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Research Article

Integrating Modern Information Technologies in Training Future Primary School Teachers

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ABSTRACT

Introduction: Against the backdrop of a large-scale upgrade of the education system, the development of professional competence of primary school teachers is gaining a special role. The concept of development of the New Ukrainian School (NUS) determines new requirements for teachers in terms of compliance with current standards in the field of education.

Objectives: The study involved a combined approach to analyzing the current role of information technology in education. The article belongs to the category of descriptive research, assimilating a review of case studies and analysis of secondary information data.

Methods: At varius vel pharetra vel turpis nunc eget lorem. Feugiat scelerisque varius morbi enim nunc. Cras semper auctor neque vitae tempus quam pellentesque nec. Faucibus purus in massa tempor nec feugiat nisl. Congue nisi vitae suscipit tellus mauris a. Est sit amet facilisis magna etiam tempor. Dictum varius duis at consectetur. Purus semper eget duis at tellus at urna. Ipsum consequat nisl vel pretium. Viverra maecenas accumsan lacus vel facilisis volutpat est. Bibendum arcu vitae elementum curabitur vitae nunc sed. Nisl tincidunt eget nullam non nisi est. Ac turpis egestas integer eget aliquet nibh praesent.

Results: The study examines aspects of the integration of modern methodological and pedagogical tools based on digital transformation, which include, in particular, interactive teaching methods and elements of information and communication technologies. It has been found that innovative digital solutions actively contribute to the development of the key competencies of a modern teacher – creativity, critical thinking, communication and social competence. It is substantiated that a significant function in the system of professional training of primary school teachers is currently assigned to the formation of competencies in inclusive education. The study found that modern graduates of higher pedagogical institutions have traditional competencies, while requiring additional tutoring at the initial stage of their professional activity, as well as more attention to the formation of digital skills in the process of professional training.

Conclusions: A number of practical recommendations are proposed to optimize the system of professional education of future primary school teachers in order to improve the quality of their training and the successful implementation of the NUS development concept.

Keywords: primary school, vocational education, innovative methods, new Ukrainian school, digital technologies, professional competence, inclusive education.

INTRODUCTION

Today, innovative educational technologies are positioned as the basis for effective qualitative transformation of the professional training system. The integration of digital educational solutions significantly improves the quality of professional training, allowing researchers to select, analyze and interpret information, communicating effectively and quickly without time and space constraints. In addition, this integration actualizes the emergence of innovative forms of interaction in the research field and contributes to solving rather large-scale problems.

Innovative tools of digital educational solutions are globally expressed in the development of various forms of online learning, as well as the introduction of interactive technologies of information and communication interaction, which simplifies access to significant amounts of scientific knowledge through specialized programs, electronic resources and virtual environment. They not only improve the quality of education, but also create the preconditions for an accessible and convenient exchange of information, scientific ideas, and discussion arguments between future teachers.

The training of primary school teachers within the framework of the NUS development concept should combine high-quality theoretical training and the development of sustainable practical skills. In addition to basic professional competencies, future teachers should develop digital skills and readiness to work with children with special learning needs. In addition, teachers should have the ability to continuously improve themselves and grow professionally. These aspects require the active integration of modern educational solutions into the process of professional training of primary school teachers, primarily through the active use of information technology.

The purpose of the article is to analyze the potential of modern information technologies in the field of professional training of future primary school teachers.

LITERATURE REVIEW

According to Timotheou et al. [1], the transformation of the educational process towards the formation of universal professional competencies in future teachers requires proper methodological support to guarantee the quality of educational content. The publications of Terzi et al. [2] actualize the expanded variability of practical pedagogical tools in the context of maximum individualization of learning and integration of tools of modern information systems.

The results of scientific research by Falcione et al. [3], Gallagher and Savage [4] demonstrate the relationship between the level of quality of training of future primary school teachers and the use of interactive teaching methods. In particular, the author proposes a method of project-based learning that improves the academic performance of students, promotes the development of logical and critical thinking, and the problem-oriented nature of the search for scientific solutions.

Onah and Sinclair [5], Demitriadou et al. [6] argue that teacher education programs should have practical relevance and foster students' increased interest in educational activities. According to the researchers, this can be achieved by integrating innovative project-based learning. Scientists consider digital means of education to be the basis for the effective development of communication and social competence, which involves the formation of teamwork skills, creativity and critical thinking, and cross-cultural competencies in future teachers.

A number of scholars pay special attention to the development of teachers' competencies in the context of inclusive education, which is positioned as an important strategic element of the NUS conceptual reform. In particular, Halan et al. [7], Canaran and Mirici [8] explore the main problems of the system of primary education teacher training in the context of the inclusive component, the formation of the necessary skills and practices in this area. The authors emphasize the need to integrate modern digital solutions into inclusive practices.

Haleem et al. [9], Gronau et al. [10] explore the potential of tutoring in teacher training. The system of practice-oriented learning with the use of modern digital tools is studied by Criollo-C et al. [11]. The researchers focus on the need to transform the methodology of education to the formation of basic competencies, skills and abilities.

Fombona et al. [12], on the other hand, analyze the potential of interactive educational tools in the context of developing teachers' professional competence, sustainable teamwork skills, creativity and motivation, and emphasize the impact on the cognitive sphere, information competence, self-motivation, and the expansion of skills in the field of methodology and pedagogy.

METHODS

The study involved a combined approach to analyzing the current role of information technology in education. The article belongs to the category of descriptive research, assimilating a review of case studies and analysis of secondary information data.

The research materials were based on primary sources of information – recent publications indexed in the leading scientific databases Web of Science, Scopus, as well as statistics from official sources. The keywords used for the search were primary school, vocational education, innovative methods, new Ukrainian school, digital technologies, professional competence, inclusive education. The criteria for exclusion and inclusion of scientific papers and publications were the spatial and temporal indicator and the level of information reliability. The determined sample size -–25 sources – was considered appropriate in view of practical realities, while ensuring sufficient scientific and statistical power.

In the process of working on the article, the following methods were used: analysis and synthesis - to identify the main modern theoretical concepts and scientific developments on the integration of innovative technologies into the vocational training environment; comparison – to systematize existing approaches to optimizing the vocational training system, define basic concepts and criteria, identify factors of influence; structural and logical method – to develop practical proposals for optimizing the system of teacher education.

The results and conclusions were formed through the method of deduction and scientific abstraction. This made it possible to mentally move away from the standard indicators of the phenomenon of teacher training and consider the phenomenon under study in the context of the modern digitalized scientific and communication environment, which requires appropriate adaptability.

RESULTS

The main task of the modern educational concept of the NUS is the comprehensive development of the individual. At the same time, a teacher must possess not only professional competence but also a high level of professional ethics, aesthetic outlook, critical thinking and creativity. The fragmentation of the traditional methodology of education in the context of the formation of pedagogical competencies has led to difficulties in applying the acquired knowledge outside the discipline, while modern society strives for comprehensive development and integration, readiness to work with inclusion [9]. This is especially true for primary school teachers.

Among the main methodological means of forming the professional skills of future teachers within the framework of a personality-oriented educational concept, it is advisable to highlight:

1) a combination of different forms, methods and tools of teaching to develop the necessary competencies;

2) involvement of interdisciplinary connections;

3) practice-oriented professional training;

4) transfer of innovative technologies for methodological case studies on the development of communicative competence [13, 6].

Teachers should use different teaching methods, approaches and tools, while creating a favorable psychological microclimate. The new concept of Ukrainian school development focuses on the adaptability of primary school teachers, their readiness for continuous development and professional improvement [10]. Therefore, the use of modern multimedia technologies contributes to the formation of unlimited opportunities for creating innovative teaching methods that combine elements of traditional and innovative education.

An integrated educational system provides for expanded access to a variety of digital resources and tools, while traditional teaching practices should be adaptive. Through active interaction with digital content, future teachers create new resources, actively communicate, and successfully select resources for personalized learning [3, 14]. It is important to note that the insufficient level of compliance with labor market requirements is reflected in the development of outdated professional orientations and competencies.

In this context, the experience of developed European countries is indicative (Figure 1).

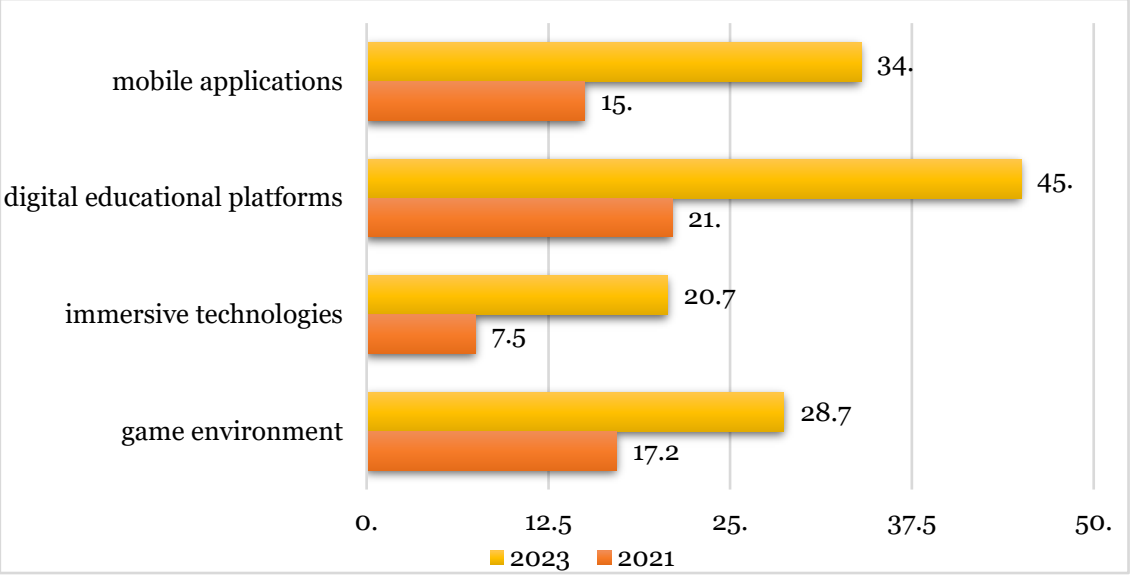

Figure 1: Innovative learning tools in EU universities, % of students

Source: systematized by the author based on [15]

The strategy of optimizing the system of teacher education is based on the integration of management tools in the information sphere to form a single digital platform of the educational institution, the creation of universal means of informatization and methods of information interaction to reflect the dynamics of the information environment.

The empirical data for this study were obtained through questionnaires and interviews with graduate students of pedagogical institutions (Appendix A), their teachers (Appendix B) and employers (Appendix C). The results are presented in Table 1.

Table 1: Results of Assessing the Professional Competence of Future Primary School Teachers

Parameter	**Graduates (%)**	**Professors (%)**	**Employers (%)**
Level of theoretical and practical training	85	92	78
Skills in the practice of innovative pedagogical technologies	73	87	82
The need for more practical training	68	62	67
Ability to adapt to the individual needs of students	77	84	80
Readiness to work with inclusion	66	83	69
Digital skills	74	86	81
The need for tutoring	59	64	55
Familiarity with the requirements of the modern educational environment	82	90	77

Source: compiled by the author

The analysis of the information presented in Table 1 shows that the vast majority of graduates of teacher education institutions (85%) positively assess their own level of professional training. 15% of respondents, on the other hand, need additional tutoring and support. At the same time, 73% of students are confident in the effectiveness of modern

teaching technologies, and 68% emphasize the importance of practice-oriented educational technologies. At the same time, the readiness of future teachers to work with inclusion is 66%, which requires correction through additional training as part of professional education.

Analyzing the results of the survey of teaching staff, it is worth noting that 92% of respondents are confident that the professional training programs meet the requirements of the NUS. 87% are convinced that graduates are ready to apply innovative pedagogical methods in practice, and 62% of respondents emphasize the importance of expanding practical classes and internships. Teachers highly appreciate the level of graduates' readiness to work in an inclusive environment (83%).

Employers positively assess the level of theoretical training of pedagogical graduates, while 67% of respondents are convinced that their communication and social competence is developed. Employers emphasize the need to expand tutoring programs for young teachers and provide them with active support at the beginning of their careers. At the same time, 77% of employers report that the level of teacher training meets the requirements of the NUS, which leaves room for improvement of the professional training system.

In general, empirical data demonstrate the readiness of modern graduates for professional activities. At the same time, more attention needs to be paid to practical classes, the development of internships and tutoring, and the formation of a strategy for continuous professional development of teachers.

A review of modern training programs for future primary school teachers confirms our findings [14]. At the same time, since the main task in the context of global integrated educational processes is to maintain and improve the quality of education, it is necessary to provide adequate technical support for the integrated educational process, select the optimal software of information systems and portal platforms, and organize effective monitoring and control.

DISCUSSION

The discourse on the methodology of vocational teacher education in the era of digitalization of the labor market in the works of contemporary scholars is represented by different interpretations of this definition, which indicates the need to develop a unified conceptual approach. There is a need to develop a universal model for the development of conceptual practice-oriented education in the context of the integration of adaptive systems. This is confirmed by Falcione et al. [3], Timotheou et al. [1], Cleophas et al. [13]. The authors see the integration of a practice-oriented concept of vocational education in the context of adaptive systems as the specificity of an effective structural and functional model of teacher training using innovative information technologies.

Such a model involves the involvement of the potential of innovative pedagogical and digital tools against the background of a general focus on consolidating various forms of educational and methodological support for the system of targeted training of digital technology specialists [16, 17].

The skills of primary school teachers, according to Haleem et al. [9], Gronau et al. [10], require the integration of the potential of modern digital solutions in the context of targeted educational tools and services that diversify the learning process and can significantly improve the effectiveness of the educational process. At the same time, the results of the current study convincingly show that an effective educational model should not involve an increase in the number of pedagogical technologies implemented, but a change in the approach to the educational process.

Naji et al. [18], van den Bergh et al. [19], in continuation, position an innovative teaching methodology as a basic component of the modern educational model, which should include the implementation of practical learning and cognitive activities; monitoring, analysis and evaluation of learning outcomes; stimulation of motivation for learning activities. The researchers also include practice-oriented and problem-based learning, interactive games and lectures, presentations and trainings, project-based method and case study technology as innovative methods.

Thus, it can be argued that the main discussion in the field of methodological improvement of the educational system today focuses on the aspects of integrating innovative pedagogical methods and technologies, improving the level of teachers' training for inclusive education, and the active use of digital solutions [20, 21]. At the same time, without detracting from the achievements in this area, a number of problematic issues related to the improvement of educational programs remain unresolved. Further development of the NUS concept will require expanding the

professional and personal competencies of future teachers, complementary to the dynamics of modern educational conditions.

CONCLUSION

The study of the specifics of the impact of innovative teaching methods on the level of professional pedagogical training shows that the integration of information technologies into the educational environment allows to increase the level of motivation of students, stimulating the development of basic skills for successful social and professional realization, competitiveness in the labor market, continuous self-development and self-improvement.

Innovative digital solutions actively contribute to the development of the key competencies of a modern educator – creativity, critical thinking, communication and social competence. At the same time, significant functionality is given to the formation of competencies in inclusive education. In this context, the introduction of information and computer technologies and the use of modern multimedia technologies contribute to the formation of unlimited opportunities for creating innovative teaching methods that combine elements of traditional and innovative education.

An integrated educational system provides for expanded access to a variety of digital resources and tools, while traditional teaching practices should have adaptive dynamics. Further research should focus on developing effective tutoring programs for better adaptation of young teachers.

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APPENDIX A
Questionnaire for graduates of pedagogical universities

1. Please rate your readiness to work in the NUS by the following aspects (1 - not at all ready, 5 - fully ready):

- Knowledge of the theoretical foundations of the NUS
- Use of modern pedagogical technologies
- Personality-oriented learning
- Competence-based approach to learning
- Inclusive education
- Knowledge of ICT

2. How confident are you in your ability to adapt teaching materials to the individual needs of your students? (1 – not at all confident, 5 – completely confident)

3. How would you rate your preparation for working with children with special educational needs? (1 – not at all ready, 5 – fully ready)

4. How confident do you feel about using ICT in the educational process? (1 – not at all confident, 5 – completely confident)

APPENDIX B
Questionnaire for professors of pedagogical universities

1. To what extent do teacher training programmes meet the requirements of the NUS? (1 – absolutely not, 5 – fully meet)

2. Assess the quality of student training in the following areas (1 – very low, 5 – very high):

- Person-centred learning
- Competence-based learning

- Inclusive education
- ICT skills

3. How important is it to increase the number of practical classes and internships for students? (1 – not at all important, 5 – very important)

APPENDIX C
Interviews with employers

1. How do you assess the level of theoretical knowledge of graduates? (1 – very low, 5 – very high)

2. How do you assess the readiness of graduates to manage the classroom and work with parents? (1 – not at all ready, 5 – fully ready)

3. To what extent are graduates ready to apply inclusive methods in practice? (1 – not at all ready, 5 – fully ready)

4. How do you assess the need for additional support and mentoring for young teachers? (1 – not at all, 5 – very much)