviation (SD) of all the questionnaire items. Furthermore, a statistical t-test using SPSS was performed to examine the significance of the gap between EFL teachers' beliefs and their classroom practice. In addition to the quantitative data analysis, the qualitative data from the interviews were analysed using a procedure proposed by Rayford (2010). First, the interview was transcribed verbatim, then the interview transcript was coded and coloured according to the emerging themes. The two emerging themes and sub-themes are presented in [Table 1](#) below.

**Table 1.** Emerging themes and sub-themes

Themes	Sub-themes
Reasons for conducting assessment	Measuring students' achievement Getting feedback on instruction Helping students' learning Checking students' understanding of the lessons
Characteristics of good assessment	Clarity of direction Valid Positive washback Reliable Authentic Practical

**3. Results**

**1) Teachers' perception about assessment principles and their classroom practice**

The questionnaire findings revealed that most teachers exercised language assessment in their classroom practices. Table 2 below presents the frequency of assessment tasks they completed in each semester.

**Table 2.** Frequency of assessment tasks performed by teachers each semester

Once	Twice	Three times	Four times	More than four times	Total
0	3	4	3	12	(N=22)
0.0	13.6	18.2	13.6	54.5	100 %

As shown in Table 2 above, more than 50 % of teachers performed the assessment tasks more than four times, indicating that these assessment practices were part of their normal routine. Teachers considered the importance of assessment in their language instruction in the classroom, for example, Clara said that she was always prepared for an assessment, while Santi planned periodical assessment. Findings from the questionnaire also suggested that more than half of the participant teachers also constructed their own assessments (68 %), as the tests in published work books were not always available with the related materials.

In addition, as mentioned earlier in the method section, quantitative data analysis was performed on the questionnaire data to investigate teachers' procedural principles of classroom-based assessment: planning, implementation, monitoring, and recording and dissemination. Table 3 and Table 4 below present teachers' planning assessment principle and the classroom practice respectively.

**Table 3.** Teachers' perception of Shim's (2009) planning assessment principle

Items	Proposition	Mean (M)	SD
Q1	Teachers should first identify the purpose of the assessment when they design the assessment.	4.55	.510
Q5	Teachers should use assessment specifications when they carry out the assessment.	4.55	.510
Q12	Teachers should give the students advance notice, so that the students will be able to prepare for the assessment.	4.45	.596
Q14	Teachers should make sure that all students are given the same learning opportunities in their classrooms.	4.45	.800
Q11	Assessment should focus on students' progress and achievement rather than on comparisons between the students in the classroom.	4.41	.590

Q2	Teachers should consider the attainment targets which the curriculum requests when they design the assessment.	4.36	.581
Q3	Teachers should consider what their students' needs are when they design the assessment.	4.36	.492
Q13	Teachers should respect the privacy of the students and guarantee confidentiality.	4.32	.780
Q7	Assessment (tasks) should be meaningful to the students.	4.18	1.140
Q4	Teachers should balance the attainment targets with their students' needs when they design the assessment.	4.18	.588
Q10	Assessment (tasks) should be designed in such a way as to obtain information about students' potential to use the language effectively.	4.09	1.411
Q6	Assessment (tasks) should be related to what students do in real class time.	4.00	1.069
Q9	Assessment (tasks) should be designed in such a way as to obtain information about what students can do at that particular time.	3.91	1.377
Q15	Teachers should make sure that assessment is not affected by students' personal characteristics such as gender, appearance, and economic and social background.	3.86	1.552
Q8	Assessment (tasks) should be designed in such a way as to obtain information about what students know at that particular time.	3.77	1.631

**Table 4.** Teachers' classroom practice of Shim's (2009) planning assessment principle

Items	Proposition	Mean	SD
Q14	I make sure that all students are given the same learning opportunities in their classroom.	4.64	.492
Q1	I first identify the purpose of the assessment when I design the assessment.	4.59	.503
Q2	I consider the standards or attainment targets which the curriculum requests when I design the assessment.	4.55	.510
Q12	I give the students advance notice, so that the students are able to prepare for the assessment.	4.41	.503
Q8	Assessment (tasks) are designed in such a way as to obtain information about what students know at that particular time.	4.36	.727
Q9	Assessment(tasks) are designed in such a way as to obtain information about what students can do at that particular time.	4.36	.658
Q7	Assessments (tasks) are meaningful to the students.	4.32	.894
Q10	Assessment(tasks) are designed in such a way as to obtain information about students' potential to use the language effectively.	4.32	.568
Q5	I use assessment specifications when I carry out the assessment.	4.27	.550
Q4	I balance the attainment targets with the students' needs when I design the assessment.	4.23	.685
Q13	I respect the privacy of the students and guarantee confidentiality.	4.23	.528

Q15	I make sure that assessment is not affected by students' personal characteristics such as gender, appearance, and economic and social background.	4.18	.907
Q6	Assessment (tasks) are related to what the students do in real class time.	4.14	.560
Q11	Assessment focuses on students' progress and achievement rather than on comparisons between the students in the classroom.	4.09	.610
Q3	I consider what the students' needs are when I design the assessment.	4.05	.653

From the [Table 3](#) above, the propositions Q1, Q5, Q12, and Q14 obtained the highest score (M = 4.55), indicating that the teachers perceived that planning played a critical role in classroom assessment, while the other propositions (M > 3.50) suggested that teachers felt that they had applied such planning principles in their classroom practice. However, little concern was given to proposition Q8, showing that teachers felt that the assessment they had designed were able to give them information about what students should know at a particular time. In addition, as shown in [Table 4](#), teachers' perception of the planning principles was applied in classroom practice. The proposition of Q14, Q1, and Q2 were shown to have higher scores, with M > 4.50, indicating that teachers practised the planning principles in classroom settings.

In addition to the planning principles, the current study found that teachers felt they had appropriate knowledge about what and how to apply classroom-based assessment. [Table 5](#) and [Table 6](#) below describe teachers' perceptions and the classroom practice of the assessment implementation principle.

**Table 5.** Teachers' perception of Shim's (2009) assessment implementation principle

Items	Proposition	Mean	SD
Q19	Students should be supported when they have a problem hindering their completing the assessment (tasks).	4.59	.503
Q20	Teachers should provide students with an opportunity to monitor their own work while they are performing the assessment (tasks).	4.55	.596
Q21	Teachers should give students immediate feedback after they complete each assessment (task).	4.50	.802
Q17	Teachers should explicitly instruct the students how to do the assessment (tasks).	4.32	1.171
Q22	Assessment (tasks) processes are completed within a manageable time considering the given context.	4.27	1.120
Q18	Students should understand the desired outcome of the assessment (tasks).	4.23	1.152
Q16	Teachers should inform the students of the reasons why they are being assessed.	3.45	1.969

**Table 6.** Teachers' classroom practice of Shim's (2009) assessment implementation principle

Items	Proposition	Mean	SD
Q21	I give students immediate feedback after they complete each assessment (task).	4.36	.492
Q20	I provide students with an opportunity to monitor their own work while they are performing the assessment (tasks).	4.32	.646
Q19	Teachers should explicitly instruct the students how to do the assessment (tasks).	4.18	.733
Q16	I inform the students of the reasons why they are being assessed.	4.09	.684

Q17	I explicitly instruct the students how to do the assessment (tasks).	4.05	1.046
Q22	Assessment (tasks) processes are completed within a manageable time considering the given context.	3.91	1.109
Q18	Students understand the desired outcome of the assessment (tasks).	3.86	.990

From Table 5 above, the propositions Q19 and Q20 obtained the highest mean score in the implementation stage (M = 4.59, SD = .503; M = 4.55, SD = .596), indicating that teachers strongly agree that students should be supported when they encounter problem in completing the assessment task. Teachers also believed that they needed to provide their students with an opportunity to monitor their own work and complete assessment tasks. This is interesting, as in Table 6, teachers were shown to apply what they have already comprehended about assessment implementation principles in the classroom settings (M > 3.50).

Table 7 and Table 8 below present the survey findings regarding teachers' perceptions about monitoring assessment principles and the classroom practices.

**Table 7.** Teachers' perception of Shim's (2009) monitoring assessment principle

Items	Proposition	Mean	SD
Q27	Teachers should use the results of assessment for revising their teaching.	4.64	.492
Q29	Teachers should make assessment a part of teaching and learning.	4.64	.581
Q31	The overall feedback should enable students to know how to improve their work and take their learning forward.	4.50	.512
Q32	The whole process of assessment should be consistent in terms of procedure and administration.	4.50	.512
Q24	Marking criteria should be connected with the aims of the assessment and the learner's characteristics in a given context.	4.50	.740
Q26	Teachers should mark the students' performance consistently.	4.45	.596
Q33	The process of assessment should be supported by the involvement of the parents.	4.36	.658
Q23	Teachers should construct a marking system as a part of the whole assessment process.	4.32	.716
Q30	Teachers should share the findings of assessment with other teachers.	4.32	.716
Q28	Teachers should not use the results of assessment negatively.(punishment)	4.27	.883
Q25	Teachers should let students have detailed information about the marking criteria.	4.18	.853
Q34	Teachers should monitor the misuse of the overall consequences of the assessment as a tool of power.	4.09	.811

**Table 8.** Teachers' classroom practice of Shim's (2009) monitoring assessment principle

Items	Proposition	Mean	SD
Q29	I make assessment a part of teaching and learning.	4.36	.581
Q23	I construct a marking system as a part of the whole assessment process.	4.32	.568
Q27	I use the results of assessment for revising my teaching.	4.27	.550
Q24	Marking criteria are connected with the aims of the assessment and the learner's characteristics in a given context.	4.23	.612
Q28	I use the results of assessment positively not negatively.	4.23	.612

Q32	The whole process of assessment is consistent in terms of procedure and administration.	4.23	.429
Q26	I mark the students' performance consistently.	4.14	.560
Q31	The overall feedback enables students to know how to improve their work and take their learning forward.	4.09	.426
Q33	The process of assessment is supported by the involvement of the parents.	3.91	.868
Q34	I monitor the misuse of the overall consequences of the assessment as a tool of power.	3.91	.868
Q30	I share the findings of assessment with other teachers.	3.82	.664
Q25	I let students have detailed information about the marking criteria.	3.77	1.193

Table 7 above showed that the two prepositions (Q29 and Q23) achieved the highest scores, indicating that teachers monitored their assessment by using the results of the assessment to revise their teaching (M = 4.64, SD = .492) and incorporating assessment into classroom teaching and learning activities. The data in Table 8 supports the earlier findings showing that teachers applied what they comprehended about the monitoring assessment principles in classroom practice. However, teachers' responses to Q30 suggest that for certain reasons, teachers preferred not to share their findings of assessment with other colleagues. More importantly, the preposition of Q25 was reported to the lowest (M = 3.77, SD = 1.193), indicating that only a few teachers hold this belief. Permitting the student to know detailed information about the marking criteria was not common practice among the teachers in this study.

The findings from the quantitative data analysis related to teachers' perceptions about recording and dissemination principle and their classroom practices are presented in Table 9 and Table 10 below.

**Table 9.** Teachers' perception of Shim's (2009) recording and disseminating assessment principle

Items	Proposition	Mean	SD
Q36	Teachers should be aware of their responsibilities for the output of their professional work.	4.36	1.093
Q39	Teachers should be involved in the development of the report system at all levels.	4.27	1.202
Q35	Teachers should consider students' rights as assessment takers; they must never be harmed by the assessment.	4.23	1.110
Q38	Schools should develop their own report system of students' progress and achievement.	4.23	1.066
Q40	A formal review of a student's progress and achievement should be reported to the local education authority and the central government.	4.23	1.152
Q37	Local or nationwide report systems about the students' progress and achievement should be provided.	3.82	1.651

**Table 10.** Teachers' classroom practice of Shim's (2009) recording and disseminating assessment principle

Items	Proposition	Mean	SD
Q36	I am aware of my responsibilities for the output of my professional work.	4.45	.510
Q38	My schools develop their own report system of students' progress and achievement.	4.41	.590
Q35	I consider students' rights as assessment takers; they must never be harmed by the assessment.	4.27	.456
Q37	Local or nationwide report systems about the students' progress and achievement are provided.	4.14	.560

Q39	I am involved in the development of the report system at all levels.	4.00	.816
Q40	A formal review of a student's progress and achievement is reported to the local education authority and the central government.	3.95	1.133

Table 9 above shows that all teachers generally agreed to all prepositions presented. The preposition of Q36 had the highest score (M = 4.36, SD = 1.093), with the lowest for preposition of Q37 (M = 3.86, SD = 1.651), indicating that the teachers strongly believed that they should record the practices of assessment and disseminate the results to their colleagues, schools and local education authority. More importantly, teachers felt that recording and disseminating their assessment practices was important and would impact on their classroom practice. Table 10 showed teachers implemented the recording and disseminating in the classroom context. What is interesting is that the proposition of Q40 seemed to be a dilemmatic principle to some teachers as they did not frequently implement this principle.

In addition, the findings from the interviews were in line with the quantitative data analysis. In the interview, teachers mentioned that they conducted assessment to measure students' achievement, get feedback on instruction, and check students' understanding of the lessons as well as helping students with their learning. When developing an assessment plan, the teachers said that they first should relate the assessment to the objectives of the lessons and to what had been learned by the students. Furthermore, most teachers agreed that students should be advised in advance of what they will be assessed on so that they could prepare and perform to their best. In addition, as part of good planning, teachers should respect the privacy of the students and are required to assure confidentiality. Teachers in this study gave an example of such practice, with three teachers stating that in respect of students' privacy, they did not announce the assessment results publicly, returning the marked assessment to students individually for personal feedback and to avoid embarrassment. One teacher said:

"I never announced assessment results publicly in front of the class. I want to respect students' privacy. Some of them would get embarrassed if I do so. I handed students' marked assessment individually so that I can discuss students' progress in private". (Interview with Clara)

Nonetheless, two teachers claimed that although they recognised the importance of confidentiality, they still announced the results of assessment publicly to motivate students. As a teacher stated:

"I usually announced the results not only in one class but also in all classes I taught. I taught six parallel classes of the same grade. I did this in order to motivate students so that they were encouraged to achieve better next time". (Interview with Risa)

All teachers in this study agreed that assessment plays a pivotal role in teaching and learning. They provided reasons for conducting assessment and what constitutes a good assessment. These data highlighted the 'why and what' of assessment from the teachers' own perspectives.

**2) Discrepancy between teachers' perceptions about the assessment principles and their classroom practice**

As mentioned earlier in the method section, quantitative data analysis with a statistical t-test was performed to identify any discrepancy between teachers' perceptions about assessment principles and their classroom practices, a summary of which is shown in the following Table 11:

**Table 11.** T-test results

Assessment stage	Paired samples test	Mean	SD	t	Sig. (2-tailed)
Implementation stage	Pair 4 Q19A – Q19B	0.409	0.796	2.409	0.025
Monitoring stage	Pair 5 Q27A – Q27B	0.364	0.727	2.347	0.029
	Pair 8 Q30A – Q30B	0.500	0.913	2.569	0.018
	Pair 9 Q31A – Q31B	0.409	0.590	3.250	0.004
	Pair 11 Q33A – Q33B	0.455	0.912	2.339	0.029

Note: A=perception, B=practice

These results suggested that there was a significant difference between what teachers perceived about the assessment principles and their classroom practice, specifically on one aspect in the implementation stages and four in the monitoring stage ( $p$ -value  $> .05$ ). In the implementation stage, teachers were shown to have appropriate knowledge that they should support students to complete the assessment tasks ( $M = 4.59$ ,  $SD = 0.503$ ). For example, in the interview, teachers asserted that good assessment should be clear in direction and have positive washback to improve students' learning. Unfortunately, the  $t$ -test result indicated that teachers did not seem to apply such an assessment knowledge in real classroom practice, as they failed to provide clear instruction to the student about what and how students were expected to do with the assessment ( $t = 2.409$ ,  $p < 0.05$ ). In the interview, teachers asserted that:

"Assessment is a part of students' learning activities. The assessment contents are of the material the students have already learned. When we assign students with assessment tasks, we assume that they [students] already know about what they are instructed to do. [It is] because the contents in the assessment tasks strongly relate to the learning material. Thus, we do not think it is necessary to give further explanation." (Interview with Santi)

In the monitoring stage, the discrepancy between teachers' perceptions and their classroom practice was also evident as teachers did not seem to use the assessment results to improve their teaching ( $t = 2.347$ ,  $p < 0.05$ ) and were reluctant to share the findings from their assessment with other colleagues ( $t = 2.569$ ,  $p < 0.05$ ). Furthermore, teachers did not employ overall feedback to improve students' work and learning ( $t = 3.250$ ,  $p < 0.05$ ) and the process of assessment was not supported by parents' involvement ( $t = 2.339$ ,  $p < 0.05$ ). These were cases that in the interview, teachers were observed to focus the assessment process on the students' final score rather than the overall learning process. For example, teachers expressed their utmost concern if students failed to meet the targeted minimum completion criteria (KKM), exploring every alternative in an attempt to support students to meet the KKM. One teacher, Maria asserted:

"If students' score was still below the KKM, I conducted remedial teaching, assigned students additional tasks they can take home, gave them opportunity to take another tests. It was my responsibility to make sure they meet the KKM".

In the interview, teachers expressed their worries regarding the parents' lack of motivation to get involved in their children's learning. They mentioned:

"... not all parents paid attention to their children's learning. They took teachers for granted and hold us responsible for their children learning. I contacted some parents to advise them of their children achievement. However, it seemed only those educated parents responded and paid attention and took action. Less educated parents seemed to ignore my message. I even sent personal WhatsApp message to some parents but nothing changed. Their children still did not do homework etc."

#### **4. Discussion**

This study investigated EFL teachers' assessment literacy through their perceptions and practices of assessments within the classroom context. The questionnaire results indicated that teachers had a good knowledge of assessment, as well as good assessment practice showing good planning, implementation, monitoring, recording and dissemination stages, although there were some discrepancies in the implementation and monitoring stages. This finding was different from several previous studies, in which teachers were found to be illiterate (DeLuca, Klinger, 2010; Jannati, 2015); or teachers were literate but did not put their knowledge into practice (Shim, 2009).

As a whole, the current study indicated that teachers seemed to practice assessment for learning (AfL), with most teachers conducting assessments to support student's learning and using assessment results as feedback on their instruction. Teachers also attempted to be transparent in their assessment practice by advising students on what they will be assessed on and some teachers maintained the students' privacy in relation to assessment results. However, findings from the interviews and document study revealed that although teachers claimed that they performed good practice, there was no evidence to confirm the quality of such practice. For example, teachers claimed to provide feedback as common assessment practice, giving immediate feedback, but there was no proof as to whether the feedback provided was of high quality to facilitate students' reflection on their learning. Immediate and quality feedback is indeed important to assist students'

learning and achievement (Hattie, Timperley, 2007). It was also found that feedback was not only conducted to improve students' learning but also to assist students in meeting the standard set by the institution. These results were consistent with Jannati's (2015) findings that some teachers focused on improving students' achievement and monitoring students' progress, while others were concerned about the students' final grade.

Furthermore, teachers' use of assessment materials was also problematic. The document study revealed that teachers utilised assessment materials from published textbooks, but the quality of the materials was questionable. Some assessment materials were mechanical, involving lower order thinking skills, and were less authentic. As Koh et al. (2018) argue "pre-designed and/or prescribe" materials were sometimes taken for granted by teachers, hence, affecting the quality and credibility of the results. The same issue was identified with teacher-made assessments, as most of them were in the form of multiple choice questions.

Hence, although teachers appeared to be committed to good assessment practices, the findings showed that grading still seemed to be their major concern. The fact that teachers' assessment practices aimed at students' meeting the KKM set by the school implies that teachers' practices were influenced by the local or school policy or regulations (Brown, 2004; Zoekler, 2007). Moreover, teachers incorporating non-achievement factors, such as attendance and attitudes, when assigning grades was a representation of sociocultural factors in this particular context (Zulaiha, 2017). This findings indeed support Willis' et al. (2013) claim that assessment is cultural doings involving social factors that take place within particular contexts.

Perhaps one social factor in this particular context that also influenced the assessment process was parents' involvement. Teachers in this study felt supported when parents actively engaged in their children's learning, such as helping with homework. Parent involvement is, in fact, important in foreign language learning as it facilitates children's English development (Forey et al., 2016). Teachers claimed that parents' involvement was influenced by their educational level, but Chi and Rao (2003) assert that it may be due to time availability as well as parents' foreign language proficiency.

## 5. Conclusion

In conclusion, in general, the teachers in this study were assessment literate and aware of the principles of classroom-based assessment, reporting that they put most principles into practice. However, a question remains as to whether their assessment practice was of high quality. This study had some limitations, indeed, only a small number of participants were involved due to time constraints and resources, hence limiting the generalisability of the findings. It is recommended that future research should involve a larger sample of teachers from different contexts as well as relevant stakeholders. Despite these limitations, the findings contribute to a better understanding of teachers' assessment literacy in their particular context, as they make meaning and interact with assessment materials and relevant stakeholders of assessment.

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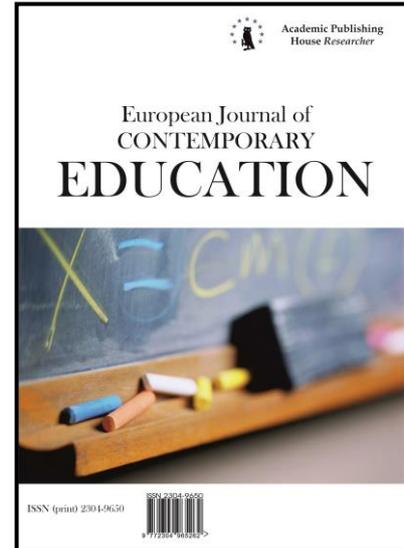
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## The History of Education

### The Public Education System in Voronezh Governorate in the Period 1703–1917. Part 1

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#### Abstract

This paper examines the public education system in Voronezh Governorate in the period 1703–1917. This part of the collection represents an attempt to reproduce a picture of how the region's public education system developed between 1703 and 1861.

In putting this work together, the authors drew upon a pool of statistical data published in Memorandum Books for Voronezh Governorate, reports by the Minister of Public Education, and Memorandum Books for certain educational institutions (e.g., the Voronezh Male Gymnasium).

The authors' conclusion is that, overall, the public education system in Voronezh Governorate developed in complicated conditions. During the 18<sup>th</sup> century, this process was influenced by both external (e.g., wars) and internal (e.g., lack of funding and teachers' daily-life difficulties) factors. The lack of consistency in the operation of the governorate's school system was resolved only after there appeared in the region educational institutions funded by the government. By the beginning of the 1860s, Voronezh Governorate witnessed the creation of an entire network of educational institutions that were subordinate to governmental agencies (the Ministry of Public Education, the Department of Religious Affairs, and the Department of State Property). During that period, the region witnessed the establishment of a gymnasium, a teachers' seminary, and an ecclesiastical

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seminary, i.e. educational institutions that were potential providers of a skilled local workforce essential to the development of the public education system.

**Keywords:** public education, Voronezh Governorate, statistical data, educational institutions, female education

### **1. Introduction**

The history of Voronezh Governorate has many blank pages. One of them is that Voronezh Governorate was the first governorate in the Russian Empire to declare (in 1915) that its network of primary schools was ready for the introduction of compulsory public education (*Iz «ob"yasnitel'noi zapiski...»*, 1916: 165). It is to be recalled that, based on the results of Russia's 1897 census, just 21 % of its population was literate (knew how to read and write) (*Obshchii svod*, 1905: 39-40). Without question, the above-mentioned fact was a major success for the governorate's administration, the local Directorate for Public Schools, and the Russian Empire as a whole. So how did the region's system of public education start out, what difficulties did it face, and what were the regional characteristics that had an effect on its development? These issues will be examined in a collection of papers on the subject written by the authors. This part of the collection offers insight into the development of the public education system in Voronezh Governorate in the period 1703–1861, i.e. through to the abolition of serfdom in Russia.

### **2. Materials and methods**

In putting this work together, the authors drew upon a pool of statistical data published in Memorandum Books for Voronezh Governorate (*Pamyatnaya knizhka*, 1856: 13-15; *Pamyatnaya knizhka*, 1861: 337-339), reports by the Minister of Public Education (*Iz «ob"yasnitel'noi zapiski...»*, 1916: 159-176), and Memorandum Books for certain educational institutions (e.g., the Voronezh Male Gymnasium (*Pamyatnaya knizhka Voronezhskoi gubernskoi gimnazii*, 1891)).

This study employs the following research methods: multi-factor analysis, integrated analysis, periodization, classification, and comparison. The use of these methods will help ensure the reliability of the study's findings. The study is of an interdisciplinary nature and is predicated on the principles of comparatism, which will help identify the various levels of a source's informativeness and compare pieces of information on the issue under investigation from different sources. The work employs the interdisciplinary and integrated approaches to exploring the subject of public education in Voronezh Governorate, which will help examine the development of the region's public education in an integrated fashion, i.e. by reference to relevant internal and external factors.

### **3. Discussion**

The historiography relating to the public education system in the Russian Empire is diverse. It emerged during the pre-revolutionary period, and received some, if little, coverage during the Soviet period. The interest in it was reignited during the post-Soviet period.

**Pre-revolutionary historiography.** During the pre-revolutionary period, researchers were mainly focused on general issues of education in Russia. For instance, M.F. Vladimirskii-Budanov investigated the subject of interaction between the state and the public education system during the period from the 18<sup>th</sup> century to the establishment of the ministries (*Vladimirskii-Budanov*, 1874). S.S. Knyaz'kov and N.I. Serbov explored Russia's public education system of the period preceding the era of Alexander II (*Knyaz'kov, Serbov*, 1910). S.V. Rozhdestvenskii studied the activity of the Ministry of Public Education, which was associated with the organization's 100<sup>th</sup> anniversary (*Rozhdestvenskii*, 1902).

The study of the public education system in Voronezh Governorate implies reliance upon the regional literature. There is an entire body of publications related to the history of various educational institutions in Voronezh Governorate. In this context, it is worth mentioning works on the history of the Voronezh Male Gymnasium (*Panteleevskii*, 1901), the Voronezh Ecclesiastical Seminary (*Nikol'skii*, 1898; *Nikol'skii*, 1901), the Mikhailovsky Cadet Corps (*Zverev*, 1895), the Voronezh Teacher's Seminary (*Litvinov*, 1911), and several private educational institutions (*Veselovskii*, 1864).

**Soviet historiography.** During the Soviet period, researchers generally were discouraged from exploring the public education system in the Russian Empire, as there had been set a political narrative positing that the majority of people in Tsarist Russia were poorly literate. In this regard,

there was a focus on extolling the role played by the Bolsheviks in providing literacy to the masses. Hence the comparatively insignificant number of works on the education system of the pre-revolutionary period. Nonetheless, there actually *was* some research done on issues of workforce preparation in Tsarist Russia at large (Panachin, 1979) and public education in the Voronezh region in particular (Vinokurov, 1954).

**Post-Soviet historiography.** In the contemporary period, issues related to the national system of public education in the Russian Empire have been investigated by I.V. Fomichev (Fomichev, 1996) and A.Yu. Butov (Butov, 1991). Certain researchers have explored public education in Voronezh Governorate specifically (Pyl'nev, Rogachev, 1997; Pyl'nev, 2009). There has been some research done on the public education system in the Russian Empire's central governorates: Vologda Governorate (Cherkasov et al., 2019; Cherkasov et al., 2019a; Cherkasov et al., 2019b; Cherkasov et al., 2019c), Vyatka Governorate (Magsumov et al., 2018), and Vilna Governorate (Natolochnaya et al., 2019; Natolochnaya et al., 2019a). Some researchers have explored public education in the Don region as well (Peretyatko, Zulfugarzade, 2017; Peretyatko, Zulfugarzade, 2017a; Peretyatko, Zulfugarzade, 2019; Peretyatko, Zulfugarzade, 2019a).

#### 4. Results

The point of departure in the development of the public education system in the Voronezh region is the year 1703, in which the first mention of an educational institution in the area appears (a school in the village of Endovishcha) (Pyl'nev, Rogachev, 1997: 4). It is worth remembering that during that period the public education system both in Russia and in Europe (Cherkasov et al., 2019: 209-210; Mamadaliev et al., 2019: 448) was in an incipient state and mostly relied on the personal initiatives of private teachers, as well as the educational activity of the church.

A significant impetus to the development of the city of Voronezh was provided by the creation of a naval shipyard and the commencement of construction of military ships for the fleet of Emperor Peter I. The fleet needed not only ships but professional personnel as well, which led to the establishment of a state-run school in Voronezh in the spring of that same year, 1703.

In May, the school received its first textbooks, which included Russian and Latin primers, psalters, books of hours, and arithmetic textbooks. This is testimony that it was a comprehensive school.

In 1705, at the initiative of Peter I, on the left bank of the River Voronezh they laid the foundation of a fortress (the Tavrov Fortress) and a shipyard based at it. The comprehensive school was moved from Voronezh to Tavrov and was named Tavrov School. However, circa 1712 the school closed down.

On November 29, 1718, Peter I signed an edict for the provision of instruction in literacy and numeracy to carpenters, ship mechanics, blacksmiths, and other types of craftsman. By 1722, both the shipyard in Tavrov and the school resumed operation. By 1725, the Tavrov school had nearly 160 students on its roll. The government's shipbuilding activity in Tavrov lasted up until 1740, subsequent to which it was continued in Saint Petersburg, with the school closing down for good. That being said, during that period there already was a local garrison school running in Voronezh (Pyl'nev, Rogachev, 1997: 13).

In 1714, the Russian government undertook the first attempt to create the nation's first network of state-run comprehensive primary schools. On February 28, Peter I issued an edict for the establishment of arithmetic schools in all of Russia's governorates, with students' admission age set to be between 10 and 15 years. Arithmetic schools were to be based at monasteries, and instruction was to be provided by graduates of the Moscow School of Mathematics and Navigation and the Maritime Academy.

Attending an arithmetic school must have put significant mental strains on students, as a typical school day lasted for nearly eight to nine hours, whereas school breaks were quite short (a Christmas break and a break of one month in summer). In 1715, an arithmetic school was opened in Voronezh as well. Over the 10 years that followed, the school was attended by 197 individuals, with 136 of these failing to complete the entire program of study (due to either dropping out on their own accord or being disenrolled due to inadequate progress) and just 58 completing it successfully. Note that the student body consisted of 40 children of public officers, 151 children of persons of ecclesiastical status, and six children of soldiers, dragoons, and gunners

(Pyl'nev, Rogachev, 1997: 20). This might be some of the first-ever statistical data on the student body across Voronezh Governorate.

Garrison schools in Russia owe their emergence to Peter I. It was his initiative to have in place in each infantry garrison regiment a garrison school that would provide instruction to soldiers. As early as the reign of Anna Ioannovna, a regulation was put in place requiring a school of this kind to have at least 80 students on the roll (Pyl'nev, Rogachev, 1997: 21).

In 1744, the arithmetic schools were merged with the garrison schools. By 1796, the Voronezh garrison school had two companies, each numbering 80 (Pyl'nev, Rogachev, 1997: 22).

There were attempts to establish church schools as well. For instance, in 1737 Voronezh became home to a church school that provided children with instruction in reading, writing, and Latin. As early as the following year, the school had 522 students on its roll. However, by the end of 1739 the school virtually ceased operation, most probably due to lack of funding. That same year, 1739, there was an attempt to establish a church school at the Uspenskaya Church. The school was in operation until 1744, when it closed down too.

The lack of permanence with regard to the operation of both church and private schools was largely associated with the fact that much in this respect depended on a specific, often everyday-life, setting that teachers were in. This is why these schools were not distinguished by permanence. Here is a good example: in 1739, a church school was opened in the village of Nikolskoye; a half-year later, the school's teacher passed away, which led to the school's closure (Pyl'nev, Rogachev, 1997: 24).

A much greater degree of permanence was characteristic of the operation of schools established with financial support from the government or some other solid source. In 1745, Voronezh became home to the Voronezh Ecclesiastical Seminary (Nicol'skii, 1898: 1). The facility was running with annual financial support from the diocese's churches and monasteries. There were clear-cut quotas in place on this: 1/30 of each church's revenue and 1/20 of each monastery's revenue. Of interest is the fact that most of this revenue was based on bread grown on the land owned by the churches and monasteries (Nicol'skii, 1898: 17).

The seminary accepted into its lower grade children aged between seven and 15 years who had some literacy and numeracy skills. The first six grades in the seminary were as follows: Analogy, Infima, Grammar, Syntaxima, Poetics, and Rhetoric (Nicol'skii, 1898: 36). Virtually all instruction was provided in the Latin language. The first grade was called 'Analogy' or 'Elementary' and incorporated reading and writing in Slavic, as well as initial exposure to reading and writing in Latin. Of interest is what was taught in the final grades, namely poetics – teaching students various figures of speech and verse writing. In the Rhetoric grade, students were taught the art of public speaking and logic (Nicol'skii, 1898: 38). Later on, there were set up two more grades at the seminary – the Philosophy grade in 1777 and the Theology grade in 1779 (Nicol'skii, 1901: 39).

The seminary's library began to form back in 1757, when they purchased in Kiev 1,000 rubles worth of fundamental works. This included works by many Greek and Latin theologians, philosophers, and philologists, as well as classical books in Hebrew, Greek, German, and Latin (Nicol'skii, 1898: 181). Some of the books provided were from private collections. For instance, in 1778 the library received another 700 works, which had been bought from the wife of the deceased Ostrogzhsk senior regimental physician Zager for 50 rubles. For comparison, two years later the library acquired in Moscow 54 volumes of Voltaire's works at the same price, 50 rubles (Nicol'skii, 1898: 182).

In 1789, they put together the library's catalogue – it contained 4,020 volumes, with 1,545 of these being books in Russian, 959 – in Latin, 81 – in German, 175 – in French, and 1,261 – classic educational books. There were some highly valuable books as well, like the Ostrog Bible, published in 1581. By the end of the 18<sup>th</sup> century, the seminary's library held a stock of over 5,000 books (Nicol'skii, 1898: 182-183).

In the early 19<sup>th</sup> century, the library went on to comprise the following two major holdings: fundamental (for teachers) and discipular (for students).

On September 22, 1786, Voronezh became home to the region's main public school (Pamyatnaya knizhka Voronezhskoi gubernskoi gimnazii, 1891: 3).

In late 1798, they established in Voronezh the city's own printing office. The facility's strong operational capacity would eventually make the city of Voronezh one of Russia's key centers for book printing.

In the period 1806–1826, the governorate became home to several parish schools under the Ministry of Public Education. These schools were allowed to be attended by children of all estates, ages, and genders. As at 1828, the governorate's district schools had a combined enrollment of 401 students (395 boys and six girls).

There were plans to open a military school in Voronezh back in 1805, but the project was put off due to, mainly, financial reasons. On November 8, 1845, Voronezh became home to the Mikhailovsky Cadet Corps ([Voronezhskii Velikogo Knyazya Mikhaila Pavlovicha kadetskii korpus, 1912: 38](#)). The institution gave admission preference to the children of officers (Full Cavaliers of the Order of Saint George), orphans, and half-orphans. The first batch numbered just 36 students. The program of study comprised a two-year preparatory period and a four-year core study period, which later would be increased to five years.

On January 17, 1809, Professor A.I. Stoikovich transformed the city's main school into a gubernial gymnasium. In the year it opened, the gymnasium had a library stock of 28 books and 300 minerals and fossils. The gymnasium was established by way of reorganizing the main public school, with the latter's third and fourth grades transformed into first and second gymnasium grades. In first grade, instruction was provided in the following disciplines: Algebra, Geometry, Logic, Comprehensive Grammar, Latin, French, German, Ancient History, Geography, Mythology, and Drawing. In second grade, students were taught the following subjects: Psychology, Edification, Mathematics (the final part of General Mathematics and the initial part of Applied Mathematics), French, German, History (modern and national), and Geography. In third grade, the following subjects were offered: Aesthetics, Rhetoric, General Statistics, General History, Physics, and Applied Mathematics. In addition, one continued taking Latin, French, German, and Drawing.

By 1854, Voronezh Governorate had in operation schools under the following key agencies: the Ministry of Public Education, the Department of Military Affairs, the Department of Religious Affairs, and the Department of State Property. There also were private schools on squire's estates.

The following schools were running under the Ministry of Public Education: the Voronezh Male Gymnasium, three private boarding schools in Voronezh and Ostrogozhsk, 10 district schools, two private schools in the city of Voronezh, and 16 parish schools. Overall, the Ministry of Public Education was running 32 educational institutions with a combined enrollment of 1,685 students (1,540 boys and 145 girls) ([Pamyatnaya knizhka, 1856: 12-13](#)).

The following educational institutions were running under the Department of Military Affairs: the Mikhailovsky Cadet Corps and two schools for military cantonists. The combined number of students in attendance at these educational institutions was 3,391 males ([Pamyatnaya knizhka, 1856: 13](#)).

The Department of Religious Affairs was running an ecclesiastical seminary and four district schools, with a combined enrollment of 1,686 males ([Pamyatnaya knizhka, 1856: 13](#)).

The Department of State Property oversaw the operation of 58 parish schools in the villages of state peasants, with a combined enrollment of 3,493 students (3,084 boys and 409 girls) ([Pamyatnaya knizhka, 1856: 13-15](#)).

The number of private schools on squire's estates was six, with a combined enrollment of 195 students (183 boys and 12 girls) ([Pamyatnaya knizhka, 1856: 15](#)).

Overall, in 1854 the governorate had in operation 104 educational institutions with a combined enrollment of 10,450 students (9,884 boys and 566 girls).

Among these educational institutions, only three might be subsumed as secondary (the Voronezh Male Gymnasium, the Voronezh Ecclesiastical Seminary, and the Mikhailovsky Cadet Corps). The rest were lower and primary, with the latter being more numerous.

The above data on the number of students in the pre-reform period indicate a significant gender imbalance: there were 15 times fewer girls. During that period, this was explained by simple peasant logic: males were to provide the living, while females were to take care of the house and children, and, therefore, they could well do without schooling.

On the eve of the abolition of serfdom, in 1860, the public education system in Voronezh Governorate looked as described below.

The city of Voronezh had 361 students enrolled in its gubernial male gymnasium (inclusive of the boarding school) (273 children of nobles and functionaries, seven children of persons of ecclesiastical status, 69 children of petit bourgeois, and 12 children of peasants). The district school had 90 students on its roll (39 children of nobles and functionaries, one child of a person of

ecclesiastical status, 39 children of petit bourgeois, and 11 children of peasants). The two parish schools had a combined enrollment of 161 students (26 children of nobles and functionaries, three children of persons of ecclesiastical status, 79 children of petit bourgeois, and 53 children of peasants). The three female boarding schools ((1) Odrowąż Wysocki's, (2) Depner's, and (3) Meshalskaya's) provided instruction to a combined 77 children of members of the noble estate, seven children of persons of ecclesiastical status, and 48 children of petit bourgeois ([Pamyatnaya knizhka, 1861: 337](#)). In addition, there also was in operation one private school (Bolotova's), which served both genders. The school had 35 students on its roll (12 boys and 10 girls from the families of nobles and functionaries, three boys and one girl from the families of persons of ecclesiastical status, and nine girls from the families of petit bourgeois). The first Sunday school was opened in late 1860. The number of students in attendance at it would reach 28. The second Sunday school was opened on August 20, 1861 and was housed in the building of the male gymnasium. The number of students in attendance at it would reach 50.

Back in 1859, the administration of the city of Voronezh was considering opening a female school, but the idea failed to materialize due to lack of funding. In 1860, thanks to donations and proceeds from plays, lotteries, and other activities, it finally became possible to come up with the amount of capital required to establish the facility. The female school went into operation in August of 1861. The number of girls in attendance at this three-grade school would eventually reach 114 ([Pamyatnaya knizhka, 1861: 337](#)).

As at 1860, the Alexandrinsky Orphan's Home had 125 children under its care. On November 1, 1861, the Council of the Imperial Philanthropic Society established at the orphan home a "school of the industrious". The school had in attendance 22 girls, with 13 of these educated by way of funding from the Committee for the Care of the Poor and nine – by way of funding from benefactors, who each contributed 35 rubles for each girl annually. The school provided instruction in the following disciplines: Religious Education, Russian, Arithmetic, and Penmanship.

Voronezh District had a combined 86 peasant boys enrolled in its two parish schools under the Department of State Property ([Pamyatnaya knizhka, 1861: 338](#)).

Below is an outline of the numerical state of affairs with regard to educational institutions across the cities and districts of Voronezh Governorate.

The town of Zadonsk had a combined 105 boys enrolled in its single district and single parish schools (20 children of nobles and functionaries, two children of persons of ecclesiastical status, 58 children of petit bourgeois, and 25 children of peasants). In addition, the town also had an ecclesiastical school with 134 students on its roll. The district's two parish schools under the Department of State Property had a combined enrollment of 41 boys, and the two schools on squire's estates had a combined enrollment of 32 boys and five girls.

The town of Zemlyansk had a combined 44 boys enrolled in its single parish school (three children of nobles and functionaries, 36 children of petit bourgeois, and five children of peasants). The district's four parish schools under the Department of State Property had a combined enrollment of 185 boys and eight girls.

There were no educational institutions in the town of Korotoyak, but the district had a combined 241 boys and five girls enrolled in its six parish schools ([Pamyatnaya knizhka, 1861: 338](#)).

The town of Nizhnedevitsk had a combined 70 boys enrolled in its single district and single parish schools (11 children of nobles and functionaries, one child of a person of ecclesiastical status, 41 children of petit bourgeois, and 17 children of peasants). The five parish schools under the Department of State Property had a combined enrollment of 121 boys and 21 girls from the families of state peasants ([Pamyatnaya knizhka, 1861: 338](#)).

The town of Ostrogozhsk had a combined 92 boys enrolled in its single district and single parish schools (18 children of nobles and functionaries, six children of persons of ecclesiastical status, 54 children of petit bourgeois, and 14 children of peasants). In addition, the city had one private female boarding school with 27 girls on its roll (15 children of nobles and functionaries, one child of a person of ecclesiastical status, and 11 children of petit bourgeois). The 14 parish rural schools under the Department of State Property had a combined enrollment of 847 boys and 190 girls. The three schools on squire's estates had a combined enrollment of 127 students ([Pamyatnaya knizhka, 1861: 338](#)).

The town of Beryuch had a combined 81 students enrolled in its single district and single parish schools (14 children of nobles and functionaries, 39 children of petit bourgeois,

and 28 children of peasants). In addition, the town had an ecclesiastical school with 226 students on its roll. The two parish schools in the villages of state peasants had a combined enrollment of 169 boys and four girls, and the single school on Count Sheremetyev's estate in the sloboda of Alekseyevka had 77 boys on its roll ([Pamyatnaya knizhka, 1861: 338-339](#)).

The town of Valuyki had a combined 85 boys enrolled in its single district and single parish schools (26 children of nobles, eight children of persons of ecclesiastical status, 31 children of petit bourgeois, and 20 children of peasants). The five parish schools in the villages of state peasants had a combined enrollment of 347 boys and 11 girls ([Pamyatnaya knizhka, 1861: 339](#)).

The town of Boguchar had a combined 97 boys enrolled in its single district and single parish schools (16 children of nobles and functionaries, 66 children of petit bourgeois, and 15 children of peasants). The students in attendance at the eight parish schools in operation in the villages of state peasants numbered a combined 406 boys and five girls ([Pamyatnaya knizhka, 1861: 339](#)).

The town of Pavlovsk had a combined 100 boys enrolled in its single district and single parish schools (eight children of nobles and functionaries, 72 children of petit bourgeois, and 20 children of peasants). The students in attendance at the four parish schools in the villages of state peasants numbered a combined 257 boys and seven girls, and the single school in the sloboda of Vorontsovka (on the estate of Prince Vorontsov) had 154 boys on its roll ([Pamyatnaya knizhka, 1861: 339](#)).

The town of Novokhopersk had a combined 81 boys enrolled in its single district and single parish schools (10 children of nobles and functionaries, two children of persons of ecclesiastical status, 63 children of petit bourgeois, and six children of peasants). The students in attendance at the five parish schools in operation in the villages of state peasants numbered a combined 148 boys and seven girls ([Pamyatnaya knizhka, 1861: 339](#)).

The town of Bobrov had a combined 82 boys enrolled in its single district and single parish schools (17 children of nobles and functionaries, 64 children of petit bourgeois, and one child of a peasant). The students in attendance at the seven parish schools in operation in the villages of state peasants numbered a combined 390 boys and 18 girls, and the two schools on squire's estates had a combined enrollment of 70 students ([Pamyatnaya knizhka, 1861: 339](#)).

**Table 1.** Total Numbers of Educational Facilities and Students in Voronezh Governorate in 1854 and 1860 ([Pamyatnaya knizhka, 1856: 13-15](#); [Pamyatnaya knizhka, 1861: 337-339](#))

Educational institution	1854				1860			
	Number of facilities	Number of students			Number of facilities	Number of students		
		Boys	Girls	Total		Boys	Girls	Total
Voronezh gymnasium (inclusive of the boarding school)	1	242	-	242	1	361	-	361
Private boarding school	3	-	102	102	4	-	158	158
District schools under the Ministry of Public Education	10	423	-	423	10	1,088	-	1,088
Parish schools under the Ministry of Public Education	15	853	5	858	12			
Private schools	2	22	38	60	1	15	20	35
Female schools	-	-	-	-	2	-	136	136
Sunday school	-	-	-	-	2	78	-	78
Ecclesiastical seminary	1	477	-	477	N/A			
District ecclesiastical school	4	1,209	-	1,209	2	360	-	360
Schools under the	58	3,084	409	3,493	64	3,238	276	3,514

Department of State Property								
Private school on a squire's estate	6	183	12	195	9	460	5	465
Total	100	6,493	566	7,059	107	5,600	595	6,195

Table 1 does not include the data for schools under the Department of Military Affairs. Thus, the number of students for 1854 is reduced by 3,300. Note that the statistics for 1860 contain no information about an ecclesiastical seminary and two ecclesiastical schools that were in operation at the time. Thus, the data for 1860 should be regarded as incomplete. As evidenced from Table 1, the period 1854–1860 witnessed a 50 % increase in the number of schools on squire's estates (from six to nine), with the number of students at them rising nearly 2.5 times. In addition, there was an increase in the number of schools under the Department of State Property (i.e., schools situated on lands inhabited by state peasants). Another fact worthy of note is the general public's growing interest in female education, illustrated by the emergence of at once several female schools in Voronezh Governorate on the eve of the abolition of serfdom.

### 5. Conclusion

Overall, the public education system in Voronezh Governorate developed in complicated conditions. During the 18<sup>th</sup> century, this process was influenced by both external (e.g., wars) and internal (e.g., lack of funding and teachers' daily-life difficulties) factors. The lack of consistency in the operation of the governorate's school system was resolved only after there appeared in the region educational institutions funded by the government. By the beginning of the 1860s, Voronezh Governorate witnessed the creation of an entire network of educational institutions that were subordinate to governmental agencies (the Ministry of Public Education, the Department of Religious Affairs, and the Department of State Property). During that period, the region witnessed the establishment of a gymnasium, a teachers' seminary, and an ecclesiastical seminary, i.e. educational institutions that were potential providers of a skilled local workforce essential to the development of the public education system.

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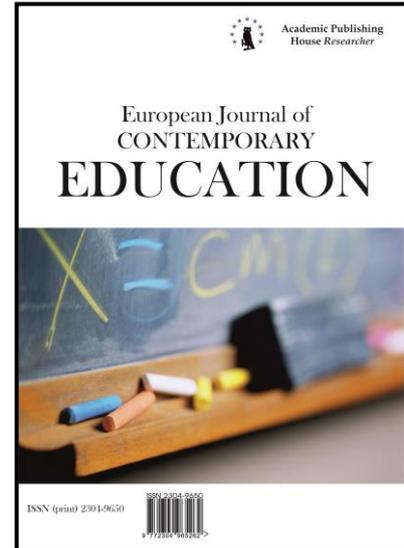
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## The Social Background of Functionaries in the Russian Empire's Public Education Sector in the First Half of the 19<sup>th</sup> century: The Case of the Ukrainian Governorates

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### Abstract

This paper is focused on a specific component of the bureaucratic apparatus in the Russian Empire – educational functionaries. More specifically, the work explores the social background of educational functionaries in the Ukrainian lands in the first half of the 19<sup>th</sup> century. The authors composed data samples on Taurida, Volhynian, and Poltava Governorates covering the years 1830 and 1850. Use was made of a body of little-known archival documentation from the State Archive of Kharkov Oblast and the Central State Archive of Ukraine in Kiev.

The authors explored the regional characteristics of the way educational institutions in rightbank, leftbank, and southern Ukrainian governorates were staffed with functionaries. The work attempted to determine how the areas' numbers of members of the various social groups in pedagogical service correlate with each other. It was found that, despite the low popularity of pedagogical service among the nobility, there were quite many members of this estate serving in the public education sector. However, due to a major need for teacher functionaries the government had to express a favorable attitude toward the hiring of members of other social groups willing to serve in educational institutions across the Russian Empire. This explains the significant number of members of the lower estates employed in the sector as well.

**Keywords:** public education, Russian Empire, Ukraine, bureaucracy, estate, social background, teacher, pedagogical.

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## **1. Introduction**

The public education sector plays an important part in the life of any country or community. It is this particular sector that has always been responsible for providing members of society with scholarly and practical knowledge, inculcating various social norms and ideologies in them, or having them develop various professional skills. Considering the significance of the above functions, the educational department is to be regarded as an essential component in the government apparatus.

In the period between the late 18<sup>th</sup> and 19<sup>th</sup> centuries, the system of education in the Russian Empire was wholly oriented toward serving the state. In doing so, it had been continually perfected. The sector's high political significance is also attested by the fact that every time the country's borders were expanded the Russian government not only put in place its administrative authorities in the new areas as a primary step but also strove to establish as many educational facilities for local youth as possible there. Thus, in any region newly incorporated into the empire there almost instantly was launched the process of educating youth in such a way as to nurture a citizen who would be loyal to the Russian state exclusively.

It goes without saying that, to ensure the proper operation of the educational sector, the state needed a properly selected and trained workforce of both teachers and administrative staff. In said period, the network of educational institutions in the Russian Empire expanded quite rapidly. The period witnessed the establishment of a large number of various schools and gymnasias and an increase in the number of institutions of higher learning. Accordingly, the state's need for pedagogical personnel at the time was substantial. The government would often dispatch to the empire's remote areas pedagogues from other regions (Degtyarev, 2016).

To attract the required number of people into pedagogical service, the government put forward a range of incentives. For instance, teachers and instructors were given the status of public officers. They could now work their way up the Table of Ranks and be entitled to various benefits (orders, cash bonuses, etc.). By obtaining through their service a certain rank or order, they could also acquire the right to personal or hereditary nobility in the Russian Empire. Yet, pedagogical service was not very popular among members of the noble estate. Due to a major need for teacher functionaries, the government had to express a more favorable attitude toward hiring members of less privileged social groups willing to work in the vineyards of the educational sector.

Under a monarchy in the Russian Empire, especially prior to the 1860–1880s reforms, service in the educational sector was for many members of the lower estates an opportunity to become part of the empire's bureaucratic apparatus and get into the privileged social-professional "caste" of functionaries.

In the context of the workforce of functionaries in the Russian Empire's public education sector, it is worth devoting special attention to the following three key components: (1) its place within the empire's bureaucratic apparatus; (2) the social background and status of functionaries at educational institutions; (3) their educational and professional levels and their duties and responsibilities.

## **2. Materials and methods**

In putting this work together, the authors made extensive use of materials from the 'Kharkov University' repository of the State Archive of Kharkov Oblast (GAKhO. F. 667) and from the 'Office of the Trustee of the Kiev Educational District' repository of the Central State Historical Archive of Ukraine in Kiev (TsGIAUK. F. 707).

Apart from insights from a number of researchers, the work's methodological basis is grounded in a set of general scholarly and special principles and methods. Specifically, these include general principles of inquiry such as the principles of historicism, systemicity, and objectivity. The use of these methods helped identify and analyze the gist of the issue under investigation and identify some of the key characteristics inherent to the regions of the Russian Empire under examination. The work also employed a set of cliometric methods for the purpose of identifying and analyzing a number of relevant quantitative indicators. A key principle used in this study is the principle of historical anthropologism, as the work's central focus is a certain human community, i.e. a bearer of specific values and traditions with a role to play in history.

### **3. Discussion**

In pre-1917 Russian historiography, the periodical press and certain publications carried a large number of works devoted to the history of various institutions of lower, secondary, and higher education in the Russian Empire. The overwhelming majority of these works was of a descriptive nature and contained a lot of statistical material. There also were reference publications containing historical and biographical information. Yet, these works either did not cover the various aspects of teaching service or covered them only superficially.

Soviet scholars explored the history of particular educational institutions in the Russian Empire (Shishkova, 1979), with some also devoting attention to the social and quantitative characteristics of students at institutions of secondary and higher learning (Egorov, 1957; Kamosko, 1970; Ryabikova, 1974). In our time, these thematic areas continued to be investigated by A. Feofanov (Feofanov, 2006), E. Sysoeva (Sysoeva, 1998; Sysoeva, 2008), O. Travkina (Travkina, 2003), L. Korablina (Korablina, 2002), V. Kravchenko (Kravchenko, 2011), and some others.

Contemporary scholars have substantially expanded the spectrum of topics in the study of the system of public education in the Russian Empire. Keen interest has been expressed in the study of state policy regarding the regulation of the national education system and local education systems (Mantrov, 2007; Pivovarov, 2001; Magsumov et al., 2018; Cherkasov A. et al., 2019), the link between education and public service (Degtyarev, 2012; Degtyarev, 2013a; Degtyarev, 2013b; Degtyarev, 2016), the sociology of education (Shpak, 2008), and a few other aspects.

In contemporary historiography, the workforce in the Russian Empire's public education sector in the period between the late 18<sup>th</sup> and first half of the 19<sup>th</sup> centuries has rarely been the subject of special research, especially when it comes to regional-level personnel – instructors at parish schools, district schools, lyceums, gymnasia, and universities. An exception is research studies by Yu. Disson, V. Morozova, O. Serdyutskaya, V. Slotin, N. Firsova (Disson, 2008; Firsova, 2007; Morozova, 2007; Serdyutskaya, 2008; Slotin, 2010; Korilova, Magsumov, 2017), and some others.

### **4. Results**

In the 19<sup>th</sup> century, the workforce of educational functionaries in the Russian Empire was now a social-professional group (inhomogeneous in estate background, age, and educational level) that provided for the operation of the public education sector by way of mental production and transfer of information (educating and nurturing youth) and performance of administrative functions (administration and reporting) (Slotin, 2010: 65). Therefore, despite the absence in their professional activity of bureaucratic duties (with minor exceptions), this category of functionaries is to be regarded as an indispensable part of the bureaucratic apparatus in the Russian Empire.

The emergence of teachership as a special category within society, a social group that would exist owing to its paid specialized professional work teaching youth, was associated with the reforms of Catherine II (Morozova, 2007: 58). In light of the need for the vocational training of teachers for public schools, it was necessary to establish their legal status and financial standing in keeping with the ideal image of the teacher that had formed in 18<sup>th</sup> century pedagogics. The Commission on the Establishment of Public Schools, headed by Count P. Zavadovsky, had to work on resolving this issue independently, as the Austrian legislation used as the basis for the school reform did not contain the necessary guidelines in relation to this.

The School Statute of 1786 did not establish the precise work status of public school teachers and was limited to providing that they were to be regarded as being in active public service and entitled to the same rights and privileges as other functionaries. However, putting these promises into effect in real life was not an easy task to accomplish. The thing is that during that period public school teachers were predominantly hired from a pool represented by members of the clergy, petty bourgeoisie, and other taxed estates, whereas public service, with all the privileges and benefits it offered, was considered a privilege of the nobility. Starting in the early 19<sup>th</sup> century, educational functionaries enjoyed all of the same rights and privileges as civil service officers. Even the official status of functionaries in the public education sector was defined by the Senate as functionaries in public service. According to Russian researcher V. Slotin, this was associated with the actual policy implemented by the monarchy – to prioritize the principle of service-based activity, whereby the job of all educational institutions was not only to educate young people but prepare them for service as well (Slotin, 2010: 64-65).

Thus, the public service workforce included both civil officers and science and education personnel. With that said, the spectrum of positions these individuals held was quite broad: from members of the Academy of Sciences to lab assistants or from professors to family tutors (mentors).

School functionaries made up a significant part of the bureaucratic apparatus in the first half of the 19<sup>th</sup> century. For instance, at February 1, 1850, in Poltava Governorate alone the local gubernial gymnasium and district schools had as many as 129 staff, with seven positions open to be filled (supervisors and teachers) (TsGIAUK. F. 707. Op. 16. D.66. L. 2-6). However, account should also be taken of personnel at the parish schools. Another body of archival data for the same year points to 40 teachers at these facilities (TsGIAUK. F. 707. Op. 16. D. 682). Thus, it may be assumed that, within the system of public education, depending on the number of educational institutions, each of the governorates had upwards of 150 pedagogical personnel on staff (governorates with institutions of higher learning in place had a lot more staff than that).

The elements of the composite portrait of the region's workforce of school functionaries should acquire a deeper meaning once you analyze its qualitative characteristics and their transformation as part of the implementation of the state's policy on public education. Conducting this kind of analysis is possible if you have on hand a system of theoretically grounded and tried-and-tested criteria and metrics for assessing the qualitative composition of the region's workforce of functionaries. These criteria may cover quite a broad spectrum of professional and personal qualities and psychophysical characteristics of staff in the government apparatus. It appears possible to explore the composition of the region's workforce of functionaries only across a relatively small number of characteristics, including rank, education, age, length of service, and social background. For the purposes of this work, the primary focus is on the last one – the social background of teacher functionaries.

As mentioned earlier, by social background, in the last quarter of the 18<sup>th</sup> century the bulk of teaching staff at most educational institutions in the Russian Empire was made up of members of the clergy. With the passage of time, based on a realization that this service is public too, with all the implications that it carried, attempts were made in government circles to restrict access to teaching posts for individuals from unprivileged strata of society. These attempts can be regarded as relatively unsuccessful, as the social makeup of pedagogical personnel kept being diverse compared with other departments (although it must be acknowledged that the share of members of the nobility did, however, increase over time).

In April of 1810, the newly appointed Minister of Public Education, A. Razumovsky, started virtually straightaway to support and promote the idea of staffing the schools based on preferential treatment for members of certain estates. The minister agreed with those who claimed that teaching was the only thing most school functionaries did, with many known only within the scholarly community. He also asserted that “school principals with neither a high rank nor an estate of their own do not stand to get very much respect ... By contrast, if principals were hired from among landowners, this would restore the trust of the nobility in these institutions and encourage the people to attend school”. Yet, it was clear that a change like that would result in a loss of opportunity for many potential principals. With this in mind, they created the so-called “institution of distinguished principals”, which was to help select principals who met the criteria formulated by the minister. In the Ukrainian lands incorporated into the Russian Empire as a result of the division of Rzeczpospolita, an attempt to have marszałeks (marshals of the nobility) attend exams in each district school was made back in 1804 (on an initiative of T. Chatsky), but the initiative was turned down by the administration of Vilna University. D. Bovua provides some data with regard to the social makeup of the pedagogical workforce in district schools and gymnasia within the Vilna Educational District in the early 19<sup>th</sup> century – “aside from a few foreigners, there were 500–600 instructors descended from szlachta families” (Bovua, 2007: 242-243). Thus, the issue of stratification amongst Rightbank Ukraine's workforce of school functionaries was not particularly topical.

The authors analyzed a body of documentation covering 44 school functionaries in Volhynian Governorate for the year 1832 (records of service, reports, and official correspondence). These were staff members whom the administration recommended for a number of class ranks for being in service for the required number of years. They represented the following nine educational institutions in Volhynian Governorate: Volhynian Lyceum, Międzyrzec Gymnasium, Międzyrzec District School, Lutsk District School, Klevan District School, Zhytomir District School, Berdychev District School, Vladimir District School, and Liubar District School. Nobles accounted for a large

share of this group – 41 out of the 44 functionaries. Two of the functionaries were descended from clergy and one from foreigners (GAKhO. F. 667. Op. 287. D. 122). In a sense, this was due to the fact that the region had one of the largest relative shares of the szlachta estate in Europe. Members of the szlachta themselves had quite a high level of education and treated public service (including pedagogical activity) as an honorable mission, sincerely believing it was their duty to fulfill it. Yet, over time the number of non-noble functionaries at educational institutions in the rightbank Ukrainian lands increased (as was the case with other sectors in the region as well). This was associated with the following two reasons:

1) The region’s institutions employed functionaries from other regions of the empire, with this workforce including persons who were not descended from nobility.

2) During the course of the process of incorporation into the Russian Empire of the Ukrainian governorates which up until the end of the 18<sup>th</sup> century were part of Rzeczpospolita, a large number of members of the former Polish szlachta did not receive the rights enjoyed by the Russian nobility, and at some point members of this group stopped (as a result of losing the right to do so) positioning themselves as nobles.

Having said that, over time a certain percentage of such “non-nobles” did manage to obtain, through their service, a title that was facilitative of acquiring the right to nobility. For instance, among the Nemirov Gymnasium’s functionaries not descended from nobility, the rank of collegiate assessor was granted to A. Andrievsky and V. Makievsky. Subsequently, through the teaching profession these individuals managed to acquire the right to hereditary nobility (TsGIAUK. F. 707. Op. 12. D. 35. L. 4, 10).

Upon being granted the rank of collegiate assessor, a functionary could apply for their name to be entered in the genealogical book of nobility. For instance, in September of 1830 senior teacher at the Taurida Gymnasium P. Strukov requested that the Board of Kharkov University forward a copy of the certificate granting him the title over to the Voronezh Gentry Deputy Assembly so that it entered his name in the local genealogical book (GAKhO. F. 667. Op. 288. D. 26. L. 1).

There were cases where individuals from unprivileged strata of society succeeded in acquiring even higher titles through service. An example of a successful career achieved this way is the official biography of F. Zastavsky. Born circa 1768, this man was appointed to the post of principal at the Taurida Gymnasium in 1830. He was descended from clergy. It is through service as an instructor, which he entered in 1788 as a senior teacher, that he acquired the right to hereditary nobility (he had received his education at the Kiev Ecclesiastical Academy and the Saint Petersburg Teacher’s Seminary). In 1824, F. Zastavsky was awarded an Order of St. Anna (Third Class), and in 1827 he was granted the rank of state councilor (Fifth Class). He would subsequently receive a number of other awards and benefits as well (GAKhO. F. 667. Op. 285. D. 20. L. 1-4).

Settled relatively recently at the time, the empire’s southern governorates were in need of a large number of functionaries to fill posts at the regions’ newly established public institutions. With the Russian government unable to staff all the open positions with members of the nobility, the social makeup of the regions’ workforce of public officers ended up being quite motley. This was true for educational functionaries as well. The authors conducted an analysis of records of service for 48 educational functionaries in Taurida Governorate for the year 1830. As evidenced by Table 1, by social background the bulk of this workforce was made up of members of the nobility and clergy (27.1 % and 25 %, respectively).

**Table 1.** Distribution of Functionaries at Gymnasia, District Schools, and Parish Schools in Taurida Governorate by Social Background at 1830

Nobles	Petty bourgeois	Merchants	Peasants	Persons of ecclesiastical status	Raznochintsy		
					Foreigners	Children of company officers	Other
13	6	1	2	12	4	6	4
27.1%	12.5%	2.1%	4.2%	25%	8.3%	12.5%	8.3%

The group of nobles includes Polish szlachta nobleman (as he was listed in the record of service) M. Tarnavsky. A large percentage was made up of so-called raznochinty (29.1 %), i.e. individuals who were not part of the nobility, petty bourgeoisie, merchants, peasants, clergy, or guild masters. This social group included foreigners, children of company officers, colonists, and clerks. Among the 48 functionaries, these numbered 14.

Worthy of special mention among the above functionaries are two descendants of the peasantry – all the more so as both initially were serfs. One of them, A. Topolsky, attended the Prilutskoe District School, from which he successfully graduated. Subsequently, in 1824 he continued school in Prince Bezborodko's Gymnasium of Higher Sciences, where he stayed up until 1827. In 1828, the Board of Kharkov University appointed him a lower division teacher at the Oleshky District School in Taurida Governorate. Just a year later, in 1829, A. Topolsky was freed of his unfree status and officially allowed by the Senate to enter public service (GAKhO. F. 667. Op. 285. D. 20. L. 17-19). The other peasant, A. Antonov, entered in 1821 the Kharkov Ecclesiastical Collegium, from which he graduated as a Philosophy major. Subsequently, he was a private (free) participant in a program of study in the Department of Medicine at Kharkov University. After passing his exams, he was appointed to the post of history teacher at the Novozybkov District School in Chernihiv Governorate. In 1830, he was transferred to the Oleshky District School (GAKhO. F. 667. Op. 285. D. 20. L. 34-35). The record of service contained no information on A. Antonov having been freed of his unfree status and accepted into public service. Yet, this *must* have actually taken place, as he was listed in the document as a functionary, which means he could no longer have been a serf at the time. In the column within the record of service dealing with whether he was fit to continue public service and be promoted in rank further, it was stated 'Fit and worthy to'.

In the first third of the 19<sup>th</sup> century, the workforce of school functionaries had an inhomogeneous social makeup across the empire. This, specifically, was the case with the Ukrainian lands within the Russian Empire. Here, it is worth focusing on the following three regions with distinct characteristics of their own:

1) Rightbank Ukraine – the Ukrainian lands incorporated into Russia as a result of the division of Rzeczpospolita in the late 18<sup>th</sup> century, which had many centuries' experience living under a European-style statehood. For a long period of time, everybody who served the state was granted szlachta status here. Over the years, this estate grew substantially, with virtually all public offices coming to be held by members of the szlachta. Even in the first third of the 19<sup>th</sup> century, members of other estates held public offices quite rarely.

2) Leftbank Ukraine – the lands in the former Hetmanate and a part of Sloboda Ukraine, which had a history of statehood of their own founded on both the European (a major portion of these lands belonged to Poland, with their laws based on various Polish and German regulations) and Russian experience (the region's close relationship with the Muscovite state in the mid-17<sup>th</sup> century and the gradual incorporation of the Hetmanate into Russia, with imperial legislation put in place across the region). The region's local elite was also relatively large. In addition, this estate was quite open – members of other social groups who were well-to-do, had a quality education, and desired to serve could well become members of the szlachta. As a consequence, the majority of functionaries at the region's public institutions in the period between the late-18<sup>th</sup> and first half of the 19<sup>th</sup> centuries had szlachta status, although members of other estates constituted a sizable number too.

3) The southern Ukrainian lands, which began to be colonized starting in the 18<sup>th</sup> century. This process was most active starting in the period between the late 18<sup>th</sup> and early 19<sup>th</sup> centuries. As a consequence, right from the outset all spheres of life in the region were fashioned after the Russian imperial template. There were not enough nobles to fill all positions in the region's public institutions, which contributed to the social composition of its workforce of functionaries being highly diverse compared with other Ukrainian lands.

The above characteristics had an effect on the social composition of the workforce of school functionaries as well.

Over time, the Tsarist government's assimilatory policy resulted in the Ukrainian lands' distinctive nature across all spheres of life being effaced almost entirely by as early as the mid-19<sup>th</sup> century. This is substantiated by a set of records of service for functionaries at gymnasia, district schools, and parish schools in Poltava and Volhynian Governorates composed in 1850.

During that period, the number of functionaries of this kind in Poltava Governorate was 172, and in Volhynian Governorate – 169 (TsGLAUK. F. 707. Op. 16. D. 682). Table 2 displays the findings from an analysis of this workforce by social background.

**Table 2.** Distribution of Functionaries at Gymnasia, District Schools, and Parish Schools in Poltava Governorate and Volhynian Governorate by Social Background at 1850

	Nobles		Petty bourgeois		Cossacks		Merchants		Peasants	
	Number	%	Number	%	Number	%	Number	%	Number	%
Poltava Governorate	59	34.3	15	8.7	17	9.9	1	0.6	9	5.2
Volhynian Governorate	68	40.2	20	11.8	2	1.2	3	1.8	3	1.8

	Persons of ecclesiastical status		Distinguished citizens		Raznochintsy					
					Foreigners		Children of company officers		Other	
	Number	%	Number	%	Number	%	Number	%	Number	%
Poltava Governorate	45	26.2	1	0.6	8	4.6	12	7	5	2.9
Volhynian Governorate	47	27.8	1	0.6	7	4.15	11	6.5	7	4.15

Thus, the social makeup of the workforce of school functionaries in both governorates had become more diverse. The two governorates had just about the same number of members of a particular social group. An exception was only the Cossacks. This estate was concentrated predominantly in the leftbank Ukrainian lands, while the presence of members of Cossackdom in other regions is explained by the fact that some were simply in service in those areas.

It should be noted that descendants of the peasantry (even more so former serfs) in public service was the exception rather than the rule. Members of other non-noble categories of the population, especially clergy, petty bourgeoisie, and children of company officers, being in public service was not a very rare case in the first half of the 19<sup>th</sup> century.

When it comes to parish schools, service in them was generally not seen as prestigious. Members of the nobility constituted the minority here, with many of those who did go for it eventually transferring to other places. For instance, in 1850 out of the 40 staff at parish schools in Poltava Governorate only two were members of the nobility, with the rest distributed by social background as follows: merchants – one, foreigners – two, peasants – two, children of company officers – three, petty bourgeoisie – six, Cossacks – nine, and clergy – 15 (TsGLAUK. F. 707. Op. 16. D. 682). In this case, all of the clergy held the post of teacher of God's Law. Pursuant to the laws of the Russian Empire, these individuals were considered public officers and were entitled to a salary, but they could not work their way up the Table of Ranks.

A separate group of educational functionaries was so-called family teachers (mentors). These individuals (exclusive of women), too, were considered public officers, with records of service composed for and titles granted to them. In the first half of the 19<sup>th</sup> century, there were a significant percentage of foreigners among those willing to be a family teacher. In 1832, the Volhynian Lyceum had two contenders for the title: French lady E. Delille (in September) and Venetian man L. d'Artusius (in October). Both had to swear allegiance to the Russian state (GAKhO. F. 667. Op. 287. D.194). In 1850, Volhynian Governorate had a total of five family mentors, with four of these being foreigners and one descended from nobility. These individuals had titles ranging from Class 14 to Class 9. At the same time, Poltava Governorate had just two functionaries of this kind.

One was descended from smallholders and had the rank of collegiate secretary, and the other one was descended from children of company officers and had no title.

## 5. Conclusion

In general, the workforce of educational functionaries in Ukrainian governorates within the Russian Empire was quite diverse in social background. Yet, in different regions within them it was characterized by a number of distinct features associated with a unique historical past (e.g., the former Polish Right Bank and Hetman Left Bank and southern areas colonized by the Russian government). By the mid-19<sup>th</sup> century, while retaining its social diversity, the workforce of educational functionaries in the Ukrainian lands had pretty much lost most of its regional characteristics.

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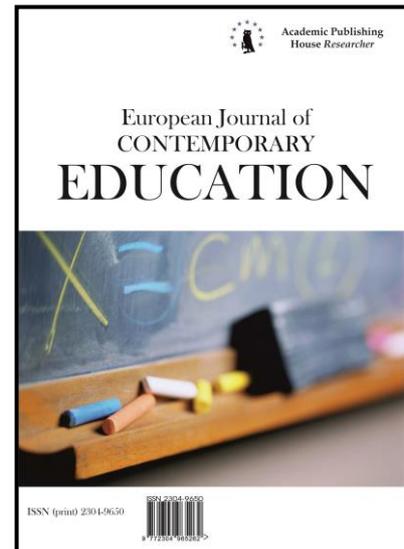
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## The System of Public Education in Kars Oblast in the Period 1878–1917. Part 1

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### Abstract

This paper examines the system of public education in Kars Oblast in the period 1878–1917. The present part of the work covers the period 1878–1908, which spans the timeframe from the incorporation of the region into the Russian Empire through to the commencement of preparatory activities related to the introduction of compulsory primary education in it.

A key source used in this work is the annual Reports on Educational Institutions in the Caucasus Educational District, which provide data on the region's schools run by the Ministry of Public Education. The authors made an extensive use of the statistical method.

The authors' conclusion is that the system of public education in Kars Oblast was characterized by a number of distinctive features. Creating the system of public education from scratch subsequent to the incorporation of the formerly Turkish-controlled areas into the Russian Empire required convincing the locals of the need to have their children attend Russian secular schools. By 1908, the region became home to a network of primary schools, four lower schools, and two secondary educational institutions. Instruction was provided to both sexes, which means education had become more accessible to the local population. While the region's student body had long been dominated by representatives of Christian denominations, the period 1907–1908 witnessed a sharp increase in the number of students of the Moslem faith too.

**Keywords:** Kars Oblast, system of public education, period 1878–1917, Ministry of Public Education.

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### **1. Introduction**

Kars Oblast was incorporated into the Russian Empire as a consequence of the Russo-Turkish War of 1877-78. The region was situated in the southwestern part of Transcaucasia. In the north and east, it bordered on Kutais, Tiflis, and Erivan Governorates, which were part of the Russian Empire, and in the south it bordered on Turkey. The region's administrative center was the city of Kars. The oblast had an area of 18,646.6 km<sup>2</sup> and a population of under 200,000, a circumstance that led to it becoming home not to a directorate (as directorates were typically established in densely populated areas) but an inspectorate for public schools – the Inspectorate for Public Schools in the Caucasus Educational District. The Inspectorate for Public Schools oversaw all ministerial educational institutions. This part of the work covers the process of making and development of the system of public education in Kars Oblast in the period 1878–1908, which spans the timeframe from the incorporation of the region into the Russian Empire through to the commencement of preparatory activities related to the introduction of compulsory primary education in it.

### **2. Materials and methods**

The key sources used in this work are the annual Reports on Educational Institutions in the Caucasus Educational District, which provide data on the region's schools run by the Ministry of Public Education and the Reports of the Chief Procurator of the Holy Synod, which contain information on the region's parochial schools. The Reports on Educational Institutions in the Caucasus Educational District, which up to 1904 (inclusive) were prepared by Trustee of the Caucasus Educational District M.R. Zavadsky, are distinguished by depth and consistency and provide a detailed insight into the network of educational institutions in Kars Oblast. In 1907, the report was prepared by a new trustee, N.F. Rudolf. The 1907 report is mainly focused on secondary educational institutions, with incomplete and fragmentary information provided on the rest of the schools. One may get the feeling that the report was prepared in haste, with multiple tables omitted. The report's quality may quite possibly have been affected by the events of the Russian Revolution of 1905. A fact that supports this argument is that the quality of the 1908 report was clearly better.

The work made an extensive use of the statistical method. The authors drew upon a diverse body of statistics that is based on reporting documentation, which covers the following: typology of educational institutions, numbers of schools, size of library stock, and numbers of students (by ethnicity, faith, estate, and gender). The use of this method helped identify some of the key distinct characteristics of the evolution of the public education system in Kars Oblast in the period 1878–1908.

### **3. Discussion**

Up to now, the system of public education in Kars Oblast in the period 1878–1917 has not been the subject of independent research. What is more, the topic has not been touched upon in research publications even incidentally. That being said, there does exist a body of summarizing research covering other regions of the Caucasus. The system of public education in the Caucasus, with Kars Oblast once part of the Caucasus Educational District, has been examined in close detail by scholars O.V. Natolochnaya, T.A. Magsumov, and N.A. Shevchenko ([Natolochnaya et al., 2018](#); [Magsumov et al., 2018](#); [Shevchenko et al., 2016](#)).

In recent years, researchers have expressed keen interest in the study of the systems of public education in the various governorates of the Russian Empire. For instance, a team of researchers led by A.A. Cherkasov has been focused on the study of the system of public education in Vologda Governorate ([Cherkasov et al., 2019](#); [Cherkasov et al., 2019a](#); [Cherkasov et al., 2019b](#); [Cherkasov et al., 2019c](#)). Elsewhere, A.Yu. Peretyatko has investigated the system of public education in the Don region ([Peretyatko, Zulfugarzade, 2017](#); [Peretyatko, Zulfugarzade, 2017a](#); [Peretyatko, Zulfugarzade, 2019](#); [Peretyatko, Zulfugarzade, 2019a](#)), O.V. Natolochnaya – in Vilna Governorate ([Natolochnaya et al., 2019](#); [Natolochnaya et al., 2019a](#)), and T.A. Magsumov ([Magsumov et al., 2018](#)) – in Vyatka Governorate.

#### 4. Results

The network of educational institutions in the Caucasus was divided into the systems of secondary education, lower education, and primary education. The system of secondary education included male gymnasia and progymnasia, real schools, female gymnasia and progymnasia, and teacher's institutes and seminaries. The system of lower education was represented by urban schools, mountain schools, Mariinsky schools, and industrial schools. The system of primary education comprised private and primary schools (Otchet, 1900: 606).

It is to be remembered that Kars Oblast's population had quite a motley ethnic makeup. In 1886, i.e. eight years subsequent to it becoming part of Russia, the bulk of the region's population was made up of Turks, 24 %, and Armenians, 21 %, with Kurds accounting for 15 %, Qarapapaqs – 13.8 %, Greeks – 13.5 %, ethnic Russians – 6 %, and Turkmens – 5 % of its population. The region's total population was 174,044.

The fact that there generally was a problem establishing educational institutions in the region may be attributed to its somewhat complicated demographic conditions. With that said, in 1880 Kars Oblast became home to its first lower educational institution – the Kars Urban School (Otchet, 1885: 186). By 1884, Kars Oblast had in operation as many as five educational institutions (run by the Ministry of Public Education). At a population of 163,000, there were only 0.37 schools per every 10,000 residents. A lower figure was exhibited only by Dagestan Oblast – 0.21 (Otchet, 1885: 206). In 1898, the region became home to the Inspectorate for Public Schools in Kars Oblast, which was part of the Caucasus Educational District.

#### Secondary education

The region's distinct characteristics were such as not to permit opening in it a secondary educational institution straightaway, as it did not have enough local youth with a lower education. It became possible to change the situation only 20 years later – in the early 20<sup>th</sup> century. Even in this area there were certain distinct characteristics at play: while it was common throughout the Caucasus to open male secondary educational institutions first, Kars Oblast's first secondary educational institution was for women. On September 8, 1902, Kars Oblast became home to its first secondary educational institution – the Kars Female Progymnasium (Otchet, 1905: 163). Four years later, on October 15, 1906, they also established the region's first male secondary educational institution – a real school (Otchet, 1908: 92).

Table 1 displays the region's numbers of secondary educational institutions and students in the period 1902–1908.

**Table 1.** Numbers of Secondary Educational Institutions in Kars Oblast and Students at Them (Otchet, 1905: 163, 211; Otchet, 1908: 92; Otchet, 1909: 78, 125)

Year	Number of educational institutions					Number of students		
	Gymnasia		Progymnasia			Boys	Girls	Total
	Male	Female	Male	Female	Real schools			
1900	-	-	-	-	-	-	-	-
1904	-	-	-	1	-	-	137	137
1907	-	-	-	1	1	199	213	412
1908	-	-	-	1	1	244	226	470

As evidenced by Table 1, despite the relatively modest size of Kars Oblast's network of secondary schools, by 1908 the region was able to ensure that both boys and girls could pursue secondary education – without having to relocate to other regions, which made secondary education more accessible.

Table 2 illustrates the distribution of students at the region’s secondary educational institutions by ethnicity.

**Table 2.** Distribution of Students at Secondary Educational Institutions in Kars Oblast by Ethnicity (Otchet, 1905: 211; Otchet, 1908: 78, 127; Otchet, 1909: 114, 183)

Year	Russians	Georgians	Armenians	Tatars	Mountaineers	Jews	Other ethnicities	Total
1900	-	-	-	-	-	-	-	-
1904	47	15	63	1	2	1	8	137
1907								412
1908	136	28	226	8	-		72	470

The bulk of students at the region’s secondary educational institutions were Armenians, followed by ethnic Russians. The student body included just a few Tatars, mountaineers, and Jews.

Table 3 illustrates the distribution of students at secondary educational institutions in Kars Oblast by faith.

**Table 3.** Distribution of Students at Secondary Educational Institutions in Kars Oblast by Faith (Otchet, 1905: 211; Otchet, 1908: 78, 127; Otchet, 1909: 80, 131)

Year	Orthodox Christians	Armenian Gregorian Christians	Catholics	Protestants	Jews	Moslems	Representatives of other faiths	Total
1900	-	-	-	-	-	-	-	-
1904	69	55	10	1	1	1	-	137
1907	183	198	13	8	2	8	-	412
1908	223	207	27	4	1	8	-	470

As evidenced by Table 3, around 50 % of the region’s students were Orthodox Christians, the figure reaching over 97 % inclusive of representatives of other Christian denominations. This was one of the highest figures exhibited within the secondary schools sector of the multiethnic Caucasus.

Table 4 illustrates the distribution of students at the Kars Oblast’s secondary educational institutions by estate.

As evidenced by Table 4, student nobles always constituted the bulk of the student body at the region’s secondary schools, followed by children of distinguished citizens and children of merchants, as well as children of petty bourgeoisie. The distribution of students representing other estates was even, with no intermittent growth recorded.

A major focus in the educational process was on out-of-school activities. In this respect, of special significance were the libraries and their accessibility to students. Normally, the region’s secondary and lower educational institutions had two library sections – fundamental (for teachers) and discipular (for students).

**Table 4.** Distribution of Students at Secondary Educational Institutions in Kars Oblast by Estate (Otchet, 1905: 211; Otchet, 1908: 79, 127; Otchet, 1909: 81, 131)

Year	Nobles*	Persons of ecclesiastical status	Distinguished citizens and first-guild merchants	Members of other urban estates	Peasants	Lower ranks and Cossacks	Foreigners	Other	Total
1900	-	-	-	-	-	-	-	-	-
1904	64	3	19	45	-	6	-	-	137
1907	123	13	96	114	57	7	2	-	412
1908	164	18	118	107	59	-	-	4	470

In 1904, the Kars Female Progymnasium had a library stock of just 251 items (106 items in the fundamental section and 145 in the discipular section) (Otchet, 1905: 167). In 1907, the stock in the fundamental section rose to 300 items, and in the discipular section – to 350 items (Otchet, 1908: 151). By 1908, the school's library stock reached 896 items (Otchet, 1909: 155).

As regards the region's real school, which was established in 1906, at 1907 its library stock was relatively small – 708 items (376 items in the fundamental section and 332 items in the discipular section) (Otchet, 1908: 94). By 1908, the school's library stock topped a thousand – 1,067 items (Otchet, 1909: 97).

As can be seen, the library stocks of secondary educational institutions in Kars Oblast were not very large. This may be attributed to the fact that the region's system of secondary schools was still young at the time, with these institutions simply needing a bit more time to get in place a library of their own.

### Lower education

As mentioned earlier, the system of lower education in Russia at the time was represented by urban schools, mountain schools, female Mariinsky schools<sup>†</sup>, and industrial schools.

Kars Oblast's first lower educational institution was established two years subsequent to the incorporation of the region into Russia. This took place on November 8, 1880, with the educational institution named the Kars Urban School (Otchet, 1885: 186).

In 1889, Kars Oblast became home to its first private lower female educational institution (Otchet, 1890: table 288). However, as was the case with other regions of Russia, Kars Oblast's system of private schools lacked permanence, with the facilities often closing down for various reasons. By 1894, there was not a single private educational institution left in the region (Otchet, 1895: table 310).

On September 8, 1890, Kars Oblast became home to the Female Mariinsky School (Otchet, 1895: table 287) Twelve years later, on September 9, 1902, the region became home to its second urban school – the Kagyzman Urban School (Otchet, 1905: 293).

On January 26, 1903, the region also became home to its first lower tradesman's school (Otchet, 1905: 453).

Table 5 illustrates the dynamics of the numbers of Kars Oblast's lower educational institutions and students at them.

\* Hereinafter inclusive of hereditary nobles, personal nobles, and functionaries

† Female educational institutions run by the Office of the Institutions of Empress Maria

**Table 5.** Numbers of Lower Educational Institutions in Kars Oblast and Students at Them (Otchet, 1885: 205; Otchet, 1890: table 200, table 292; Otchet, 1895: table 197, table 303; Otchet, 1899: 329, 397; Otchet, 1901: 362, 492; Otchet, 1905: 293, 453, 489; Otchet, 1908: 237, 397, 454; Otchet, 1909: 275, 411)

Year	Number of educational institutions				Number of students		
	Urban school	Lower tradesman's school	Female vocational school	Private school	Boys	Girls	Total
1884	1	-	-	-	160	-	160
1889	1	-	-	1	181	80	261
1894	1	-	1	-	209	100	309
1898	1	-	1	-	379	224	603
1900	1	-	1	-	507	245	752
1904	2	1	1	-	382	217	599
1907	2	1	1	-	387	196	583
1908	2	1	1	-	353	223	576

As evidenced by [Table 5](#), in Kars Oblast lower education started with education for boys. The region had neither unisex secondary nor unisex lower educational institutions in operation, i.e. boys and girls were taught separately. Up to 1900, the number of students at lower educational institutions kept increasing, but it would gradually drop later on. The negative dynamics may be explained by the fact that by 1900 the schools were simply filled to capacity. More specifically, based on statistics for the entire Caucasus, in 1900 there were 45 urban schools in operation, with a combined enrollment of 13,000 students ([Otchet, 1901: 360-362](#)), which makes it an average of 288 students per school. In the period that followed, the number of students was above the average figure, if not by much.

**Table 6.** Distribution of Students at Lower Educational Institutions in Kars Oblast by Ethnicity (Otchet, 1885: 205; Otchet, 1890: table 203, table 293; Otchet, 1895: table 202, table 303; Otchet, 1899: 329; Otchet, 1901: 362, 492; Otchet, 1905: 359, 489; Otchet, 1909: 351)

Year	Russians	Georgians	Armenians	Tatars	Mountaineers	Jews	Other ethnicities	Total
1884	16	1	92	5	-	2	44	160
1889	77	2	143	7	1	12	19	261
1894	53	3	167	2	1	3	83	312
1898	86	4	351	32	-	-	130	603
1900	70	16	468	7	-	2	189	752
1904	64	10	323	4	3	3	192	599
1908	36	7	142	3	2	126	-	316*

As evidenced by [Table 6](#), around 50 % of the region's students were Armenians, followed by ethnic Russians. A more or less even distribution was exhibited by the region's student Georgians. The number of student Tatars in the region rose sharply in 1898, but the figure would go back to minimum later on.

\* Exclusive of data on the region's Female Mariinsky School and Tradesman's School

**Table 7.** Distribution of Students at Lower Educational Institutions in Kars Oblast by Faith (Otchet, 1885: 205; Otchet, 1890: table 203, table 293; Otchet, 1895: table 202, table 303; Otchet, 1899: 329; Otchet, 1901: 363, 493; Otchet, 1905: 359, 489; Otchet, 1908: 237, 326, 399; Otchet, 1909: 275, 368, 411)

Year	Orthodox Christians	Armenian Gregorian Christians	Catholics	Protestants	Jews	Moslems	Representatives of other faiths	Total
1884	59	79	14	1	2	5	-	160
1889	102	136	7	3	1	7	3	261
1894	150	92	4	6	13	19	16	312
1898	235	321	31	3	-	4	9	603
1900	262	443	25	5	2	7	8	752
1904	257	297	26	1	3	4	11	599
1907	269	289	10	2	-	4	9	583
1908	241	307	10	3	2	6	7	576

As evidenced by Table 7, the bulk of the student body at the region’s lower educational institutions was made up of representatives of Christian denominations, with Armenian Gregorian Christians accounting for nearly 50–60 %. Only in 1894 was the number of non-Christians up somewhat, reaching nearly 15 %, with the figure being significantly lower in other years.

Table 8 illustrates the distribution of students at the region’s lower educational institutions by estate.

**Table 8.** Distribution of Students at Lower Educational Institutions in Kars Oblast by Estate (Otchet, 1885: 204; Otchet, 1890: table 293; Otchet, 1895: table 202, table 303; Otchet, 1899: 329; Otchet, 1901: 363, 493; Otchet, 1905: 359, 489; Otchet, 1908: 237, 399; Otchet, 1909: 275, 411)

Year	Nobles	Persons of ecclesiastical status	Distinguished citizens and first-guild merchants	Members of other urban estates	Peasants	Lower ranks and Cossacks	Foreigners	Other	Total
1884	19	17	92		29	2	1	-	160
1889	9	21	-	102	69	20	35	-	261
1894	24	13	-	172	78	20	5	-	312
1898	20	15	3	424	105	34	2	-	603
1900	45	26	6	473	171	20	11	-	752
1904	21	18	12	362	161	25	-	-	599
1907	7	14	20	143	185	5	1	12	387*
1908	8	4	18	131	181	3	1	7	353 <sup>†</sup>

Looking at Table 8, one cannot but notice the virtually continual increase in the number of peasants amongst the student body at the region’s lower educational institutions. Subsequent to

\* Data not available on the Female Mariinsky School

† Data not available on the Female Mariinsky School

the opening of the region's secondary educational institutions, the number of student nobles at its lower schools began to drop, the figure decreasing more than two times in the period 1900–1904. By contrast, the number of peasants and petty bourgeoisie had been rising throughout the period.

A few words will now be said about the libraries of lower educational institutions in Kars Oblast.

By 1884, the Kars Urban School had a library stock of 1,481 items (1,159 items in the fundamental section and 322 items in the discipular section) (Otchet, 1885: 188-189). By 1889, the library stock increased, reaching 1,778 items (Otchet, 1890: table 186), and as early as 1894 it numbered 2,352 items (Otchet, 1895: table 185). By 1898, the library stock reached 2,969 items (Otchet, 1899: 297). In 1900, the library stock posted a decline, numbering 2,467 items (Otchet, 1901: 301). By 1904, the stock rose to 3,137 items (Otchet, 1905: 297). In 1907, the stock numbered 3,525 items (Otchet, 1908: 263). By 1908, the stock rose to 3,624 items (Otchet, 1909: 301).

By 1894, the Female Mariinsky School had a library stock of 2,529 items (1,250 items in the fundamental section and 1,279 items in the discipular section) (Otchet, 1895: table 288). By 1898, the school's library stock reached 2,770 items (Otchet, 1899: 382). In 1900, the stock numbered 2,929 items (Otchet, 1901: 432). In 1904, it was 3,334 items (Otchet, 1905: 428). In 1907, it was 3,504 items (Otchet, 1908: 333). However, in 1908 the school's library stock posted a sharp decline, dropping to 1,790 items (Otchet, 1909: 375).

By 1904, the Kagyzman Urban School, established in 1902, had a library stock of 821 items (341 items in the fundamental section and 480 items in the discipular section) (Otchet, 1905: 297). In 1907, the stock numbered 939 items (Otchet, 1908: 263). In 1908, it numbered 1,088 items (Otchet, 1909: 301).

In 1904, the Kars Lower Tradesman's School, established in 1903, had a library stock of just 291 items (266 items in the fundamental section and 25 items in the discipular section) (Otchet, 1905: 455). By 1907, the stock numbered 495 items (Otchet, 1908: 413). By 1908, it reached 485 items (Otchet, 1909: 425).

All in all, the region's lower educational institutions had a combined library stock of 6,897 items.

### Primary education

The region's network of primary educational institutions comprised private, ministerial (schools under the Ministry of Public Education, including zemstvo and public schools), and parochial schools.

#### Private primary schools

Private primary schools did not receive wide use in Kars Oblast. Currently, data is available only for two primary private schools in the region, which were in operation in the period 1900–1904.

Table 9 illustrates the distribution of students at private educational institutions in Kars Oblast by gender.

**Table 9.** Distribution of Students at Private Educational Institutions in Kars Oblast by Gender (Otchet, 1885: 283; Otchet, 1901: 526; Otchet, 1905: 16, 522; Otchet, 1908: 454; Otchet, 1909: 466)

Year	Boy students	Girl students	Total
1884	-	-	-
1894	-	-	-
1898	-	-	-
1900	76	11	87
1904	60	22	82
1907	-	-	-
1908	-	-	-

As evidenced by Table 9, the region's private educational institutions had no particular focus on gender. As a rule, these schools were unisex and their gender balance kept changing.

**Table 10.** Distribution of Students at Private Primary Schools in Kars Oblast by Ethnicity (Otchet, 1901: 528, Otchet, 1905: 524)

Year	Russians	Georgians	Armenians	Tatars	Mountaineers	Jews	Other ethnicities	Total
1900	-	-	87	-	-	-	-	87
1904	-	-	82	-	-	-	-	82
1907	-	-	-	-	-	-	-	-

As evidenced by Table 10, the entire 100 % of the student body at the region's private educational institutions was made up by Armenians.

**Table 11.** Distribution of Students at Private Primary Schools in Kars Oblast by Faith (Otchet, 1901: 529; Otchet, 1905: 525)

Year	Orthodox Christians	Armenian Gregorian Christians	Catholics	Protestants	Jews	Moslems	Representatives of other faiths	Total
1900	-	87	-	-	-	-	-	87
1904	-	81	1	-	-	-	-	82
1907	-	-	-	-	-	-	-	-

As evidenced by Table 11, virtually all of the student Armenians were Armenian Gregorian Christians, except for one, who was Catholic.

**Table 12.** Distribution of Students at Private Primary Schools in Kars Oblast by Estate (Otchet, 1901: 529; Otchet, 1905: 525)

Year	Nobles	Persons of ecclesiastical status	Distinguished citizens and first-guild merchants	Members of other urban estates	Peasants	Lower ranks and Cossacks	Foreigners	Total
1900	-	2	-	80	5	-	-	87
1904	1	-	-	73	8	-	-	82
1907	-	-	-	-	-	-	-	-

As evidenced by Table 12, the overwhelming majority of students at private educational institutions were petty bourgeoisie, followed by peasants. At the same time, the student body included just a few children of nobles and children of persons of ecclesiastical status.

### Ministerial schools

The first ministerial school in Kars Oblast was opened back in 1876, i.e. at a time when the region was part of Turkey. The region became home to another three educational institutions in 1882. Thus, by 1884 Kars Oblast had in operation a total of four primary educational institutions (Otchet, 1895: 260). Note that the school established in 1876 ceased operation as early as 1889, with one of the three schools opened in 1882 closing down too (Otchet, 1890: table 299). By 1894, one more of those three schools closed down (Otchet, 1895: table 321). By the start of 1898, Kars

Oblast had in operation 10 primary schools, with 10 more opening over the year (Otchet, 1899: 486). This was a time that marked the starting point for an increase in the number of educational institutions in Kars Oblast.

**Table 13.** Distribution of Primary Schools under the Ministry of Public Education in Kars Oblast by Type (Otchet, 1885: 256-257, 276; Otchet, 1890: table 315, table 332; Otchet, 1895: table 321, table 333; Otchet, 1899: 487, 516; Otchet, 1901: 537, 566; Otchet, 1905: 532-533, 562; Otchet, 1908: 352, 358; Otchet, 1909: 400)

Year	Tow-grade schools			One-grade schools			Total schools	Number of students		
	Male	Female	Unisex	Male	Female	Unisex		Boys	Girls	Total
1884	2			2			4	60	84	144
1889	1	-	2	1	-	2	6	335	72	407
1894	1	-	2	3	-	-	6	332	67	390
1898	1	-	2	9	-	8	20	1,002	164	1,166
1900	1	-	3	12	-	13	29	1,416	297	1,713
1904	2	-	4	19	2	28	55	2,481	388	2,869
1907	2	-	8	10	2	43	65	3,163	760	3,923
1908	2	-	11	-	2	51	66	3,360	830	4,190

Table 13 traces the dynamics of establishment of primary educational institutions in the period 1884–1908. During this time, the number of educational institutions rose 16 times. But what is most important is that the region’s school system had become more sustainable, with virtually no schools closed down in the early 20<sup>th</sup> century. During the period, the number of students rose 29 times. As regards the region’s gender balance amongst the student body, there was just one girl per every three boys, a balance that pretty much persisted through the entire period under examination (the year 1884 should be disregarded, as 84 of the girls were students at a private school that closed down that same year).

**Table 14.** Distribution of Students at Primary Schools in Kars Oblast by Ethnicity (Otchet, 1885: 279; Otchet, 1890: table 311; Otchet, 1895: table 336; Otchet, 1899: 522; Otchet, 1901: 566, 572; Otchet, 1905: 562; Otchet, 1909: 402)

Year	Russians	Georgians	Armenians	Tatars	Mountaineers	Jews	Other ethnicities	Total
1884	14	1	90	1	34	2	2	144
1889	23	2	135	8	-	-	199	367
1894	66	6	239	23	1	1	63	399
1898	33	2	722	8	14	3	384	1,166
1900	153	2	854	24	12	5	663	1,713
1904	~524	~11	~1,282	~86	~11	~11	~944	2,869*
1908	1,139	21	1,559	264	15		1,192	4,190

Of major interest is what is in Table 14: overall, by ethnicity the region’s primary school system exhibited percentages similar to those displayed by its secondary and lower school systems

\* Of these, 18 % were Russians, less than 0.5 % – Georgians, 44 % – Armenians, 3 % – Tatars, less than 0.5 % – mountaineers, less than 0.5 % – Jews, and around 33 % – representatives of other ethnicities (Otchet, 1905: 570).

(i.e., the way being led by Armenians, followed by ethnic Russians, and then by representatives of other ethnicities. Of interest is the fact that in the early 20<sup>th</sup> century the region witnessed a sharp increase in Tatars attending its primary schools, with the figure topping 6 % by 1908.

**Table 15.** Distribution of Students at Primary Schools in Kars Oblast by Faith (Otchet, 1885: 278-279; Otchet, 1890: table 311; Otchet, 1895: table 336; Otchet, 1899: 523; Otchet, 1901: 573; Otchet, 1905: 563; Otchet, 1908: 352; Otchet, 1909: 394)

Year	Orthodox Christians	Armenian Gregorian Christians	Catholics	Protestants	Jews	Moslems	Representatives of other faiths	Total
1884	47	90	1	1	2	1	2	144
1889	214	113	22	-	-	8	10	367
1894	123	241	10	-	-	24	1	399
1898	339	563	103	56	3	98	4	1,166
1900	700	663	152	37	5	109	47	1,713
1904	~1,066	~1,186	~100	~14	~14	~114	~375	2,869*
1907	1,430	1,207	103	963	29	191	-	3,923
1908	1,399	1,391	132	13	25	284	946	4,190

As evidenced by Table 15, the way by number amongst the region’s student body was led by Orthodox Christians and Armenian Gregorian Christians, followed by representatives of other Christian denominations and Moslems. Of interest is the large number of Protestants in 1907, with the drop in their number in 1908 attributable to nothing other than a typo in the statistical data.

**Table 16.** Distribution of Students at Primary Schools in Kars Oblast by Estate (Otchet, 1885: 278; Otchet, 1890: table 311; Otchet, 1895: table 336; Otchet, 1899: 523; Otchet, 1901: 573; Otchet, 1905: 563)

Year	Nobles	Persons of ecclesiastical status	Members of the urban estates	Peasants, lower ranks, and Cossacks	Foreigners	Total
1884	13	4	108	19	-	144
1889	11	19	101	235	1	367
1894	14	9	89	287	-	399
1898	12	34	352	762	6	1,166
1900	14	33	512	1,153	1	1,713
1904	~20	~43	~839	~1,965	-	2,869 <sup>†</sup>

As evidenced by Table 16, the number of students at the region’s primary schools was up virtually 20 times. The period witnessed no major change in the number of student nobles, whereas the number of student peasants rose tremendously – as much as 103 times (!). There also was a major increase in the number of students born to persons of ecclesiastical status, as well as representatives of the urban estates.

\* Of these, 37 % were Orthodox Christians, 41 % – Armenian Gregorian Christians, 3.5 % – Catholics, less than 0.5 % – Protestants, less than 0.5 % – Jews, 4 % – Moslems, and 13 % – representatives of other faiths (Otchet, 1905: 571).

† Of these, 0.7% were nobles, 1.5 % – persons of ecclesiastical status, 29 % – petty bourgeoisie, and 68 % – peasants (Otchet, 1905: 571).

A few words will now be said about the libraries of primary schools in Kars Oblast.

By 1884, among the region’s four schools at the time only two had libraries of their own, with a combined stock of 693 items (Otchet, 1885: 267). By 1889, four of the region’s five schools had libraries of their own, with a combined stock of 1,272 (Otchet, 1890: табл. 305). By 1894, all of the six schools run by the Ministry of Public Education had libraries of their own, with a combined stock of 3,054 (Otchet, 1895: табл. 327). Given the fact that in 1898 the region became home to as many as 10 more schools (i.e. half of the number of those already in operation at the time), the number of libraries was not large – 11, i.e. 55% of the total number of schools in place. The combined book stock was 7,251 items (Otchet, 1899: 504). In 1900, the region had 25 libraries against 29 educational institutions, with a combined book stock of 14,523 items (Otchet, 1901: 554). By 1904, 48 of the region’s 55 schools had libraries of their own, with a combined stock of 30,605 items (Otchet, 1905: 550). Thus, by 1904 there was an average of 637 items per primary school library in Kars Oblast.

**Parochial schools**

Kars Oblast had in place an entire network of primary schools run by the Holy Synod. However, because Kars Oblast had not formed a separate diocese, the exact number of parochial schools in operation in the period is unknown. That being said, there is some fragmentary information available for the period 1889–1898 (Table 17).

**Table 17.** Numbers of Parochial Schools in Kars Oblast and Students at Them (Otchet, 1890: table 319; Otchet, 1895: table 341; Otchet, 1899: 569)

Year	Number of schools				Number of students		
	Two-grade	One-grade	Grammar schools	Total	Boys	Girls	Total
1889				5	153	14	167
1894				16	689	182	971
1898				20	802	131	933

As evidenced by Table 17, in the period 1894–1898 there was an average of 52 students per one-grade parochial school in Kars Oblast, the figure being above the average one for the Caucasus.

Table 18 illustrates the accomplishments of the system of public education in Kars Oblast in the period 1878–1908.

**Table 18.** Kars Oblast’s Public Education System in the Period 1878–1908 (Otchet, 1885: 305; Otchet, 1890: table 311; Otchet, 1895: table 340, Otchet, 1899: 566, 569; Otchet, 1901: 518, 614-615; Otchet, 1905: 610-611; Otchet, 1908: 352, 358; Otchet, 1909: 400)

Year	Number of schools under the Ministry of Public Education								Number of students			Population, thousand	Per every 10,000 residents	
	Secondary	Lower		Primary				Total	Boys	Girls	Total		Schools	Students
		Ministry of Public Education	Private	Ministry of Public Education	Private									
1884	-	1	-	4	-			5	220	84	304	162	0.3	18.76
1889	-	1	1	5	-			7	318	49	367	163	0.43	22.52
1894	-	2	-	6	-			8	541	170	711	214	0.38	33
1898	-	2	-	20	-			22	1,381	388	1,769	292	0.75	61
1900	-	2	-	29	1			32	1,999	553	2,552	292	1.1	87

1904	1	4	-	55	1		61	2,923	764	3,687	296	2.06	125
1907	2	4	-	65	-		71	3,749	1,169	4,918	~310	~2.29	~158.6
1908	2	4	-	66	-		72	3,957	1,279	5,236	~312	~2.3	~167.8

As evidenced by [Table 18](#), by 1908 Kars Oblast’s public education sector had come a long way in terms of the development of the system of secondary education (male and female), with the number of lower educational institutions rising four times and the number of primary schools increasing more than 15 times. By contrast, despite trying hard, the region’s system of private schools ended up failing to get a foothold in Kars Oblast. In the 30-year period from 1878 to 1908, the number of educational institutions run by the Ministry of Public Education rose 14 times, with the number of students increasing 17 times. It is to be remembered that significant effort in this area was put in by the Department of Religious Affairs.

Apart from educational institutions under the Ministry of Public Education and parochial schools under the Department of Religious Affairs, Kars Oblast also had in operation Armenian Gregorian schools at the Armenian churches and Moslem schools at the mosques. In 1889, there were 10\* Armenian schools and 94† Moslem schools in the region, with the figures being 18‡ and 292§ respectively in 1894. In 1907, the region had 86 Moslem schools, with a combined enrollment of 2,515 boys and 227 girls ([Otchet, 1908: 155](#)). Statistically, the data on the region’s Armenian Gregorian schools were left out, as for the most part these schools did not report on their performance to the Ministry of Public Education. Account was not taken of the region’s Moslem schools either, as these almost exclusively taught the Quran, with some also providing instruction in the Turkish language.

### 5. Conclusion

The system of public education in Kars Oblast was characterized by a number of distinctive features. Creating the system of public education from scratch subsequent to the incorporation of the formerly Turkish-controlled areas into the Russian Empire required convincing the locals of the need to have their children attend Russian secular schools. By 1908, the region became home to a network of primary schools, four lower schools, and two secondary educational institutions. Instruction was provided to both sexes, which means education had become more accessible to the local population. While the region’s student body had long been dominated by representatives of Christian denominations, the period 1907–1908 witnessed a sharp increase in the number of students of the Moslem faith too.

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\* These were attended by 971 students (689 boys and 182 girls) ([Otchet, 1890: table 318](#)).

† These were attended by 1,585 students (1,373 boys and 212 girls) ([Otchet, 1890: table 320](#)).

‡ These were attended by 1,148 students (889 boys and 259 girls) ([Otchet, 1895: table 340](#)).

§ These were attended by 5,547 students (4,692 boys and 855 girls) ([Otchet, 1895: table 342](#)).

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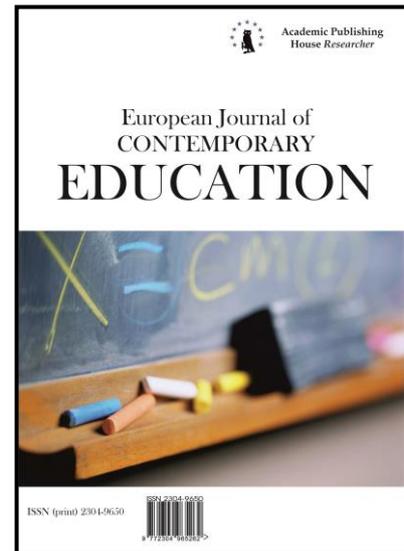
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## The System of Public Education in Tiflis Governorate in the Period 1802–1917. Part 1

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### Abstract

This paper addresses the development of the education system in the Russian Empire during the pre-revolutionary period. Its geographic scope is confined to Tiflis Governorate, and its chronological scope covers the period of integration of the system of public education in Tiflis Governorate into the all-Russian system of public education and its centralization – 1802–1871 (this includes the “departmental” period, when there was in operation the Ministry of Religious Affairs and Public Education (1817–1824)). The work provides a short analysis of key sources on the issue of the development of the public education system in pre-revolutionary Russia, a brief historiographical survey, an outline of Tiflis Governorate’s geographic, economic, and ethnic characteristics, and a summary of key issues relating to the topic’s periodization.

The authors’ conclusion is that the process of integration of the system of public education in Tiflis Governorate into the all-Russian system and its centralization was completed by 1871. Throughout the country, there now was in operation a network of educational institutions with uniform standards in place with regard to school administration and curricula. This made it possible to move on to the next stage in the process of spreading literacy in the outlying regions of the Russian Empire – to enable more of its citizens to receive public education.

**Keywords:** public education, Tiflis Governorate, gymnasium, primary school.

### 1. Introduction

In the view of a number of researchers, the process of integration of the Caucasus’s education system into the imperial Russian system was quite complicated (Shevchenko et al, 2016: 363).

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To ease the integration process, attempts were made to create writing systems for the region's ethnicities and design curricula factoring in the regional component (Shevchenko et al, 2016: 363). With that said, by the time of the fall of the monarchy and disintegration of the empire, having compulsory primary education in place was already a fait accompli throughout Russia (Cherkasov, 2011: 148). The present work examines the process of development of the education system in the Caucasus through the example of Tiflis Governorate.

## **2. Materials and methods**

In putting this work together, the authors drew upon the following materials: enactments, edicts, and other documents issued by pre-revolutionary authorities regulating the operation of the education system, as well as pre-revolutionary statistical reports.

Specifically, this included the following:

1) 'A Statistical Description of Transcaucasian Krai', published in 1835 in Saint Petersburg by historian, ethnographer, statistician, and political writer O.S. Evetsky. It provides an originally in-depth analysis of the region's geographic, biological, and economic characteristics, as well as well-detailed descriptions of the ethnic, numerical, estate/class, and (even) professional makeup of populated localities in the Caucasus, an account of the numbers and categories of public institutions (including schools), and much more (Statisticheskoe opisanie, 1835).

2) The Statute 'On the Caucasus Educational District and Educational Institutions' of October 29, 1853, issued by Emperor Nicholas I, accurately reflects the key trends in the government's reformation of the education sector in the Russian Empire. It illuminatingly illustrates the process of integration of educational institutions within the Caucasus Educational District (which incorporated Tiflis Governorate as well) into the all-Russian education system and their centralization. The authors analyzed this document particularly thoroughly, as they consider it fundamental to the integration of the Caucasus's education system and centralization of education in the Russian Empire as a whole (Polozhenie ot 29.10.1853).

3) 'A Statistical Digest on the Caucasus', published in 1869 in Tiflis by Caucasus ethnographer N.I. Voronov, which likewise provides a consistent and in-depth ethnographic, economic, and social analysis of the region (Sbornik statisticheskikh svedenii, 1869). Of major interest is also so-called 'Black Sea Letters', published in the journal Russky Vestnik (Voronov, 1857).

4) 'A Digest on the Caucasus' (1871–1885). Two years later, there came out the first volume of a nine-volume digest under the editorship of world-famous Russian naturalist, statistician, and ethnographer N.K. Seidlitz. While focused pretty much on the same subjects as those mentioned above, the work devoted special attention to winemaking in the Caucasus (Sbornik svedenii o Kavkaze). In 1894, N.K. Seidlitz published 'A Corpus of Statistical Data on the Population of Transcaucasia, with a Complete Alphabetical Index to the Region's Cities and Villages', which included a 10,000-item list (Zeidlits, 1894).

5) 'Acts of the Caucasus Archaeographic Commission, 1881', one of the 12 volumes published by the Main Office of the Viceroy of the Caucasus. The Caucasus Archaeographic Commission was established in 1864 by Viceroy of the Caucasus Grand Duke Mikhail Nikolaevich Romanov. The publication provides descriptions of various statutory enactments issued in the Caucasus starting in the 14<sup>th</sup> century (AKAK).

6) 'The First Nationwide Census in the Russian Empire, 1897', published under the editorship of N.A. Troinitsky in the capital by the Central Statistics Committee of the Ministry of Internal Affairs. Rightfully one of the most valuable statistical sources out there, it provides vast information on the ethnic makeup of Russia's population as at the end of the 19<sup>th</sup> century. In the context of the topic under study, of particular interest is Volume 18, which deals with Tiflis Governorate specifically (Vseobshchaya perepis' naseleniya, 1897).

7) 'Complete Laws of the Russian Empire', which is the most substantial source on the subject. It consists of three collections, and all three of them were used by the authors (in keeping with the work's chronological scope). The first collection comprises 45 volumes (nearly 30,000 enactments) and covers the period 1649–1825. It was compiled and edited by M.M. Speransky, dubbed "a top connoisseur of Russian law". The second collection includes 55 volumes (over 60,000 laws) and covers the period 1825–1881. The third collection incorporates over 40,000

statutory enactments, consists of 33 volumes, and covers the period from March 1, 1881\* (i.e. starting from the day Emperor Alexander II passed away) to the end of 1913 (PSZRI).

8) In the context of the topic under study, of interest is also 'A Historical Survey of the Activity of the Ministry of Public Education (1802–1902)', compiled by S.V. Rozhdestvensky and published in Saint Petersburg, which was dedicated to the completion of one hundred years' work by the ministry (*Istoricheskii obzor, 1902*).

This, of course, is by no means a complete list of sources on the subject, but the authors deemed it as sufficient for the conduct of an objective, comprehensive analysis of the topic under study.

### **3. Discussion**

There has not been much research into the development of the education system in the Caucasus in the pre-revolutionary period. This may be due to a number of reasons. Above all, it is the relatively narrow source base. An outline of most of the fundamental sources on the subject used by both historians and political writers has already been provided above. This information is widely available on the Internet – so there is nothing novel about it, as this was explored during the Soviet period quite extensively. Some of the information that is available on the subject, a relatively insignificant pool, has been scattered across multiple periodical pre-revolutionary publications (e.g., *Zhurnal Ministerstva Narodnogo Prosveshcheniya*). This suggests another difficulty – the need to explore a vast pool of information in order to obtain just a tiny nugget of information. Therefore, it is no wonder that many contemporary historians tend to “steer clear” of this subject, with most opting to employ only commonly known statistical information.

However, the afore-said is not related to the pre-revolutionary period, when historians covered the making of the education system quite eagerly and meticulously. Below is an outline of some key research on the topic conducted by Russian scholars.

Above all, it is worth mentioning 'A Historical Survey of the Activity of the Ministry of Public Education (1802–1902)', which had a volume of nearly 800 pages, published by well-known Russian historian S.V. Rozhdestvensky (*Istoricheskii obzor, 1902*). The work provides an insight into the operation of the education system in the Russian Empire in the period specified. From the perspective of the present study, the work is of substantial interest as a reference material with a large volume of systematized data.

Another fundamental work on the subject is L.N. Modzalevsky's 'Education in Caucasus Krai in the Period 1802–1880', published in 'The Memorandum Book for the Caucasus Educational District for 1880' in Tiflis in 1880 (*Modzalevskii, 1880*). The work contains nearly 100 pages worth of analytical and statistical information on the development of education in the Caucasus, serving as a “reference point” for many contemporary research studies on the history of the region and its education system.

The development of urban schools in Russia as a whole and the Caucasus in particular, through the prism of the Statute of 1872, is explored in a work by P. Zazhaev published in 1909 in the journal *Na Kavkaze* (*Zazhaev, 1909*).

Of interest from a standpoint of reference information on the Caucasus and general characterization of the region are two articles by N.I. Voronov collectively entitled 'Black Sea Letters', published in the journal *Russky Vestnik* in 1857 in Issues 1 and 3, respectively (*Voronov, 1857*).

The making of the education system in the Caucasus was explored by a number of Soviet researchers as well. Of the greatest interest, in the context of the present work, is a collection of scholarly works entitled 'Public Education and Pedagogical Thought in Russia on the Eve and at the Beginning of Imperialism: Little-Researched Issues and Sources', which came out in 1980 under the editorship of E.D. Dneprov. Aside from the ideological pretentiousness of Soviet historians in the form of a harsh criticism of Tsarist education, the collection provides a systematized account of the state of the pre-revolutionary system of education and a useful evaluation of certain events. However, for the most part, this information was taken from well-known sources (most of which are mentioned above). Unfortunately, the authors of the articles in the collection did not introduce

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\* All dates hereinafter are provided in the old style.

any new sources into scholarly discourse ([Narodnoe obrazovanie, 1980](#)). In the historiography from the USSR period, even certain collections of sources newly introduced into scholarly discourse were named in a propagandist and clearly inappropriate fashion, including from a standpoint of Soviet statehood (e.g., [Materialy po istorii, 1942](#)).

Contemporary research on the subject appears to be a lot more objective from a standpoint of impartiality. Most of this research covers the actual development and operation of the education system in the Caucasus as a whole (without a particular focus on any of its specific regions). Scholars N.A. Shevchenko, E.V. Vidishcheva, and O.V. Emelyanova have focused on the periodization of the development of education in the Caucasus and analysis of the quantitative and national makeup of the student body in the region's educational institutions, with lots of statistical information provided ([Shevchenko et al, 2016](#)).

Of major interest is a study by A.A. Cherkasov devoted to the process of development of all-Russian general (public) education during the reign of Emperor Nicholas II (1894–1917) ([Cherkasov, 2011](#)). The characteristics of the development of the public education system in the interrevolutionary period (1905–1917) have been explored in a work by O.V. Natolochnaya, N.I. Kryukova, and S.I. Buslaev ([Natolochnaya et al., 2016](#)).

In the context of the present work, definitely worthy of mention is a work by L.S. Gatagova that explores the efforts of the Tsarist government in the area of implementing public education in the Caucasus and integrating the region's education system into the all-Russian system in the 19<sup>th</sup> century ([Gatagova, 1993](#)).

Rulemaking activity in the area of education by the imperial government in the period between the 1840s and 1870s and its role in the process of integration of the Caucasus's education system into the Russian public education system have been explored by E.I. Kobakhidze ([Kobakhidze, 2015](#)).

In terms of related research by foreign scholars, worthy of particular mention is a work by Georgian researchers I. Shiukashvili and M. Gogitidze that provides an in-depth analysis of issues related to the making of the Tiflis Cadet Corps ([Gogitidze, Shiukashvili, 2016](#)).

While the above publications form but a small portion of the works devoted to the making of the Caucasus's education system and its integration into the all-Russian system, the authors regard them as of the greatest interest to the present study.

#### **4. Results**

Above all, it is worth accurately defining the study's object, for as an administrative unit Tiflis Governorate was created only in 1846, while as a purposeful policy the state's education policy for this region began to be implemented with the launch of the ministerial reform, i.e. starting in 1802. Tiflis Governorate was the successor of Georgian-Imereti Governorate, established in 1840, which, in turn, was formed of the following three regions – Georgian Governorate (created in 1801), Armenian Oblast (1828), and Imereti Oblast (1811). Given the geographic scope reflected in the name (i.e. Tiflis Governorate), at first glance the chronological scope should also be treated accordingly (i.e. the period the administrative unit was in existence) – 1846–1917. However, administrative division in the region changed, whereas its geographic elements (areas and populated localities within it) remained the same. Therefore, considering that the present work is focused on the state's education policy, rather than administrative division, in the region, it may be worth also examining briefly the education system that was in place in the region prior to the emergence of Tiflis Governorate, i.e. in its future areas.

Thus, the present study's "geographic" object is the following populated localities within Tiflis Governorate (in descending order by population size as at 1897; these were uyezd centers): the city of Tiflis (160,000), the city of Akhaltsikhe (15,500), the city of Telavi (14,000), the city of Gori (10,000), the city of Signagi (9,000), the city of Akhalkalaki (5,500), the village of Shulaveri (4,500), the city of Dusheti (2,500), the city of Zaqatala (3,000), and the village of Tianeti (1,000). Chronologically, the study covers the period 1802–1917.

As evident, the governorate's capital had an overwhelming edge over the other cities in population size. This factor, as will be shown below, had a major effect on the quality of education too, as it is in Tiflis that the best educational institutions were located. Note that the number of residents in an administrative center did not always correspond with the size of the population in the uyezd it represented. For instance, the village of Shulaveri (the administrative center of

Borchaly Uyezd) had a population of around 4,500, whilst the uyezd's was nearly 129,000; the large city of Telavi had nearly 14,000 residents, whilst the population of Telavi Uyezd was just around 67,000 ([Vseobshchaya perepis' naseleniya, 1897](#)).

Another important consideration to touch upon is the chronology of the process of implementation of imperial education policy in the Caucasus. As fairly suggested by a number of researchers (e.g., [Shevchenko et al, 2016: 364](#)), the process of making of the pre-revolutionary education system in the Caucasus can nominally be divided into the following three stages:

- 1) the period 1802–1834 – the start of the process of implementation of public education in the Caucasus;
- 2) the period 1835–1871 – centralization of the educational process and stiffening of requirements for the quality of teaching;
- 3) the period 1872–1917 – the end of the process of integration of the Caucasus's educational institutions into the public education system of the Russian Empire.

A significant amount of information on the process of making of the education system in Tiflis Governorate is provided in 'A Statistical Description of Transcaucasian Krai', published by O.S. Evetsky in 1835 ([Statisticheskoe opisanie, 1835](#)).

The Caucasus Educational District comprised four departments (the so-called 'directorates for schools'): Tiflis, Kutais, Stavropol, and Black Sea Host (its ambit included the areas of the Black Sea Cossack Host\* and the coastline of the northeastern part of the Black Sea region).

The Tiflis Directorate for Schools oversaw educational institutions within the following three governorates: Tiflis, Shamakhi, and Derbent. The actual educational institutions were as follows ([Polozhenie ot 29.10.1853: 4](#)):

- the Tiflis gubernia gymnasium;
- the higher four-grade school in Shamakhi;
- the uyezd commercial school in Tiflis;
- the eight district schools in Gori, Signagi, Telavi, Elisabethpol, Nukha, Shusha, Baku, and Derbent (in Tiflis Governorate – in the first three areas);
- the four "initial" schools in Dusheti, Tianeti, Lankaran, and Quba (in Tiflis Governorate – in the first two areas).

Thus, at 1853 the Tiflis Directorate for Schools permanently oversaw a total of 15 educational institutions, with seven of these located in Tiflis Governorate, which is testimony to the government's increased attention to this particular area. This could be attributed both to the area's sizable population and to its well-developed infrastructure and economy.

The fundamental outcome of the work conducted by the Tsarist government in terms of implementing the education system in Tiflis Governorate (1802–1835) was a network of continually operating gymnasia and schools. In this respect, there is validity in the view of the above-mentioned author of a statistical publication O.S. Evetsky that "the opening of gymnasia and schools helped provide all classes of the citizenry with the means to nurture their youth and lay a solid groundwork for the education of Transcaucasia's residents" ([Statisticheskoe opisanie, 1835: 244](#)).

However, the network was not large and its operation was not particularly centralized, i.e. the region had yet to arrive at an education system that would operate based on uniform principles, standards, and curricula. Therefore, the government's next step in developing the education system in the Caucasus was to centralize it (1835–1871).

Below is a detailed overview of a fundamental document that thoroughly covers the centralization and popularization of education in Tiflis Governorate – the Statute 'On the Caucasus Educational District and Educational Institutions' of October 29, 1853.

Pursuant to the Statute, all educational institutions under the Ministry of Public Education operating in the region would form a special educational district, the Caucasus Educational District, and, accordingly, be subject to the authority of the Viceroy of the Caucasus ([Polozhenie ot 29.10.1853: 1-2](#)). The statute is a fundamental document substantiating the intensification of the process of integration of the Caucasus's education system into the all-Russian system and its

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\* The Black Sea Cossack Host was created in 1787, under the reign of Catherine II, to help protect the northeastern part of the Black Sea area against units loyal to Zaporozhian Cossackdom (eliminated earlier). It was the precursor to the Kuban Cossack Host (officially formed in 1860).

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centralization. It clearly set out the goals, objectives, and working principles for not only public educational institutions (e.g., gymnasia, four-grade schools, and uyezd and district schools) but private institutions as well (boarding schools and private schools; this also included the activity of “home teachers” (family tutors)) (Polozhenie ot 29.10.1853: asset 10). Essentially, these goals and objectives were similar to those stipulated for educational institutions in other regions of the empire. The overall administration of the Caucasus Educational District was to be performed by the Trustee, who not only was to oversee the region’s education system but also was a member of the Council of the Main Office for Transcaucasian Krai. As evident, essentially this system of administration was similar to a gubernatorial system, where officials in charge of all public spheres, including the education sector, were subject to the authority of the governor, for the Trustee was subject to the authority of the Viceroy of the Caucasus, not the Minister of Public Education. The Statute expressly stipulated that the Trustee of the Caucasus Educational District would have the same rights and obligations as his counterparts in other regions (Polozhenie ot 29.10.1853: assets 16-18), which once again substantiates the primary objective for the document – to help integrate the region’s education system and centralize it. The Trustee was to be assisted by an aide (deputy), an inspector for public schools, an architect, an administrative support office, and a special trustee council concerned with assisting him in running the district (Polozhenie ot 29.10.1853: assets 12-13). An agency that was subject to the authority of the Trustee indirectly was the Censorship Committee (i.e., its services were enlisted upon the Trustee’s request). Understandably, the Trustee did not have authority over private educational institutions and those run under the aegis of other ministries. Note also that the post of trustee was not new – it was introduced back in 1803 via The Preliminary Rules for Public Education, i.e. essentially around the time that the Ministry of Public Education was created. On a side note, the Ministry of Public Education was established via Alexander I’s manifesto ‘On the Establishment of the Ministries’ of September 8, 1802, a move undertaken with a view to helping better educate the nation’s youth and spread science throughout it.

Along with the Aide, the Trustee Council included the Inspector for Public Schools, the principals of schools within Tiflis Governorate and other governorates within the Caucasus Educational District, inclusive of the lands of Black Sea Cossackdom, and functionaries appointed by the Viceroy to handle various issues related to education within the district.

Each type of educational institution had a chapter devoted to it within the Statute. The operation of the region’s gymnasia and boarding schools at them was substantively regulated by the Statute’s Chapters 3 and 4, respectively.

The Statute expressly set out the objectives for the region’s gymnasia: preparation of young people for public service, preparation of capable students for university, and provision of willing students with the knowledge to set them on course to succeed in areas other than public service (Polozhenie ot 29.10.1853: asset 26). The capitals of each governorate within the district were to have in operation one gymnasium. In Tiflis Governorate, there, accordingly, was one in Tiflis. The “patron” of the gymnasium was the honored trustee, appointed by the local nobility. Day-to-day administration of the gymnasium was performed by the principal and the inspector, his aide (the equivalent of today’s head of teaching). The Statute expressly stipulated that in the event of the post of principal becoming vacant, the “closest” candidate for that post would be the gymnasium’s inspector (Polozhenie ot 29.10.1853: asset 31). Inspectors (heads of teaching) were to be selected from among in-house supervisors at uyezd schools or senior (i.e. highly esteemed) instructors at the gymnasium itself. The prerequisite to become a principal (and an inspector) was to have a higher education (i.e. university) degree or to be enrolled in a university at the time.

Just like in other governorates within the Caucasus Educational District (and throughout Russia), the program of study at a gymnasium was seven years long, which was tantamount to seven grades. There also was the “zero” (preparatory) grade – thus, all in all, the program of study was eight years long. However, the program of study could extend even beyond that. Specifically, if a student needed preparation to enter a university or become a teacher at a district school or in the lower grades of a gymnasium or a home teacher, the program of study could also include a set of special courses in addition to those taught in the institution’s preparatory and seven general grades (Polozhenie ot 29.10.1853: asset 32).

A separate article provided that the gymnasium must admit children from all the free estates only (Polozhenie ot 29.10.1853: asset 33). The Statute specified the age limit for entrants:

preparatory grade – 8–12 years, first grade – 9–13 years, second grade – 10–14 years, third grade – 11–15 years, and fourth grade – 12–16 years. The gymnasium did not admit individuals older than 16. Those whose age did not allow them to attend the gymnasium as a full student could do so only as a non-degree student.

Education in gymnasia within Tiflis Governorate was provided on a paid basis – it cost each student three rubles a year (the equivalent of three live geese in the mid-19<sup>th</sup> century). This was a relatively affordable sum for urban residents, who earned from five rubles (female domestic servants) to 15–20 rubles (petty functionaries) a month, What is more, it was cheaper than, say, in neighboring Stavropol Governorate, which was a more well-to-do region (five rubles a year). Separate provision was made for the cost of tuition for relatively well-to-do families – it could be raised to five rubles a year with the approval of the Viceroy ([Polozhenie ot 29.10.1853: asset 37](#)). However, the cost was quite high for the majority of rural residents. Not many rural families could afford being left without a helper after sending their child to the city, no matter if the individual was still young at the time. It is also worth remembering that serfdom was abolished in Russia in 1861, i.e. eight years subsequent to the adoption of the Statute – as already mentioned above, only members of the free estates were allowed to attend a gymnasium. Therefore, in the 1850s attending gymnasia in Tiflis Governorate (just like throughout the Russian Empire) was something that mainly urban citizens could afford.

Of interest is the roster of courses taught in gymnasia within the Caucasus Educational District. Notably, it was expressly stated that the roster would be entirely the same as in any other gymnasium in Russia: Orthodox God's Law, Russian, Mathematics, Geography, History, Physics, Mathematical and Physical Geography, Natural History, Penmanship, Drafting, and Drawing. Separate provision was made for the roster of disciplines in the Tiflis gymnasium: in addition to the above, instruction was to be provided in Armenian Gregorian God's Law, Roman-Catholic God's Law, Moslem God's Law (with these taught to members of the respective faiths), Georgian, Tatar, and Armenian (with these taught to members of the respective ethnic groups).

The differentiation of didactic content in the Tiflis Gubernia Gymnasium depended on the students' vocational preferences as well. More specifically, if a student wished to be in public service, they additionally would have to take the Russian Jurisprudence course. Similarly, if a student planned on entering an institution of higher learning, the program of study would incorporate courses such as Latin and/or French ("as required"). Future gymnasium teachers were taught courses such as Pedagogics and Didactics. The principle of differentiation of the educational process was upheld through the Statute providing for the introduction of courses such as Agriculture, Auxiliary Sciences, Practical Mechanics, and Chemistry (although instruction in them required permission from the Viceroy and was to be provided only to students willing to enter service) ([Polozhenie ot 29.10.1853: asset 38](#)).

Upon being proposed by the Trustee of the Educational District and approved by the Viceroy, the roster of courses could be expanded even further. The roster of "core" courses was developed by the Ministry of Public Education, and these were taught via ministerial curricula exclusively. "Optional" courses could be taught via "regional" curricula as well, this requiring approval from the Viceroy. Thus, while staying true to the principle of having a centralized education system, the government tried not to overlook the importance of the regional component too.

The Tiflis gymnasium had in place a set of core "regional" courses too, like Georgian and Tatar. Armenian was to be taken only by members of the Armenian ethnic group.

The teaching workforce in all gymnasia within the Caucasus Educational District was divided into the following two major categories – "senior" and "junior" teachers. The first category included teachers of Russian, Mathematics, Physics, and Jurisprudence. In terms of the Tiflis gymnasium specifically, this group also included instructors of Natural Sciences, Agriculture, and Latin. The category of junior teachers incorporated teachers of languages and other sciences, as well as instructors of the arts ([Polozhenie ot 29.10.1853: asset 42](#)).

A few words will now be said about the schedule of classes. Each school day comprised four classes and ran from 8 am to 2 pm. The schedule was established by the Trustee of the Educational District. In the event of teachers being unable to work due to illness, the teaching of the disciplines handled by them was entrusted to other teachers, with the person's pay remaining in place if it was a short sick leave. As a rule, the school year began on January 1 and ran to the end of the calendar year. Exams were held between November 15 and December 23. There was a summer break. In the

Tiflis gymnasium, the summer break ran from July 1 to September 1 (as was the case throughout Transcaucasia).

Each gymnasium ran a “noble boarding school”, which was intended to help ease, materially and organizationally, the process of receiving education for members of the highest (noble) estate. The boarding school at the Tiflis gymnasium had 120 places, with 65 of these wholly funded by the state. The Statute expressly stipulated the number of places based on intra-estate gradation: 30 places for children of “princes and nobles”, 20 places for children of “honored Russian officials, descended from hereditary nobles predominantly”, and 15 places for children of “honored Moslems from the highest estate and Armenian meliks”<sup>\*</sup>. The rest of the places were called ‘half-public’ and were funded jointly by the state and the parents: the state provided 50 rubles to cover the children's education and living expenses, and the parents contributed another 40 silver rubles<sup>†</sup> towards their uniforms ([Polozhenie ot 29.10.1853: asset 48](#)). Successful boarding school students could go on to enter a university, with this funded entirely by the state. The region's boarding schools admitted children aged no younger than nine and no older than 15 years.

The statute's Chapter 5 deals with higher four-grade schools. The law expressly stipulated the key objective for these schools – provide the population with higher education where there had yet to be established gymnasia. It also was possible for district schools to be transformed into higher four-grade schools. It was a common practice for higher schools to incorporate ‘noble boarding schools’. The region's first-ever higher four-grade school was established in the city of Shamakhi, the administrative center of neighboring Shamakhi Governorate. A key difference between these schools and gymnasia was their openness to children from all the estates, not only the free ones. Having said that, it is somewhat hard to imagine children of peasant serfs attending a facility of this kind, especially considering the special nature of life in the Caucasus back then. Another crucial difference is that education in the higher four-grade schools was totally free (with the exception of services provided at the boarding schools). The roster of disciplines taught was similar to that in the gymnasia.

Initially, the region's higher four-grade school was a “one-of-a-kind” institution, whereas there were many district and uyezd schools in operation in it. Specifically, Tiflis Governorate had in operation three uyezd schools (see above). The governorate's capital, Tiflis, had in operation a specialized commercial school as well.

Both types of school were uniestate. One of the objectives behind establishing them was also to prepare a teaching workforce for lower “initial” schools and private schools.

Day-to-day administration of the facility was performed by the supervisor (selected from among the most responsible and dedicated teachers). The person above the supervisor was the “honored supervisor” (selected from among esteemed citizens). This post was “buyable” (one could become an “honored supervisor” for the immodest sum of 500 silver rubles. Nobles were magnanimously exempted from paying this “contribution” ([Polozhenie ot 29.10.1853: asset 82](#)). The school's principal (this post coexisting alongside the post of supervisor) was in charge of organization of academic work (i.e., being, in essence, a head of teaching).

For the most part, the region's district and uyezd schools were two-grade. If an institution could afford it, it could also have both a preparatory grade and a third grade. The post of teacher was offered to pedagogues with a higher education or a gymnasium degree received through the completion of a special program of study in pedagogics within the Caucasus Educational District. In Tiflis Governorate, compared with some other districts, district schools did not have boarding schools running at them.

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<sup>\*</sup> In the Armenian feudal hierarchy, the title of melik (from Arabic: ملك malik (king)) was the equivalent of the title of prince in Russian noble tradition. A synonym of it that is often used in the historiography is another princely title – ishkhani (from Armenian: իշխան (prince, lord, master). This appears to be not quite correct, as the melik (despite the existence of different hierarchies and groups even within the title itself) initially had “independent”, “khan”, or “royal” (using European terminology) roots and, unlike the “serving” ishkhani, was in the old days a sovereign ruler.

<sup>†</sup> On the eve of the Crimean War, the government experienced much difficulty due to a shortage of precious metals, which urged it to collect payment in silver. As a consequence, in Russian society the silver ruble had more value than its paper counterpart.

The schools had easier subjects compared with the gymnasia, which is quite logical. Instruction was provided in God's Law, Russian, Russian Grammar, Local Language, Arithmetic, Brief Geography (general and Russian), Brief History (general, Russian, and local), Introductory Geometry, and Penmanship.

In addition to the above disciplines, noble students were also taught the equivalent of today's commercial law (e.g., Judicial Procedures and Action (with Exercises), Accounting, etc.). Schools in Tiflis Governorate also taught Georgian, with the express requirement that the mother's tongue be taught by an Orthodox Christian teacher of God's Law. The roster of disciplines taught could be expanded via an edict by the Viceroy. The study break in Tiflis Governorate ran from July 1 to September 1.

The region's schools were totally free to attend. What is more, no special knowledge was required to enroll in the preparatory program of study ([Polozhenie ot 29.10.1853: asset 94](#)). The above facts unequivocally attest to the aspiration of the Tsarist government to implement literacy across the board, which, in essence, was done on a liberal basis – no one was forced to go to school, but the conditions that would urge the people to do so were, actually, there. In this respect, it is hard to agree with the assertion by many of the Soviet historians of education that the government succeeded in spreading literacy throughout the nation only under the Soviets – which was achieved thanks to the launch of a campaign against illiteracy. The key difference is that during the period that campaign was being implemented everybody, regardless of age and gender, was forced to go to school, which is what actually explains the efficiency of the process of spreading literacy in the USSR in the 1920–30s.

Apart from district and uyezd schools, the region also had in operation so-called "initial" schools. These institutions were set up "when decidedly necessary" and with permission from the Viceroy of the Caucasus ([Polozhenie ot 29.10.1853: asset 109](#)). However, certain initial schools were established in a compulsory manner and were maintained at the state's expense. In Tiflis Governorate, there were initial schools in the city of Dusheti and in Tianeti, a large village.

These schools admitted only boys aged at least eight. They were free to attend and required of students no initial knowledge of any kind. The program of study was either one year long (one-grade) or two years long (two-grade). The two-grade program of study incorporated disciplines that could be taught to members of particular estates. This is another example attesting to the region's differentiated education system.

The core disciplines included God's Law (depending on the faith, it was taught to Orthodox Christians, Catholics, and Moslems), reading and writing in Russian combined with practical learning of spoken Russian, reading and writing in the local language, and the basics of arithmetic (the four core operations and operations with "abstract and concrete numbers") ([Polozhenie ot 29.10.1853: asset 115](#)). God's Law was taught not by teachers but by members of the local clergy.

The two-grade program of study additionally included Brief Catechetics and a Brief Holy History, Brief Russian Grammar, Brief Arithmetic (e.g., common fractions and operations with them), and Penmanship.

The special program of study included Agriculture, Horticulture, and, as elective courses, Merchant Book Keeping (a course to be taken by those willing to work in an area with a well-developed trade infrastructure), advanced study of a local language, and advanced study of trade terminology.

Pedagogical personnel were selected by the principal from among persons with at least a gymnasium-level education. Teachers were paid a salary of 200 silver rubles a year (16.7 rubles a month), which at the time was a medium-level salary tantamount to the pay of a lower-level official.

By default, the school year began on January 1, but decisions regarding the study break and exam schedules were made by the principal in coordination with the trustee based on the region's seasonality. A new administrative post was introduced in the region's initial schools – the "honored guardian" (selected from among the more esteemed citizens).

Of course, the statute provided for private education as well: boarding schools, schools, and schooling via home teachers (male and female family tutors).

The region's boarding schools were divided into two major types. The first category included facilities founded wholly on private capital (which includes charitable contributions) with curricula designed by the institution. The second category included boarding schools at state-run institutions

serving children whose parents could not afford their education. However, those boarding schools had very few places available in them (see above). In this respect, the Soviet education system, which was based on the principles of socialist economics, proved a lot more efficient, as it did provide across-the-board education in a compulsory manner, whilst the economy of the Russian imperial period, founded on the capitalist paradigm, clearly could not afford this.

Boarding schools of the second type typically had the following personnel on staff: keepers (caretaking personnel) and overseers (educators, who guided the children through school, the equivalent of pedagogues in Ancient Greece). Girls were allowed to attend first-type boarding schools only. Personnel at boarding schools of the second type could not run boarding schools of the first type or handle their student body – this was directly provided for by the law. The law did not regulate the level of education for instructors in boarding schools, but only held that “the post of instructor in private boarding schools could be held only by persons who had the right to do so”. Presumably, this could be a school graduate who had completed a special program of study (i.e. a pedagogue meeting the lowest requirements for the teaching job).

The region’s private educational institutions included initial schools, which provided instruction to children of both sexes and of all estates in literacy\*, the local languages, and prayers of a particular religion ([Polozhenie ot 29.10.1853: asset 141](#)). Girls and boys had to attend separate schools, as the law directly prohibited them from pursuing education together within one school. These schools had no exams or any other graduation requirements. To get a job in them, teachers had first to complete a qualification assessment (“a test of knowledge of certain subjects”) in a district school and obtain a certificate on completion thereof. In Tiflis Governorate, the duty of supervising the operation of private schools in Tiflis was entrusted to school principals, and in other cities and villages this was the duty of in-house supervisors.

Home-based education was regulated as well. To be a home teacher, one had to have completed a special program of study (Home-Based Instruction) at a gymnasium and have a length of teaching service of at least six years ([Polozhenie ot 29.10.1853: assets 145-146](#)).

Teaching personnel in the Caucasus Educational District were to be employed based on a special regulation. The post of district trustee was to be held by an official with a rank of no lower than Grade 1 in the Table of Ranks. In addition to the core salary, this position paid an additional 1,200 rubles a year. The aide to the district trustee, a Grade 5 official, had a salary of 2,000 rubles a year (166.7 rubles a month), plus an additional food and housing subsistence allowance of 1,200 rubles a year. School inspectors were paid 1,200 rubles a year (100 rubles a month) and were entitled to compensation for subsistence expenses, a sum of 720 rubles a year. A censor (Grade 7) was paid 1,000, a Tiflis school principal (Grade 6) – 1,200, a gymnasium inspector (Grade 7) – 900, a senior instructor (Grade 9) – 800, a junior instructor (Grade 10) – 500–600, a boarding-house overseer (Grade 12) – 300, a commercial school overseer (Grade 8) – 700, and a school teacher – 400–900 rubles a year (the numbers listed here reflect the region’s core salaries only, i.e. they are exclusive of the various subsistence allowances and other types of financial assistance) ([Shtat KUO](#)). The above statistics suggest quite decent financial support for educational functionaries and efficient stimulation of their career growth. An appendix to the regulation set out a detailed list of all official positions and salaries for educational functionaries, which helped minimize abuse of power by top officials.

Understandably, the 1853 Statute, signed into law by Nicholas I, with his quite a specific view of the world order as a whole and Russian society in particular, “had no room” for public (i.e. free) unistate female vocational secondary education and higher education, which could be offered only privately. This gap was remediated during the reign of his son, Alexander II, under whom the education system did become unistate and across-the-board. Another important fact worthy of mention (which, in particular, is fair in relation to female education, given the unique mentality of the region’s population) is the significant role played by Empress Maria Alexandrovna, who could bring “direct” pressure to bear on the emperor in relation to the development of the education system – and not only the education system, with the Red Cross and dozens of charitable organizations (shelters, poorhouses, societies, etc.) and hospitals being under her direct patronage as well. It is hard to disagree with the fact that it was Empress Maria Alexandrovna who laid the groundwork for a

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\* The term ‘literacy’ hereinafter implies the four core operations in arithmetic and reading, writing, and speaking in Russian.

new period in the history of female education in Russia through the establishment of open, uniestate female educational institutions (gymnasia) (Fedorchenko, 2003: 91).

## **5. Conclusion**

Summing up, it is worth underscoring the following:

1) The system of educational institutions in Tiflis Governorate comprised a gubernia gymnasium and a district commercial school in the region's capital, three district two- and three-grade schools in the cities of Gori, Signagi, and Telavi, two lower ("initial") one- and two-grade schools in the city of Dusheti and the township of Tianeti, and a few private schools. The network of educational institutions included boarding schools, both private and public (which operated as part of the region's gymnasia and schools).

2) The operation of the region's educational institutions was thoroughly regulated by the Statute 'On the Caucasus Educational District and Educational Institutions' of October 29, 1853, intended to help integrate the Caucasus's education system into the all-Russian system and centralize it.

3) The highest official within the education sector in the Caucasus Viceroyalty was the Trustee of the Educational District (the equivalent of today's regional minister of education) – a Grade 4 official who was directly answerable to the viceroy. Statutorily, the vertical hierarchy of personnel within the education sector was enshrined in law in a most exhaustive manner.

4) A salient testimony to the successful integration of the Caucasus's education system into the all-Russian system is the requirement of compulsory instruction in Russian, as the official language, in all educational institutions in Tiflis Governorate. The region's private schools and boarding schools likewise were expected to provide instruction in Russian.

5) Public education was guaranteed for boys only – girls could pursue education only privately. Except for gymnasium education, education for males was uniestate. The education reform initiated by Alexander II largely helped remediate these flaws, making the imperial education system across-the-board and uniestate (if on a voluntary basis). Compared with the efficiency of the process of implementation of compulsory primary education during the Soviet period, the outcomes were less effective, which was due to a completely different economic paradigm. The Russian Empire's capitalist economy was primarily oriented at deriving profit and achieving corresponding boosts in production, whilst the socialist model of a commanding economy followed in the Soviet Union was based on compulsion.

6) Educational functionaries (including teachers) were paid quite decent salaries, while the system of staffing and payroll management was regulated at the statutory level, which helped minimize abuse of power by top officials.

7) The law provided for the differentiation of education. Students could choose to not only attend a particular department but take particular courses as well. This kind of differentiation was associated with a set of estate-related and regional preferences. For instance, in Tiflis Governorate the key focus was on the economic-commercial sphere (e.g., disciplines such as Agriculture, Horticulture, Commerce, etc.), whilst in the areas of Black Sea Cossackdom it was on military science (e.g., courses such as Fencing, Gymnastics, Military Science, etc.). At the same time, there also was a set of "core" disciplines that were taught, which included God's Law (depending on the faith, it was taught to Orthodox Christians, Catholics, and Moslems), Russian, Arithmetic, and Local Language. The region's public educational institutions provided education by way of curricula established by the Ministry of Public Education.

Essentially, the process of integration of the system of public education in Tiflis Governorate into the all-Russian system and its centralization was completed by 1871. Throughout the country, there now was in operation a network of educational institutions with uniform standards in place with regard to school administration and curricula. This made it possible to move on to the next stage in the process of spreading literacy in the outlying regions of the Russian Empire – to enable more of its citizens to receive public education.

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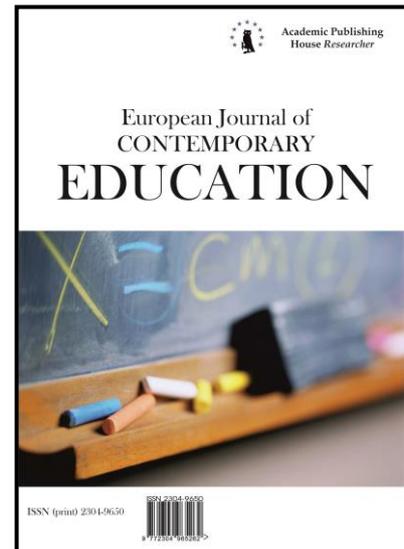
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### **The History of the Public Education System in Vilna Governorate (the Second Half of the 19<sup>th</sup> and Early 20<sup>th</sup> Centuries). Part 3**

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#### **Abstract**

This paper examines the public education system in Vilna Governorate in the period between the second half of the 19<sup>th</sup> and early 20<sup>th</sup> centuries. This part of the work analyzes the system's development in the period 1908–1917.

The authors drew upon a body of archival documentation from the Russian State Historical Archive (Saint Petersburg, Russia), a pool of statistical data published in Memorandum Books for Vilna Governorate in the period from 1880 to 1915, and an array of statistical data on the Vilna Educational District published in the scholarly journal *Zhurnal Ministerstva Narodnogo Prosveshcheniya*. The authors made use of certain regulatory documents as well.

The authors' conclusion is that by the end of 1914 students in Vilna Governorate accounted for a mere 50 % of the total number of school-age children in the region. The governorate was still far from the introduction of compulsory primary education, as it had a motley ethnic makeup and large numbers of Catholics, Jews, and Dissenters. Of note is the fact that in the last pre-war year the region witnessed a sharp increase in the number of Catholics in attendance at its educational institutions. As early as 1915, in light of the "Great Retreat" of the Russian army, a portion of the educational institutions were evacuated to the empire's central regions, with the percentage of students, thus, starting to decline.

**Keywords:** Vilna Governorate, public education system, primary schools, secondary education.

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## 1. Introduction

Vilna Governorate was an administrative-territorial unit in the Russian Empire, with its capital being the city of Vilna (present-day Vilnius). At present, most of the area is part of Belarus, with the rest of it, including the capital, forming part of Lithuania. This part of the work examines the development of the public education system in Vilna Governorate in the period 1908–1917.

## 2. Materials and methods

The authors drew upon a body of archival documentation from the Russian State Historical Archive (Saint Petersburg, Russia), a pool of statistical data published in Memorandum Books for Vilna Governorate in the period from 1880 to 1915, an array of statistical data on the Vilna Educational District published in the scholarly journal *Zhurnal Ministerstva Narodnogo Prosveshcheniya* ([Nizshie uchilishcha, 1878](#); [Nizshie uchilishcha, 1879](#); [Srednie uchebnye zavedeniya, 1896](#); [Sbornik svedenii, 1873](#)), and several regulatory documents (e.g., the Edict on the Establishment of the Educational Districts ([Imennoi ukaz, 27](#))).

In conducting the research reported in this paper, the authors employed both general methods of research, including concretization and summarization, and traditional methods of historical analysis. Use was made of the historical-situational method to explore particular historical facts in the context of the era under study in conjunction with various “neighboring” events and facts.

## 3. Discussion

Generally, there is a paucity of historiography on the public education system in Vilna Governorate. Prior to the 1860s, the system is not mentioned even in the memorandum books. However, starting in the 1890s, along with descriptions of the education system in specific years ([O-v, 1895](#); [O-v, 1896](#); [O-v, 1898](#); [Il'in, 1905](#); [Il'in, 1905a](#)), there even emerge some real research studies on the subject. Most researchers regard I.P. Kornilov's ‘The Russian Cause in Northwestern Krai’ as the first-ever work of this kind produced in the pre-revolutionary period ([Kornilov, 1901](#)).

During the Soviet time, the subject was explored in the context of the history of the national republics. For instance, the subject of public education in Belarus was investigated by I.M. Il'yushin and S.A. Umreiko ([Il'yushin, Umreiko, 1961](#)). During the post-Soviet period, the subject was now investigated by scholars from two republics – Lithuania and Belarus ([Aleksandravičius, Kulakauskas, 1996](#); [Sergeenkova et al., 2008](#); [Ershova, 2006](#)), as well as from the Russian Federation ([Korotkov, 1993](#)).

Of major significance to the analysis of related historiography are works on the development of the public education system in other governorates, including Vologda Governorate ([Cherkasov et al., 2019](#); [Cherkasov et al., 2019a](#)), Vyatka Governorate ([Magsumov et al., 2018](#)), and Don Oblast ([Peretyatko, Zulfugarzade, 2017](#); [Peretyatko, Zulfugarzade, 2017a](#)), as well as the Caucasus ([Natolochnaya et al., 2018](#); [Magsumov et al., 2018](#); [Shevchenko et al., 2016](#)). Approaching the issue from this angle helps examine it by way of comparison across the various regions of the nation.

## 4. Results

The Vilna Educational District was among the first six educational districts created in the Russian Empire via Emperor Alexander I's edict of January 24, 1803 ([Imennoi ukaz, 27](#)). At the time of its establishment, the district incorporated educational institutions in eight governorates: Vilna, Vitebsk, Volyn, Grodno, Mogilev, Minsk, Kiev, and Podolia. The Main Vilna School was made the district's educational and administrative center. It would later be transformed into Imperial Vilna University via an edict of April 4, 1803. During the first 80 years of the operation of the Vilna Educational District, the development of the public education system in Vilna Governorate was quite a complicated process. These complications were associated with (1) the motley ethnic makeup of the region's population and (2) the peasants' stereotyped image of education as useless. Subsequent to the abolition of serfdom and thanks to the implementation of a series of administrative governance reforms, the situation would ultimately change, with the process of development of the education system gaining new momentum both in the region and throughout the nation.

[Table 1](#) illustrates the development of the public education system in Vilna Governorate during the period 1861–1914.

**Table 1.** Numbers of Educational Institutions and Students in Vilna Governorate (1861–1914) (Natolochnaya et al., 2019: 661; Pamyatnaya knizhka, 1885: 18; Pamyatnaya knizhka, 1889: 62; Pamyatnaya knizhka, 1892: 124, 126; Pamyatnaya knizhka, 1898: 267-269; Pamyatnaya knizhka, 1901: 26; Pamyatnaya knizhka, 1913: 36; RGIA. F. 733. Op. 207. D. 39. L. 1; Vsepoddanneishii otchet, 1916: 122-123)

Year	Number of educational institutions	Number of students	Average number of students per educational institution
1861	145	5,728	39.5
1900	1,624	55,755	34.3
1908	1,529	71,374	46.6
1909	1,540*	72,242	46.9
1910	1,550	78,119	50.4
1911	1,589	85,620	53.9
1914	1,086	84,802	78.1

As evidenced in Table 1, the period 1908–1911 witnessed a gradual increase in the region’s average number of students per school. In 1914, there was a sharp rise in that number. The thing is that in 1914 the region started to witness a decline in the number of educational institutions due to the mass closure of grammar schools and shifting of urban educational institutions to higher primary institutions.

In 1914, Vilna Governorate had the following state of affairs in terms of the number of schools run by the Department of Religious Affairs: two-grade – 7, one-grade – 231, and rural grammar schools – 177. The 415 educational institutions had a combined enrollment of 17,291 (9,446 boys and 7,845 girls). Thus, there were 41.6 students per church school. That being said, there were an average of 26 students per grammar school, 109 students – per two-grade school, and 52 students – per one-grade school (Vsepoddanneishii otchet, 1916: 122-123).

At January 1, 1915, the total number of students in attendance at the region’s educational institutions run by the Ministry of Public Education was 67,511 (RGIA. F. 733. Op. 207. D. 39. L. 1).

It is worth noting that at 1915 the total number of children of school-going age in the governorate was 183,658 (RGIA. F. 733. Op. 207. D. 39. L. 1), with 84,802 of these attending the region’s church and ministerial schools at the time. However, the two bodies of authority were not the only ones that had schools run under their auspices in the region. For instance, the Ministry of Trade and Industry ran an eight-grade commercial school and a trade school. The Office of the Institutions of Empress Maria ran a female Mariinsky gymnasium. The Ministry of Railways ran a technical railway school and a school of the Vilna Railway Club. Along with the church schools, the Department of Religious Affairs ran the Lithuanian Ecclesiastical Seminary, a male ecclesiastical school, a female ecclesiastical school, a female three-grade diocesan school, and a diocesan Roman-Catholic seminary. The region also had in operation one facility run by the Department of Military Affairs – the Vilna Military School (Pamyatnaya knizhka, 1915: V-IX). Thus, it may be assumed that by the end of 1914 the total number of students in Vilna Governorate accounted for around 50% of all children of school-going age in the region. As early as 1915, in light of the “Great Retreat” of the Russian army, a portion of the educational institutions were evacuated to the empire’s central regions, with the percentage of students, thus, starting to decline.

The key reason behind the low figures was the region’s motley ethnic makeup. Specifically, by January 1, 1912 the population was 1,709,000, with 467,000 of these being Orthodox Christians, 25,500 – Old Believers, 1,081,000 – Catholics, 131,500 – Jews, and 3,300 – Moslems, with members of the rest of the faiths accounting for a minor percentage of the population (Pamyatnaya knizhka, 1913: 2).

\* Approximate figure, as precise data are not available.

**Table 2.** Departmental Affiliation of Educational Institutions in Vilna Governorate (1884–1914) (Pamyatnaya knizhka, 1885: 18; Pamyatnaya knizhka, 1887: 15-16; Pamyatnaya knizhka, 1889: 60-62; Pamyatnaya knizhka, 1892: 124, 126; Pamyatnaya knizhka, 1898: 267-269; Pamyatnaya knizhka, 1901: 26; Pamyatnaya knizhka, 1913: 36)

Year	Directorate for Public Schools	Diocesan clergy	Department of Military Affairs
1884	332	4*	1
1900	845 <sup>†</sup>	778	1
1908	827	701	1
1909	837	703	1
1910	842	708	1
1911	1,051	538	1
1914	648	420	1

As evidenced in Table 2, nearly half of the region’s schools were parochial schools and grammar schools.

Of particular interest is also the development of special Jewish education in Vilna Governorate. By departmental affiliation, the region’s Jewish schools ran under the aegis of its Directorate for Public Schools. Table 3 displays the distribution of Christian and Jewish schools in Vilna Governorate.

**Table 3.** Distribution of Christian and Jewish Schools in Vilna Governorate (1891–1911) (Pamyatnaya knizhka, 1901: 40; Pamyatnaya knizhka, 1913: 36)

Type of educational institution	Number across years					
	1891	1900	1908	1909	1910	1911
Public schools	187	221	474	315	416	553
Cheders	90	496	255	241	228	302

**Table 4.** Distribution of Students in Vilna Governorate by Estate (1884–1911) (Pamyatnaya knizhka, 1885: 18; Pamyatnaya knizhka, 1889: 63; Pamyatnaya knizhka, 1892: 124-125; Pamyatnaya knizhka, 1898: 264; Pamyatnaya knizhka, 1913: 27-33)

Estate, children of	Year				
	1884	1888	1892	1898	1911
Nobles and functionaries	2,337	2,621	2,862	3,156	2,723
Persons of ecclesiastical status	562	470	594	567	513
Members of the urban estates	5,422	7,162	7,668	7,947	2,413
Members of the rural estates	9,128	12,122	11,074	14,397	2,561
Persons of military status	29	27	127	82	-
Foreigners and raznochintsy	119	67	84	76	32
Total	17,597 <sup>*</sup>	22,469	22,409	26,225	8,242 <sup>§</sup>

As evidenced in Table 4, during the period spanning the 1880s and early 1890s nearly 50 % of all students in attendance at the region’s schools run under the aegis of the Directorate for Public Schools were accounted for by members of the rural estates. Around 35 % of the student body was

\* Exclusive of parochial schools

† Inclusive of 563 special Jewish institutions

‡ Exclusive of students in attendance at the region’s parochial schools

§ Data not available on students in attendance at the region’s lower, primary, and parochial educational institutions

accounted for by members of the urban estates and less than 15 % – by children of nobles and functionaries. At the very end of the 19<sup>th</sup> century, the region witnessed a redistribution of residents in attendance at its schools. Specifically, the number of children of nobles dropped sharply – from 19.5 % in 1898 to 13.9 % in 1899 and to 4.1 % in 1900. There was a decline in the number of members of the urban estates as well (1898 – 26.5 %, 1899 – 25.6 %, and 1900 – 11.9 %). At the same time, there was a sharp rise in the number of members of the rural estates (1898 – 54 %, 1899 – 60.5 %, and 1900 – 84%) (Pamyatnaya knizhka, 1901: 37). Unfortunately, the data for the year 1911 are incomplete, which makes it difficult to put together a data sample on the estates.

**Table 5.** Distribution of Students in Vilna Governorate by Faith (1884–1911) (Pamyatnaya knizhka, 1885: 18; Pamyatnaya knizhka, 1889: 63; Pamyatnaya knizhka, 1892: 125; Pamyatnaya knizhka, 1898: 264; Pamyatnaya knizhka, 1901: 38; Pamyatnaya knizhka, 1913: 27-33)

Faith	Year					
	1884	1888	1892	1898	1900	1911
Orthodox Christians	6,464	7,875	8,130	9,619	23,054	21,577
Dissenters	108	128	146	245	463	39
Catholics	6,590	8,187	7,777	9,995	15,341	26,114
Protestants and Lutherans	259	263	305	359	467	1,397
Jews	4,118	5,953	5,959	15,866	16,351	2,334
Karaites	7	9	23	29	434	43
Moslems	51	54	69	112	36	186
Total	17,597	22,469	22,409	26,225	55,755	48,690

As evidenced in Table 5, during the period spanning the 1880s and 1890s the numbers of Catholics and Orthodox Christians in attendance at schools run by the Directorate for Public Schools were about the same (around 35 %), with these two groups followed by Jewish students (around 25 %). The data for the year 1900 in Table 5 are inclusive of students in attendance at the region's parochial schools and grammar schools. Based on this, the percentage of Orthodox students in the region reached 40 %. In 1911, the number of Catholics in attendance at the region's educational institutions rose sharply.

So what were the outcomes achieved by the region's public education system by 1911? As commonly known, no census was conducted at the time – so the only source covering the matter for that period might be a pool of annual military conscription data on the number of literate recruits\*. Data of this kind are available on Vilna Governorate as well (Table 6).

**Table 6.** Literacy Level across the Districts within Vilna Governorate (1902–1911) (based on materials from the Vilna Governorate Office for Military Conscription) (Pamyatnaya knizhka, 1913)

Conscription year	Vilna	Districts							Across the governorate
		Vilna District	Vileyka District	Dzisna District	Lida District	Ashmyany District	Švenčionys District	Trakai District	
1902	65.7	39.0	61.7	63.9	58.4	45.5	50.3	36.5	50.5
1908	87.1	57.1	72.5	63.2	55.7	57.9	53.9	41.0	60.3
1909	90.7	43.7	77.7	67.2	55.9	60.1	55.2	40.2	58.2
1910	80.8	42.5	78.3	56.8	49.9	52.0	54.3	36.1	54.6
1911	78.5	48.3	82.6	63.7	61.5	67.2	58.1	48.1	63.3

\* In 2011, researcher A.A. Cherkasov likewise made use of these military conscription materials (which he did extensively as part of his research into the public education system in the Russian Empire) (Cherkasov, 2011).

As evidenced in Table 6, the percentage of the literate not only varies tangibly across the region's districts and within a given year but appears to vary sharply within each district as well. The erratic percentage of the literate suggests an unstable public education system in the region, which must have been caused by the following two key factors:

- 1) the region's schools not being distributed evenly throughout its population;
- 2) quite commonly, difficulty enrolling in a school due to its being overfilled.

It should be noted that the above data on literacy rates in the region lack formal validity, as most were gathered by way of surveys of newly enrolled learners.

## 5. Conclusion

By the end of 1914, students in Vilna Governorate accounted for a mere 50 % of the total number of school-age children in the region. The governorate was still far from the introduction of compulsory primary education, as it had a motley ethnic makeup and large numbers of Catholics, Jews, and Dissenters. Of note is the fact that in the last pre-war year the region witnessed a sharp increase in the number of Catholics in attendance at its educational institutions. As early as 1915, in light of the "Great Retreat" of the Russian army, a portion of the educational institutions were evacuated to the empire's central regions, with the percentage of students, thus, starting to decline.

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