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Professional Culture of the Specialist of the Future

**CONDITIONS DETERMINING SIMULTANEOUS TEACHER
TRAINING AT THE UNIVERSITY**

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Abstract

The goal of the research is identification of effective organizational and educational conditions of bachelors' preparation for work at school. The problem of the research is that traditional organizational and educational conditions of the university baccalaureate are aimed at the preparation of qualified specialists in the areas of mathematics, physics, chemistry, biology, foreign languages etc. rather than teachers who teach the above-mentioned subjects. The research methodology is based on the 'core competence' of Dr. Gary P. Hamel. It was established that for effective preparation of teachers at the university it is necessary to implement the following organizational and pedagogical conditions: the development of the problems' matrix, the design of simultaneous professional retraining standard, implementation of classical and informational-communicational education models. The comparative study of bachelor students' readiness to work at school after professional retraining indicated the consistent growth in both biology students and physics students (an average growth was approximately 50%: from 30% to 85%).

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Keywords: A core problems matrix, organizational and pedagogical conditions, models of simultaneous teacher preparation.



1. Introduction

Many institutions of higher education of Russia and a number of countries of Eastern Europe have had to come up with a paradoxical situation recently:

- there is an acute demand for school teachers;
- universities prepare bachelors of mathematics, physics, chemistry, biology, philology etc. who are not sufficiently prepared for school work;
- curricula of bachelors' preparation do not enable to include in the sufficient amount of educational psychology, pedagogics (theory of teaching), methodology of teaching a subject, teaching practice etc.

Thus, the following problem arises: how to organize practice-oriented preparation of students for school work in the framework of a baccalaureate while there is insufficient studying of the above-mentioned subjects.

At present the critical areas of teachers' preparation within the framework of a baccalaureate and the main problems of the preparation at university have not been established so far (Galvin, 2016). For this reason, organizational and educational conditions of teachers' preparation, models of the preparation and conditions of its sustainable functioning have not been developed.

2. Problem Statement

The review of literature (Barnes & Mattson, 2017; Barsukov & Panicheva, 2016; Chapaev, 1998; Egorychev, Mardochayev, Rybakova, Fomina, & Sizikova, 2014; Gabdulchakov, Khusainov, & Kalimullin, 2016; Hsu, Hamilton, & Wang, 2015; Maslennikova, Ugarova, Shamsutdinova, Fisina, & Shigapova, 2012; Menter, 2015; Meyer, Haywood, Sachdev, & Faraday, 2008; Slastyonin, Isayev, & Shiyanov, 2002) indicates that the organizational-pedagogical conditions of prospective teachers' preparation at a Bachelor's degree program are to include the following components:

- components of education (an undergraduate and a lecturer, society and university, theoretical knowledge and hands-on experience, etc.);
- components of pedagogic education (knowledge, theories, the content of education, disciplines, directions of research);
- teaching theory, methodology of instruction, teaching training (process of teaching, its volume, forms, and technology used);
- typologic characteristics of pedagogic education (local, regional, interregional, global, subject-oriented, interdisciplinary, specific).

Such an approach is based on the data obtained in the course of research carried out both in Russia and abroad.

3. Research Questions

The analysis of the data provided by the Federal Education and Science Supervision Service as well as questionnaire surveys of school principals conducted in 2016-2018 suggest that such bachelors are not prepared enough for future work at school. Having a good command of an appropriate subject they lack

psychological and educational competencies, organizational- methodological skills as well as teaching practice. So the necessity of new organizational- pedagogical conditions of undergraduates' preparation arises. The current conditions are to preserve the traditional fundamental study of a subject as well as to provide essential psychological and pedagogical, methodological and practical preparedness of undergraduates for prospective work as school teachers.

4. Purpose of the Study

The aim of the research is determination of efficient organizational-educational conditions of undergraduates' preparation for prospective work at school.

5. Research Methods

The research methodology rests on the concept of the 'core' competency of Hamel and Prahalad (2014) associated with the formation of the management strategies according to the significant problems matrix.

The following methods were utilized in the research:

- sociological survey;
- questionnaire survey;
- Spearman correlation analysis;
- methods of comparison and generalization.

The surveys were founded on the methodology of Prigozhin (2007). According to his methodology we compiled a list of the problems of realization of organizational-pedagogical conditions for preparation of prospective teachers at a bachelor's degree program. The experts (both Russian and foreign specialists - managers of pedagogic education) were to eliminate from them those which appeared to be insignificant or repeated, consolidate the problems if it is necessary, and emphasize the most significant problems out the modified list. The key problems of formation and realization of organizational-pedagogical conditions of prospective teachers' preparation at institutions of higher education were determined after filling in the «element-free diagram» with the aid of the method of paired comparison.

Spearman correlation analysis was applied in the course of the research (Gmurman, 2004). The current analysis allowed us to correlate professional competencies of prospective teachers with a degree of realization of organizational-pedagogical conditions of teachers' preparation at a bachelor's degree program.

The concordance coefficient is a measure of concordance of experts' opinions.

$$W = \frac{S}{\frac{1}{12} m^2 (n^3 - n) - m \sum_{i=1}^m T_i}$$

where L_i - the number of bonds (types of repeated elements) according to i -expert,

t_i - the number of elements in l bond for i expert (the number of repeated elements).

If there are no connected ranks,

T_i is equal to zero.

The rank sum written down by all the experts is equal to

$$N \cdot m \cdot (m+1)/2 = 6 \cdot 5 \cdot (5+1)/2 = 90.$$

If to divide this value by the number of ranked elements, we will get the average value of ranks. Then we will subtract this value from the rank sum obtained by the element X_j from all the experts r_j , square the obtained difference and sum it for all the elements. As a result, we will obtain the maximum possible value:

$$R(d^2) = \frac{N^2 \times (m^3 - m)}{12} = \frac{6^2 \times (5^3 - 5)}{12} = \frac{36 \times 120}{12} = 360.$$

The concordance coefficient $W = 254/360 = 0,71$.

The value $\chi^2 = N \cdot (m-1) \cdot W = 6 \cdot (5-1) \cdot 0,71 = 17,04$, т.к. $\chi^2 > \chi^2_{0,01(4)} = 13,27$.

Consequently, the coefficient is significant, and the concordance is satisfactory.

Thus, the correlation was established that represented statistical interconnection of several variables (quantitative indicators of the most repeated problems) which can be regarded within a certain accuracy as primary, nodular, subsequent and autonomous (according to Prigozhin, 2007).

Furthermore, changes of values of one/several variables are an accompaniment of the systematic change of values of another/other variables.

6. Findings

The research findings were derived in the following way. First, we completed the numbers of the problem considered as the most significant one into blank spaces titled “heading” and “right-handed footnote”, second, we contrasted each problem of the horizontal row with the one from the vertical row (in accordance with the criterion of interaction). Otherwise stated, by comparing each pair of problems we responded to the given questions: Which one of the two problems gravely worsens or leads to the other one? Which one’s solution can facilitate and make more controllable the solution of the other one?

Given that a problem from the vertical row leads to and worsens a problem from the horizontal row, we place a horizontal arrow from the left to the right and up in the block of their intersection. If the interconnection was opposite, the arrow was placed conversely. In the event of absence of evident interconnection between the two problems, we placed 0. When any problems on the list disappeared, we noted them down without entering them into the “special empty space”.

Processing of the findings by specialists and consultants allowed us to organize the blank spaces in accordance with their understanding of the most significant problems of organization of pedagogical education under the conditions of a bachelor's degree program.

As a result of processing “special empty spaces” completed by every expert, the four kinds of problems have been determined:

- 1) core problems which lead to or worsen other problems;
- 2) nodular problems which are related to some other problems, but synchronously lead to or worsen other problems;
- 3) resulting problems which are the consequences of other problems;

4) autonomous problems which are rather significant but in no way associated with other problems (Table 01).

The sign of «+» was applied to the problems which were outstanding in 2016-2017, the sign of «-» indicated the problems which occur but cannot be classified as core, nodular, resulting, or autonomous. The sign of «+» shows positive features in a problem solution, while the sign of «-» points at the preponderance of negative sides.

Table 01. The core problems matrix of formation and realization of organizational-educational conditions in professional retraining of bachelor's degree program students.

Types of problems	Typical problems associated with
Core problems	preparation of students for employment as prospective school teachers
	organization of interrelation of the course study, self-instruction, study of a subject
	cross-curricular nature of the education content
	development of instruction on the basis of study and consideration of cognitive interests and occupational needs of bachelor's degree program students
Nodular problems	realization of social and instructional purposes of pedagogical education: diagnostic, acmeological, compensative, innovative, prognostic, specialised, consultative, consulting
	multi-functionality, dynamistic nature, progressive developmental character of bachelor's degree program students in regard to objects and subjects of their prospective occupation - schools, children and parents
	openness and transparency of the professional retraining system, its end-term orientation related to the solution of urgent professional issues, flexibility determined by the possibility of analysis of objective needs of future teachers concerning their professional and personal development
Resulting problems	interrelation of professional retraining with the three objects (subjects): a personality, educational process (instructional programs), organizational structure of continuing education
	acquisition of new knowledge, practical skills, competences essential for executing educational tasks which are different from those for fulfilment of which students were admitted to the university
	allowing students to obtain a new professional qualification (according to the conformity of the basic university degree with the course of retraining)
Autonomous problems	organization of progressive preparation of students according to the innovative trends of pupils' education which is to become the foundation for hands-on activity by the new profile - a school teacher
	function of the thesis: it is to develop into an integral element of educational process and from the method of managing and assessing learning activity transforms into a means of cognitive activity stimulation and formation of research capabilities of bachelor's degree program students, and a means of real participation in the process of knowledge and skills acquisition and further practical implementation during in-class work
	need for professional retraining standard, curricula, transitional modules, instructional programs, online courses essential for professional retraining of bachelor's degree program students for employment as school teachers

As a result the core problems matrix was obtained (Table 1). On its basis it is possible to suppose that organizational-pedagogical conditions of teachers' preparation at a bachelor's degree program are to comprise:

- organization of diagnostical monitoring and revealing undergraduates who tend to be inclined to work at school, formation of teams;
- formation of the standard, curricula, programs of simultaneous professional retraining of a bachelor's degree program students;
- organization of courses of simultaneous professional retraining for employment as school teachers;
- formation of professional retraining models;
- determination of organizational conditions of sustainable operation of the above-mentioned models.

The questionnaire surveys of students enabled to establish that strategically bachelor's degree program students are to be simultaneously subjected to both psychological-educational preparation and organizational-methodological preparation together with the fundamental study of a relevant school discipline. In addition, they are to go through continuing teaching practice. So the policy of the students' preparation is to be associated with the formation of organizational-pedagogical conditions of the simultaneous preparation of school teachers.

Both the matrix of core problems and the findings of questionnaire survey demonstrated a considerable and constant motivation of undergraduates to be employed as school teachers (97%), gain expertise in psychology and education (95%), gain methodological expertise (97%), go through teaching practice at schools (97%).

Undergraduates focused on the modules related to the teaching methods (95%), technology of detailed and thorough study of an appropriate subject (87%), nurturing of talented children (85%), methods of work with low-performing pupils (75%).

School teachers face a significant number of questions regarding the forms of realization of curricula (90%), training modules (85%), teaching practices (76%), online training courses (75%) and others.

Based on the above-mentioned results, the standard of professional retraining has been designed as well as the curricula for prospective instructors of physics, biology, history, geography, philology and other disciplines.

The two models of simultaneous retraining were assessed in the course of experiments:

- the first model is classical representing an in-class hands-on learning;
- the second model is informational-communicational one supplemented with online courses.

Undergraduates majoring in biology were subjected to professional retraining procedures in their fourth year in 2017, undergraduates majoring in physics did so in 2018 (in the quantity of 250 hours).

The comparative study of undergraduates' readiness to be employed as school teachers upon completion of professional retraining showed the persistent growth in both biology and physics undergraduates (average growth was about 50%: from 30% to 85%).

Supplementing the content of professional retraining with online courses in 2018 allowed to raise the retraining mobility and the preparedness to be employed as school teachers by 10-12%, so 95-97% of undergraduates showed preparedness and willingness to work at school.

Hence it was determined that for efficient preparation of prospective teachers at university it is essential to realize the following organizational-pedagogical conditions:

- design of a core problems matrix which is associated with realization of organizational-pedagogical conditions of professional retraining of undergraduates;
- organization of diagnostical monitoring, identification of undergraduates indicating willingness to be employed as school teachers, assembly of teams;
- design of simultaneous professional retraining standard, curricula and programs of simultaneous teacher preparation for undergraduates;
- organization of simultaneous professional retraining courses for those who would like to work as school teachers;
- realization of classical education, and informational-communicational models.

7. Conclusion

The research indicates that the core problems of undergraduates' preparation comprise: preparation of students for employment as prospective school teachers; organization of interrelation of the course study, self-instruction, study of a subject; cross-curricular nature of the education content; development of instruction on the basis of study and consideration of cognitive interests and occupational needs of bachelor's degree program students.

Nodular problems comprise realization of social and educational roles of pedagogical education at university (diagnostical, acmeological, compensative, innovative, prognostic, specialised, consultative, consulting), multi-functionality, dynamistic nature, progressive developmental character of bachelor's degree program students in regard to objects and subjects of their prospective occupation - schools, children and parents; openness and transparency of the professional retraining system, its end-term orientation related to the solution of urgent professional issues, flexibility determined by the possibility of analysis of objective needs of future teachers concerning their professional and personal development.

For the above reason curricula, transitional modules and educational programs of simultaneous professional retraining demand comprehensive and detailed consideration.

The matrix obtained in the research demonstrates (Table 1) that in the design and realization of organizational-pedagogical conditions of undergraduates for employment at school it is crucial to principally resolve the problems related to:

- organization of progressive preparation of students according to the innovative trends of pupils' education which is to become the foundation for hands-on activity by the new profile - a school teacher;
- function of the thesis: it is to develop into an integral element of educational process and from the method of managing and assessing learning activity transforms into a means of cognitive activity stimulation and formation of research capabilities of bachelor's degree program students, and a means of real participation in the process of knowledge and skills acquisition and further practical implementation during in-class work;
- need for professional retraining standard, curricula, transitional modules, instructional programs, online courses essential for professional retraining of bachelor's degree program students for employment as school teachers.

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