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Effectiveness of the Pedagogical System of Training Future Primary School Teachers to Use Innovative Technologies: Research Results

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Ефективність педагогічної системи підготовки майбутніх учителів початкової школи до застосування інноваційних технологій: результати досліджень

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Abstract

The purpose of the article is to theoretically substantiate the peculiarities of forming the readiness of future primary school teachers to use innovative technologies. Among **the research**

methods used, the following were decisive: analysis, generalization, experiment, questionnaires, expert evaluation, and observation. **Results.** In today's conditions, the driving force in the field of education is the use of innovative pedagogical technologies of learning and education, which satisfy the didactic requirements for ensuring the educational process. The training of a new generation of primary school teachers, who are able to depart from traditional forms and methods of working with students and at the same time perceive and extrapolate new pedagogical experience, new technologies, forms and methods of work in their professional activities, is aimed at realizing the need to create a positive educational environment by activating intellectual and sensory and emotional resources of each student. That is why there is a need to use appropriate pedagogical technologies in professional education. This, in turn, actualizes the need to include appropriate content in the subject-methodical training of future primary school teachers, requires rethinking and searching for new organizational forms and methods of training that would improve its quality and effectiveness, expand and deepen the content of professional training. This is due to the latest trends in the development of social, interstate, and cultural relations in the field of professional and pedagogical training of specialists and is the subject of special attention of the state, which is reflected in the main documents that determine the priorities of the educational policy of Ukraine: the laws of Ukraine «On Education», «On Higher Education» , «On the national informatization program», state programs «Information and communication technologies in education and science» for 2006-2010, Concept of implementation of state policy in the field of general secondary education reform «New Ukrainian school» for the period until 2029, Concept of media implementation of education in Ukraine (2010), Strategy for the development of the information society in Ukraine (2013), etc. So, the result of professional training of future teachers is the readiness to use pedagogical technologies in professional activities, which is

determined by the actual problem of pedagogical science and practice. **Conclusions.** The author formulates general conclusions and recommendations for the implementation of theoretical and practical results of the study in the educational process of pedagogical universities, and identifies prospects for further research in the field of the problem under study.

Keywords: future teachers, innovative technologies, professional training, effectiveness of methods.

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Introduction

The realities of life require the future teacher to be intellectually developed and socially active, to use various pedagogical techniques and tools to perform the most important professional function that is to prepare students for adaptation and communication in society. An adequate level of technical competence becomes an integral part of the teacher's professional activity. In particular, the process of training students should be connected with the organization of active professional activities and focus on pedagogical communities created and managed by the university teachers. The theoretical aspects of the problem of professional training and methodological principles of the future teacher's formation at the stage of studying in a higher education institution are found in the works of well-known domestic teachers: S. Goncharenko, V. Kremen, N. Nychkalo (philosophical prerequisites for the professional training of a future specialist); O. Antonova, I. Bekh, O. Dubaseniuk, O. Kovalenko, N. Kuzmina, O. Pekhota, I. Pidlasyi, S. Sysoieva (pedagogical principles of teacher's professional development); O. Bondarenko, V. Zabolotnyi, V. Imber, O. Konoshevskiy,

O. Fushtei (consider the prospects and problems of using multimedia teaching tools in higher education institutions), etc. The works of researchers I. Ziazun, V. Bondar, N. Moiseiuk and others reflect the problems of formation and development of a teacher's creative personality in the information society. The peculiarities of the use of pedagogical technologies in educational activities have been the subject of scientific consideration by L. Burkova, H. Selevka, O. Pekhota, O. Pometun, T. Remekh, O. Sagan, O. Strebna and other domestic and foreign scholars.

The purpose of the article is to theoretically substantiate the peculiarities of forming the readiness of future primary school teachers to use innovative technologies.

Materials and methods

Based on the analysis of scientific and pedagogical sources on the research problem, we concluded that the New Ukrainian School today needs a teacher of a new generation who is skillful in new abilities, among which a significant place belongs to the teacher's readiness to use pedagogical technologies in their own professional activities (New Ukrainian School, 2016).

In the context of constant educational changes and transformational processes in the education sector, more and more attention is paid to the formation of a highly professional specialist – a competitive teacher. Currently, there is an active search for the most effective ways, methods, tools and techniques that would facilitate this process. The search for the optimal content, forms and methods of training pedagogical staff ready for effective professional activity is devoted to the works of such researchers as: I. Bohdanova, O. Didenko, V. Yermieiev and others. Scientists pay attention to the readiness and self-realization of future teachers. We are impressed by the statements of O. Pometun, L. Serediak, I. Sushchenko, and O. Yanushevych, who argue that «in the context of socio-economic changes and qualitative social transformations of recent times in our country, the school cannot remain an untouched stable system. Its development is influenced by demographic and ethnic factors,

renewal of the philosophy and paradigm of education, educational technologies, Ukraine's integration into the European educational space, development of new concepts of content and structure of education, and concepts of training specialists for the renewed primary school. This requires the development of new state standards for higher pedagogical schools with appropriate content for all levels of specialist training. Therefore, future pedagogical specialists need to be able not only to find information and use it, but also to use it in their professional activities» (Pometun, 2005, p.65).

It follows that the primary task of higher education institutions today is to train a specialist who is able to apply innovative technologies in their professional activities.

A well-known Ukrainian teacher I. Ziaziun (Ziaziun, 2001, p.74) argues that pedagogical technology is a field of knowledge that combines certain methods, means and ways of using them to achieve educational goals. V. Monakhov considers pedagogical technology as a model of organization and implementation of the educational process with unconditional provision of comfortable conditions for the teacher and student, as a model of joint design activity (Marmaza, 2004, p. 23).

We are impressed by the opinion of O. Pekhota, who interprets the key definition of our study as a common field of pedagogical knowledge consisting of two groups of issues. The first group is the use of technical means in the educational process, the second is the organization of the educational process (Pekhota, Sereda & Prasol, 2016, p.125).

So, as we can see, pedagogical technology is a way to create an optimal educational system of socialization, personal and professional development of the individual, which, subject to professional coordinated actions of the teacher and other participants in the educational process, will be able to achieve the predicted goal. It is a certain pedagogical activity that ensures a higher level of efficiency and success of this process and guarantees a successful end result. Pedagogical technology is an

objective, conceptual, systematic description of the actions of teachers and students, which is designed to ensure the achievement of educational goals. It is a certain meaningful generalization that covers the content of existing definitions; it is a system of ways and means of teaching; it is a certain way of organizing the educational process, etc. (Pedagogical Technologies in Continuing Professional Education, 2001).

The analysis of scholars' works shows a certain difference in views on the problem, which is explained by its complexity and lack of study. However, scholars are unanimous in one thing: the use of pedagogical technologies will ensure the achievement of educational goals.

The emergence and necessity of applying new pedagogical technologies in the educational process is caused by new needs of society, new discoveries and constant development.

The use of innovative technologies in the educational process requires an awareness of certain features of this category. These include the following:

1. educational material is presented through learning tasks;
2. there should be a clear logic, sequential actions and operations;
3. educational activities should be motivated;
4. means and ways of obtaining information;
5. the manifestation of creative activity and initiative on the part of the teacher and students in the application of a particular pedagogical technology;
6. determining the boundaries of activity and creative activity of participants in the educational process;
7. the educational program material is different from the point of view of «manufacturability». One can be rebuilt through the use of pedagogical technologies (methods of solving problems, mathematical expressions), the other may lose some of its ability to influence the student, his or her emotions, feelings (historical information, artistic information);

8. the use of each pedagogical technology should be based on psychological justification;

9. any pedagogical technology cannot equally ensure a high level of knowledge, education and upbringing of students. The result of this process is influenced by the following factors: emotional attitude of the class; material support of the school; pedagogical competence of the teacher (Koval, 2009, p.11).

Discussion

The problem of preparing teachers for innovative activities is also a subject of contemporary psychological and pedagogical research. Theoretical and methodological aspects of professional pedagogical training of teachers should be minded.

The process of modern psychological and pedagogical research involves the following main stages:

- defining the problem, formulating the purpose of the study;
- collection and thorough study of real facts and pedagogical conditions defined by the research problem;
- formulation of the research hypothesis;
- scientific assumption, prediction of the probable result (conclusion) of psychological and pedagogical research;
- experimental testing of the hypothesis (collection of factual materials on the problem, practical, experimental verification of them);
- theoretical, analytical and mathematical processing of experimentally obtained data, establishing relationships, revealing causal relationships, generalizing, formulating conclusions or refuting the hypothesis;
- formalization of the research results, their presentation in the form of tables and graphs and implementation into practice (Khymynets, 2012, p. 89).

The research problem is created by the realities and conditions in which the phenomenon occurs and the researcher who studies educational processes works. The object of psychological and pedagogical research is pedagogical theories (phenomena, events, facts, etc.) that make up or underlie the

educational process. The purpose of the study is to find new models, ways to optimize and improve the educational process. In psychological and pedagogical research, it is not a simple accumulation of facts that is needed, but the disclosure of their essence and the identification of the cause and effect dependence of the relations between them, that is, a systematic selection of information and its detailed scientific analysis is required (V. Khymynets, 2012, p. 90).

The stage of collecting primary information is characterized by conceptuality in approaches to the process under study and the need for its fundamental analysis. This stage should be characterized by the ability to analyze the collected information, not to use secondary information and, through this process, to generalize the facts obtained, establish systems of relationships and dependencies between them, and make appropriate adjustments to the course of the experiment.

The development and formulation of a hypothesis are based on the results of the analysis of the initial data and are aimed at identifying the main contradictions of the educational process and their specific manifestations, as well as at choosing ways to overcome them. All hypotheses of pedagogical research are divided into hypotheses-bases and hypotheses-consequences, which are derived from the first ones by M. Ostrovska (Ostrovska, 2021, p. 222).

The hypothesis-base indicates the probable cause of the conflict problems of the process or phenomenon under study.

The consequence hypothesis is usually multi-stage. In formulating it, a number of assumptions are made, and attention is focused on what factors could have caused or provoked the problem.

Scientific forecasting of the likely outcome is a stage of specifying the research hypothesis that is choosing specific ways to optimize the educational process, which are aimed at overcoming difficulties and identified contradictions.

Experimental testing of the hypothesis is, in fact, the stage of conducting a formative experiment.

The level of scientific psychological and pedagogical research largely depends on the researcher's training, his/her capabilities and skills to theoretically and analytically process the results, reveal causal relationships, establish interrelationships, generalize, formulate conclusions, or refute the hypothesis, the ability to formalize the research results and present them in a form accessible to perception (Bondarchuk, 2012, p. 13; Bondar, 2003, p. 48). Much in this regard depends on and is determined by the conditions (type of educational institution, its material and technical support, professional level of colleagues, level of training of all participants in the experiment, etc.).

An experimental study of the system of training future teachers to use innovative technologies in primary school, testing its assimilation and effectiveness during studying at a higher education institution consists of four stages: stating, diagnostic, formative and control. The experiment describes the results of diagnosing the readiness of future primary school teachers to use innovative technologies according to certain criteria, studied indicators and levels; the results of the control diagnostics are presented, which allowed to trace the dynamics of future teachers' readiness to organize IED and use innovative technologies in primary school at different stages of education. The ways of specifying pedagogical conditions within the professionally oriented educational environment of higher education institutions, forms and methods of interaction between the subjects of the educational process, the formation of an objective position of future primary school teachers regarding the assessment of their own IED and the results obtained in its process are considered.

Throughout the entire period of the study, the author, as an associate professor of the Department of Pedagogy and Psychology of Primary Education of the Ferenc Rakoczi II Transcarpathian Hungarian College of Higher Education, personally participated in the development, testing and practical

implementation of the developed conceptual approaches to the preparation of future primary school teachers for IED. Considerable attention was paid to the development of methodological conditions, organizational, psychological and pedagogical recommendations for the direct application of innovative pedagogical technologies in the educational process of higher education institutions in the training of future primary school teachers.

The main purpose of the experiment was to test the effectiveness of the application of a scientifically based system of graduated training of future primary school teachers to use innovative pedagogical technologies by solving a number of tasks, among which we highlight the main ones:

- to define the initial level of readiness of future primary school teachers to use innovative pedagogical technologies under traditional conditions (diagnostic stage of the experiment);
- to introduce a system of graduated training of future teachers to apply innovative pedagogical technologies in the educational process of primary school (formative stage of the experiment);
- analyze the results of the diagnostic and formative stages of the experiment (control stage of the experiment).

It is important to emphasize that only a detailed study of a number of components and features of educational activities can provide material to draw reasonable conclusions about the peculiarities of training future primary school teachers to use innovative technologies. Detailed consistent records and relevant assessments of such activities make it possible to compare and summarize the material collected during the observation period, facilitate its systematization and guarantee the reliability of the results and conclusions drawn.

It is known that the reliability of the results of an experiment depends on the quality of measurement of empirical data obtained during the study, the correctness of their mathematical processing, as well as the correctness of estimates

and theoretical conclusions drawn on the basis of these data. In this study, the criterion of reliability of the information obtained was used to characterize the quality of measurement and interpretation of empirical data in the most objective way.

The purpose of the diagnostic stage of the experiment was to find out the initial level of quality of future primary school teachers' training in the use of innovative technologies. The realization of the goal required solving the following tasks: to form experimental and control groups of students (EG, CG); to clarify the diagnostic tools for measuring the level of preparation of future teachers for the use of innovative technologies in primary school.

To this end, the following subproblems of this stage of the study were identified:

- the identification of components of IES of primary school teachers trained within the classical pedagogical model as the main condition for the introduction of innovative technologies at school;
- the significance of the components of the professional educational environment of a higher education institution for the formation of future teachers readiness to use innovative pedagogical technologies at primary school;
- the definition of the factors of professionally oriented educational environment of higher education institutions, which became the basis for the formulation of pedagogical conditions, that is the leading component of the system of training future teachers to apply innovative technologies in the educational process of primary school;
- the diagnosis of the degree of future teachers' readiness to apply innovative technologies in the educational process of primary school;
- the verification of the efficiency of applying the developed system of training future teachers to use innovative technologies in the primary school educational process.

At the first stage of the diagnostic experiment, we studied the personal qualities of future primary school teachers, their ability to be subjective in the process of ICT. We used the research data to determine the components of subjectivity as a professional quality of a teacher. The methods used in the study were questionnaires, expert evaluation, and observation.

At the second stage, the study aimed to identify the most significant components of a professionally oriented educational environment from the point of view of teachers and students, as well as to find out whether there is a subject-subject interaction between a teacher and a student in a higher education institution.

At the third stage, the most significant factors influencing the formation of future primary school teachers' readiness for ICT and the use of innovative technologies in the educational process of primary school were identified. The ranking of respondents' answers allowed us to identify the factors that have the greatest impact on the innovative educational activities of higher education institutions: teaching staff; content of education; teaching technologies; student personality; bases of educational practices; innovative activities. It should be noted that the last two factors received the same number of points from students. Taking into account the above factors and their influence on the theoretical provisions of innovative educational activities of higher education institutions, we have identified pedagogical conditions for the formation of future teachers' readiness to apply innovative technologies in the educational process of primary school: implementation of subject-subject interaction in a professionally oriented educational environment of a higher education institution; gradual formation of innovative knowledge (IED basics) in future primary school teachers; the right to choose an individual development trajectory; availability of relevant educational and methodological literature;

The fourth stage of the diagnostic experiment is devoted to diagnosing the level of future teachers' readiness at different

stages of training to use innovative technologies in the educational process of primary school. The diagnostics of future teachers' readiness to use innovative technologies in the educational process of primary school took place in three stages and had different target orientation. In the I-II study years the students' readiness to organize educational activities (the ability to subject-subject interaction in the educational process) was tested; in the III year the readiness to use innovative technologies in the educational process was tested, in the IV year the readiness to use innovative technologies in professional activities was tested.

Conclusion

Based on the research methods used, the author formulates general conclusions and recommendations for the implementation of theoretical and practical results of the study in the educational process of pedagogical universities, and identifies prospects for further research in the field of the problem under study.

Improving the professional training of future teachers, their training for innovative educational activities and the application of innovative pedagogical technologies in the educational process of primary school requires an appropriate selection of methods and techniques. In modern higher education didactics, the methodology of applying educational technologies, including innovative ones, is interpreted as an orderly way of interconnected, purposeful activity of a teacher and students, aimed at effectively solving educational tasks, which are realized through the system of methods and means of educational activity by E. Zimnytsia (Zimnytsia, 2009, p. 12).

This helped to verify the effectiveness of the proposed content and methodological support for the training of future secondary school teachers in the use of innovative technologies.

Островська М.Я.

Ефективність педагогічної системи підготовки майбутніх учителів початкової школи до застосування інноваційних технологій: результати досліджень

Анотація

Мета статті – теоретично обґрунтувати особливості формування готовності майбутніх учителів початкових класів до використання інноваційних технологій. Серед використаних методів дослідження визначальними були: аналіз, узагальнення, експеримент, анкетування, експертна оцінка, спостереження.

Результати. У сучасних умовах рушійною силою в галузі освіти є використання інноваційних педагогічних технологій навчання і виховання, які задовольняють дидактичні вимоги щодо забезпечення освітнього процесу. Підготовка нової генерації вчителів початкової школи, здатних відходити від традиційних форм і методів роботи з учнями і водночас сприймати та екстраполювати у своїй професійній діяльності новий педагогічний досвід, нові технології, форми і методи роботи, спрямована на усвідомлення необхідності створення позитивного освітнього середовища шляхом активізації інтелектуальних та чуттєво-емоційних ресурсів кожного учня. Саме тому виникає потреба у використанні відповідних педагогічних технологій у професійній освіті. Це, у свою чергу, актуалізує необхідність включення відповідного змісту в предметно-методичну підготовку майбутніх учителів початкової школи, вимагає переосмислення та пошуку нових організаційних форм і методів навчання, які б дозволили підвищити її якість та ефективність, розширити і поглибити зміст професійної підготовки. Це зумовлено новітніми тенденціями розвитку суспільних, міждержавних, культурних відносин у сфері професійно-педагогічної підготовки фахівців і є предметом особливої уваги держави, що відображено в основних документах, які визначають пріоритети освітньої політики України: законах України «Про освіту», «Про вищу освіту», «Про національну програму інформатизації», Державній програмі «Інформаційні та комунікаційні технології в освіті і науці» на 2006-

2010 роки, Концепції реалізації державної політики у сфері реформування загальної середньої освіти «Нова українська школа» на період до 2029 року, Концепції впровадження засобів навчання в Україні (2010), Стратегії розвитку інформаційного суспільства в Україні (2013) тощо. Отже, результатом професійної підготовки майбутніх учителів є готовність до використання педагогічних технологій у професійній діяльності, що визначається актуальною проблемою педагогічної науки і практики. **Висновки.** Автором сформульовано загальні висновки та рекомендації щодо впровадження теоретичних і практичних результатів дослідження в навчальний процес педагогічного ЗВО, визначено перспективи подальших досліджень у галузі досліджуваної проблеми.

Ключові слова: майбутні вчителі, інноваційні технології, професійна підготовка, ефективність методів.