A MODULAR APPROACH TO THE FORMATION OF COMPETENCIES OF BACHELORS OF TEACHER EDUCATION

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Abstract

Purpose of the study: The purpose of this study to develop a model for the implementation of a modular approach to the formation of competencies of bachelors of pedagogical education and experimentally prove its effectiveness in the practice of professional training of students - future teachers.

Methodology: Based on the diagnostic tools for B. Bloom's taxonomy in the author's modification, the levels of formation for each competency (n=19) identified for research work in the aspect of advanced (excellent), basic (good) and threshold (satisfactory) indicators were determined. Monitoring was carried out according to activity and reflective indicator. The study participants were students studying at the bachelor's degree in the direction of "Education and pedagogical sciences" (n=87). The authors used the SPSS20 program to analyze the student's t-test.

Main Findings: The pedagogical experiment showed the reliability of a larger number of students of the experimental group, compared with the control group, in terms of the high - advanced level of formation of their average competencies (p<0.01). The implementation of the modular approach with the highest significance (p<0.01) had an impact on students' ability to analyze the main stages and patterns of historical development for the formation of patriotism and civic position. Using the author's curriculum, the ability to solve the problems of upbringing and spiritual and moral development of students in educational and extracurricular activities significantly increased (p<0.01) among students.

Applications of this study: The results of the experiment will be of interest to a wide circle of students and specialists in the field of pedagogical science.

Novelty of this study: The practical implementation of the author's curriculum on the basis of a modular approach to the formation of competencies at the levels of "knowledge - skill - skill - action" in the system "basic academic disciplines - varied subjects - educational practice - state certification" has made it possible to increase the efficiency of the educational process.

Keywords: *Formation of Competencies, Pedagogical Education, Students T-Test, Modular Approach, Teacher Education.*

INTRODUCTION

Under the influence of reforms of the Russian school, modern education has entered the next stage of reform - the formation of mechanisms to ensure the quality of education based on innovative changes (Kwan et al., 2018). In the educational process, innovations are implemented: in the content of education, in methods, technologies, forms, methods, techniques, tools, in organization and management (Kaufman and Scott, 2016). Innovative pedagogical technologies imply an endless variety of approaches and relationships, enhance the focus of training, deepen the motivation of educational and socially useful activities, intensify the educational process, etc. (Peurach, 2016). Pedagogical innovations cover the entire sphere of education, have a systemic influence on all components of the pedagogical process, are aimed at changing the pedagogical system in order to increase its effectiveness, mobilize the internal resources of the pedagogical system and lead to an increase in the result (Gulbrandsen and Aanstad, 2014). Pedagogical innovations cover the following main areas: optimization of the educational process, humanistic pedagogy, organization and management, new pedagogical technologies (Nagovitsyn et al., 2019).

One of the main innovative pedagogical technologies is the introduction of a modular approach to vocational training at the university (Kwan et al., 2018). The implementation of the competency-based approach to teaching students through the modular construction of the formation of general and professional competencies is an innovation in the system of training future teachers (Corcoran and O'Flaherty, 2017). The educational system "basic academic disciplines - varied subjects - educational practice - state certification" requires the systematization of professional training of students through a modular approach at the Pedagogical University (Jenset et al., 2017). In this regard, the search for the most effective system of modular professional education of future teachers comes to the fore in the system of higher professional education of a pedagogical profile.

LITERATURE REVIEW

During the implementation of federal education standards in the higher education system, real innovations in the preparation of a bachelor of pedagogical profile at a university are important (Munthe and Rogne, 2015, Nagovitsyn et al., 2019). The study of innovative processes in vocational teacher education has been widely reflected in pedagogical theory and practice (Corcoran and O'Flaherty, 2017; Richmond and Tatto, 2016). In various studies, the innovation process is considered as the development of three key stages: generating an idea, developing an idea in an applied aspect and implementing innovation in practice (Jenset et al., 2017; Kwan et al., 2018).

Some experts distinguish the following stages of the development of innovation as a pedagogical initiative: the creation of an author's idea of training or education, a pedagogical concept (Mandinach and Gummer, 2016; Lee et al., 2015). Other specialists (Barghi et al., 2017; Kaufman and Scott, 2016) focus on the development of non-traditional content of plans and programs (Summers et al., 2005) or on the initial testing and subsequent correction of teacher training through the implementation of innovative technologies for individual use differentiated practices (Peurach, 2016; Varga et al., 2007).

A university teacher is the main subject of innovation in vocational education (Evans et al., 2017). His readiness for innovative activity is considered as a necessary personal quality, the main condition for effective professional activity in a high-tech innovative society (Jacobs, 2000; Kwan et al., 2018). However, despite the use of the traditional approach to learning, he must in practice design and practically implement a fundamentally new pedagogical system of competency type (Notten, 2016). To achieve these goals in the higher education system, it is necessary to create full-scale resource support for the scientific and educational process, conditions for attracting talented, highly qualified teaching staff and a base for financial support from various sources, create a system for developing the necessary scientific and methodological literature and access to modern information resources (Klassen and Tze, 2014; Humphreys et al., 2020). In addition, important and promising directions for the development of education are the development of innovative approaches that stimulate the development of new ideas for teachers and students, the desire to participate in solving professional problems, the formation of skills for active independent development of material, creative skills, and the active development of innovative educational technologies (Alsop et al., 2007; Toom et al., 2017).

Thus, the scientific literature thoroughly studied the issues of training students on the basis of the implementation of innovative technologies; however, the development of features and the introduction of a new innovative curriculum based on the implementation of modular technologies for the formation of competencies of bachelors of teacher education has not yet been implemented.

Purpose of the study: To develop a model for the implementation of a modular approach to the formation of competencies of bachelors of pedagogical education and experimentally prove its effectiveness in the practice of professional training of students - future teachers.

Hypothesis: If a model for the implementation of a modular approach to the formation of the competencies of bachelors of teacher education is developed and put into practice, then the effectiveness of the implementation of professional training of future teachers will be significantly increased.

METHODOLOGY

Based on the diagnostic tools for B. Bloom's taxonomy in the author's modification, the levels of formation for each competency (n=19) identified for research work in the aspect of advanced (excellent), basic (good) and threshold (satisfactory) indicators were determined. The proposed system of competency formation levels has qualities that allow them to be used in the practice of developing a test tool. To determine the content of the levels, the method of group expert assessments was used, which ensures the quasi metric accuracy of the information. Testing consisted of two parts (activity indicator for 1-3 steps and reflective indicator for 4-6 steps).

Activity indicator: 1 stage - 60 tasks; Stage 2 - 30 tasks (choosing the right option from 3 to 4 options with the mandatory justification of the selected answer or saying your option); Level 3 - 15 tasks (practical demonstration of acquired skills). Key to the indicator: (positive answers at 1 stage) + (positive answers at 2 levels) * 2 + (positive answers at 3 levels) * 4. Advanced level - more than 145 points (inclusive); basic level - more than 115, but less than 144 points (inclusive); threshold level - more than 85, but less than 114 points (inclusive); insufficient level - less than 84 points (inclusive) (Nagovitsyn et al., 2018).

Reflective indicator: 4 stage - 8 detailed reports - analyzes; 5th stage - 4 essays on the topic in the field of pedagogical activity in an educational organization (2 - on a chosen topic, 2 - on this one); Stage 6 - 2 projects in the field of pedagogical activity in an educational organization (1 - on a chosen topic, 1 - on a given one). Key: (positive detailed reports - analyzes of 1 stage) + (detailed essays of 2 stages) * 2 + (substantiated projects of 3 levels) * 4. Advanced level - more than 20 points (inclusive); basic level - more than 14, but less than 19 points (inclusive); threshold level - more than 10, but less than 14 points (inclusive); insufficient level - less than 10 points (inclusive) (Nagovitsyn et al., 2018).

Study participants: students studying at the bachelor's degree in the direction "Education and pedagogical sciences" (n=87). Students participating in the experiment provide training in accordance with the Federal State Educational

Standards of Higher Education in the direction of 44.03.01. Teacher Education, for each direction in the experiment, which was implemented over four years (2014 - 2018), five academic groups took part. In turn, two groups of students enrolled in pre-primary education and primary education training profiles were enrolled in the experimental group (n=39). Three academic groups of students enrolled in the "Music" and "Physical Culture" training profiles were enrolled in the control group (n=48). All study participants gave informed consent to participate in the study and publish the results.

Statistical analysis: To evaluate the results of the studies, the authors used the SPSS20 program. The level of reliability and reliability of the obtained data was determined using Student's T-test at $p < 0.01$, $p < 0.05$.

FINDINGS

Based on the study of special scientific literature on the implementation of the competency-based approach in higher education (Brookhart, 2011; Goodman et al., 2008; Leenknecht et al., 2017), in particular, on the formation of general, general cultural and professional competencies of students in academic and extracurricular time (Nagovitsyn et al., 2019; Shawer, 2017), students at the undergraduate level, a model for the implementation of a modular approach to the formation of the competencies of bachelors of teacher education was developed (Fig. 1):
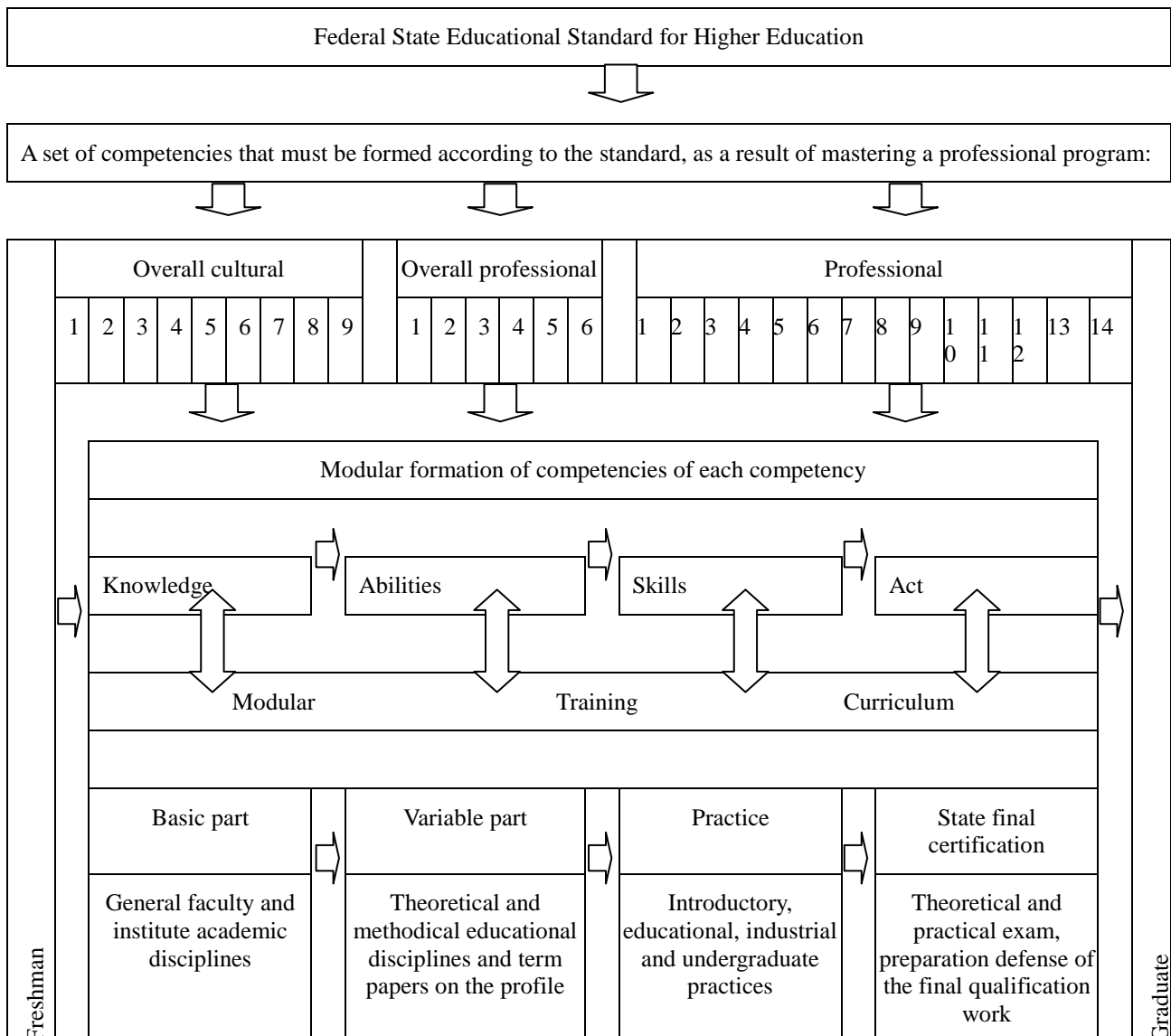

Figure1: Model for the implementation of a modular approach to the formation of competencies bachelors of teacher education

Source: Author's findings

*Model Notes:

Overall cultural competencies (OCC):

- OCC-1: the willingness to synthesize the concepts of philosophical and social and pedagogical paradigms for the formation of scientific thinking;
- OCC-2: the readiness to synthesize the main periods and principles of stages in history for the education of patriotism and the responsibility of civic consciousness;
- OCC-3: the ability to use natural science and mathematical knowledge for orientation in the modern information space;
- OCC-4: the readiness for communication online and offline in native and foreign dialects for the analysis of situations of communication and intercultural synergy;
- OCC-5: the group interaction skills, be tolerant of social, personal, racial and life differences;
- OCC-6: the readiness for self-control and independence in training;
- OCC-7: the ability to use basic legal knowledge in various fields of activity;
- OCC-8: readiness to maintain the level of physical fitness, providing full-fledged activity;
- OCC-9: the ability to use first-aid techniques, methods of protection in emergency situations.

Overall professional competencies (OPC):

- OPC-1: readiness to recognize the social significance of their future profession, to have the motivation to pursue professional activities;
- OPC-2: the ability to be included in the system of education, training, and self-formation based on individual characteristics, including individual needs for training;
- OPC-3: readiness for psychological and pedagogical support of the educational process;
- OPC-4: readiness for professional activity in accordance with regulatory legal documents in the field of education (OPK-4);
- OPC-5: proficiency in the basics of professional ethics and speech culture;
- OPC-6: readiness to ensure the protection of students' life and health (OPK-6).

Professional competencies (PC):

- PC-1: the skill in organizing the curriculum on the subject on the basis of mandatory accounting for federal educational laws;
- PC-2: the readiness for the practical implementation of innovations in the system of training, education, and self-monitoring;
- PC-3: the readiness to synthesize negative actions in the process of upbringing, the spirituality of schoolchildren, their morality and moral development;
- PC-4: the willingness to intervene in the professional space to bring to a high-level individual, educational and extracurricular training results in education and the implementation of quality management of all parts of the educational process;
- PC-5: the willingness to provide pedagogical support for socialization and professional self-determination of students;
- PC-6: willingness to interact with participants in the educational process;
- PC-7: the ability to organize students 'cooperation, maintain their activity and initiative, students' independence, develop their creative abilities;
- PC-8: the ability to design educational programs;
- PC-9: the willingness to implement a group project in the field of differentiation of educational paths for youth;
- PC-10: the readiness to implement an individual project of their career growth in the education system and the formation of a ready-made personality for work at school;
- PC-11: readiness to use systematic theoretical and practical knowledge for the formulation and solution of research problems in the field of education;
- PC-12: the ability to manage the educational and research activities of students;
- PC-13: the ability to identify and shape the cultural needs of various social groups;

- PC-14: the ability to design and implement cultural and educational programs.

The results of diagnostic procedures implemented in May-June 2018, for each of the formed competencies by the level of formation (advanced, basic and threshold), are presented in Fig. 2-4:
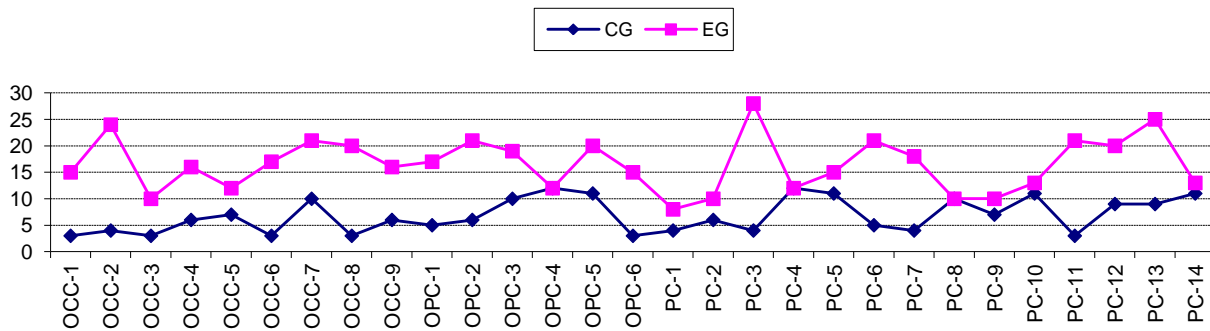

Figure 2: Number of study participants (%) by the advanced level of competency formation in the EG and the CG (p<0.01)
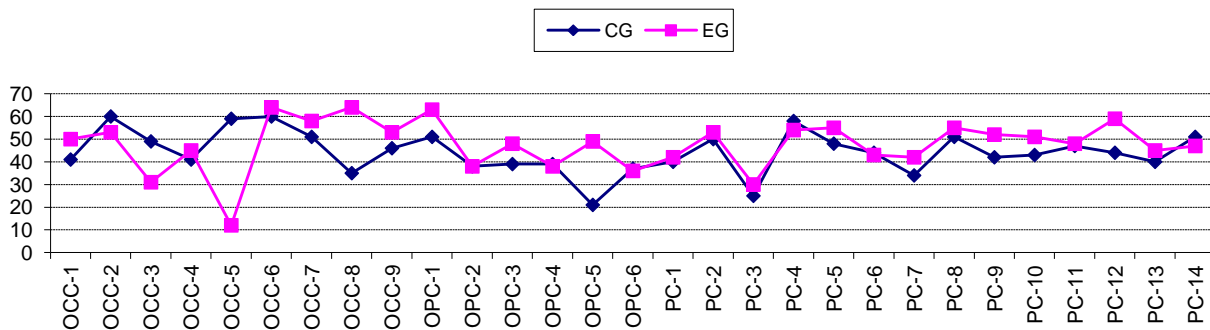

Figure 3: Number of study participants (%) by the basic level of competency formation in the EG and the CG (p>0.05)
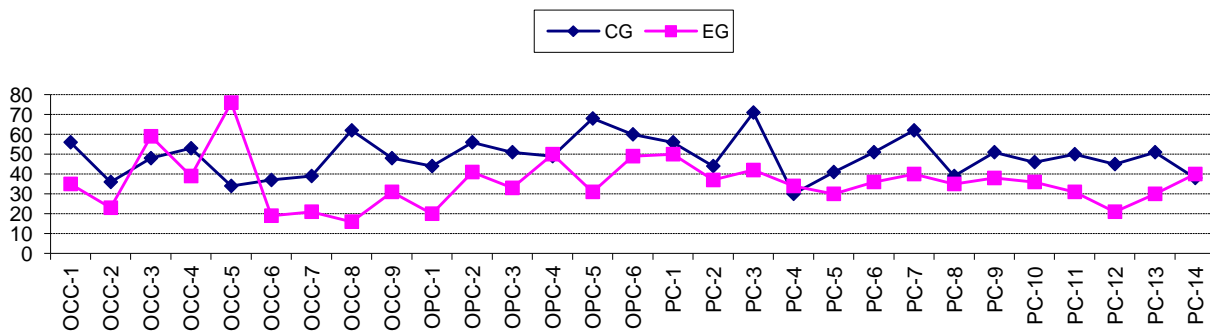

Figure 4: Number of study participants (%) by the threshold level of competence formation in the EG and the CG (p<0.05)

The mathematical and statistical analysis by Student's T-test showed significant reliability of the differences between the number of study participants (%) in the EG and the CG in terms of the high level of competency formation (p<0.01). It should be noted that the special effects of introducing the author's model at an advanced level were recorded among students in the formation of the following competencies (Fig. 2): the readiness to synthesize the main periods and principles of stages in history for the education of patriotism and the responsibility of civic consciousness and the readiness to synthesize negative actions in the process of upbringing, spirituality of schoolchildren, their morality and moral development.

Mathematical and statistical processing of the results according to the basic level of competency formation in the EG and CG revealed the unreliability of differences between focus groups (p>0.05). What proves: students studying on average during the entire professional training (4 years) for the educational grade "4" in both groups is reliably equal.

A statistical analysis of the obtained comparative data on the number of study participants in the EG and CG (%) by the threshold level of competency formation revealed a significant sign of the differences (p<0.05). The author's model,

implemented in the process of vocational training, made it possible to increase the educational performance of students studying in undergraduate studies in the profiles of "Preschool education" and "Primary education". However, the low efficiency of authoring on the formation of the following competencies among students was recorded: the ability to use natural science and mathematical knowledge and the ability to work in a team, tolerantly perceive social, cultural and personal differences.

DISCUSSION

The features of an individually-differentiated approach in the implementation of training in the positive and negative aspects have been experimentally confirmed by many experts (Bastian, 2017; Darling-Hammond and Snyder, 2000; Hammerness and Klette, 2015). On the example of specific practical studies (Adu-Yeboah and Yaw, 2018; Lynch and Fisher-Ari, 2017), focused on independent work of students in order to form key professional competencies such as sociability, leadership, the ability to analyze a large amount of information in a short time, make decisions in unplanned conditions (Brookhart, 2011; Darling-Hammond and Snyder, 2000; Jenset et al., 2017), this study has been implemented. The scientific novelty of the experiment consists in the fact that the original modular system of each competency is implemented throughout the training. The practical implementation of the author's modular system of activity "knowledge - skill - skill - action" for the formation of competencies in the system of "basic academic disciplines - varied subjects - educational practice - state certification" has made it possible to increase the efficiency of the educational process of the future teacher.

In the context of using a modular approach, the teacher needs to clearly formulate the goals and results of his academic discipline, this can neutralize further discrepancy between the content of the discipline and the specific level of formation of each competency (Goodman et al., 2008; Evans et al., 2017). Using this innovative method in building vocational training for a bachelor of teacher education requires high synergistic interaction between teachers of various departments of the institute to implement the training sequence (Hammerness and Klette, 2015; Munthe and Rogne, 2015). The implementation of modularity in the formation of each competency necessary for the formation of higher education according to the Federal Standard can significantly increase the theoretical and practical competence of undergraduate graduates. The application of the considered approach in teaching practice contributes to expanding the boundaries of students' worldview, self-determination of their personal and professional culture (Baier et al., 2019; Klassen and Tze, 2014). It should be noted that the success of the formation of personal and professional qualities depends on a number of factors: the presence of unformed qualities necessary for the basic level of the chosen profession; motivation level for professional activity; orientation to further professional activity; the need for personal and professional culture.

CONCLUSION

The implementation of innovative technologies in pedagogical activity contributes to the fact that methods and approaches in pedagogy must develop, mobilize, find more effective, efficient ways of transformation, change, development, due to the modern integrative process of new ideas in education. The introduction of innovative technologies, such as the application of a modular approach to the formation of competencies, is especially important for improving the system of modern teacher education. However, the effect of innovations depends on a number of reasons (demand in society, the possibility of their provision at the university, the willingness of teachers to implement them in practical activities, etc.), therefore, their introduction in the educational process should bring the educational process the opportunity to achieve the desired result. Undoubtedly, they should become the object of further scientific research and organizational and managerial decisions.

LIMITATIONS

The experiment was attended by students of the Glazov State Pedagogical Institute. The students of the experimental group during the implementation of the educational process at educational and extracurricular classes in the process of vocational training implemented the author's curriculum based on a modular approach to the formation of competencies of bachelors of teacher education. In turn, students in the control group in the process of training used the standard model for the implementation of the educational process based on the formation of competencies according to the model "1 competency - 1 academic subject". This model was announced in the work programs of teachers' disciplines and was implemented in the system of educational and extracurricular work of a higher educational institution for the preparation of bachelors of teacher education.

FUTURE SCOPE OF THE WORK

The results of the experiment will be of interest to a wide circle of students and specialists in the field of pedagogical science, as well as to teachers and administrative staff of faculties and the institute of other non-pedagogical areas. The author's recommendations on the implementation of diagnostic procedures for monitoring the formation of general cultural, professional and professional competencies will increase students' motivation to set individual goals in the field of improving professional results. Further research will be aimed at studying the impact of the author's module

curriculum on different qualification categories. An experimental study will cover a larger sample of subjects with different individual capabilities and needs for the implementation of vocational training.

AUTHOR'S CONTRIBUTION

Roman S. Nagovitsyn - Analysis of scientific and methodological literature and federal standards, formulation of theoretical and methodological foundations of the study, preparation of the initial version of the text.

Svetlana Yu. Senator - Data and evidence collection, the primary development of the model for the implementation of a modular approach to the formation of competencies bachelors of teacher education.

Aleksandr Y. Ratsimor - Development of a special fund of assessment tools and diagnostic tools for analyzing the formation of students' competence, conducting an experiment.

Nataliya V. Neverova - Implementation of mathematical and statistical analysis of these groups, conducting an experiment, revising of the model for the implementation of a modular approach to the formation of competencies bachelors of teacher education.

Oleg V. Srebrodolsky - A collection of final data and evidence, formulation of conclusions and limitations in the study, development of future scope of the work.

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