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THE EFFECTIVENESS OF INTEGRATED ELECTRONIC DIDACTIC SUPPORT IN DEVELOPING DIGITAL COMPETENCE OF PRIMARY SCHOOL TEACHERS

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ABSTRACT: This study is devoted to a comprehensive examination of the effectiveness of integrated electronic didactic support in developing digital competence of primary school teachers. The research is based on the results of experimental work covering 416 students from Tashkent, Kokand and Bukhara State Pedagogical Institutes in 2022-2024. The study analyzes the integration of project-based learning, gamification and distance learning methods based on a blended learning model. The results showed that the proposed methodology helped increase students' digital competencies while significantly improving the quality of their professional training.

KEY WORDS: English: digital competence, electronic didactic support, primary education, blended learning, project method, gamification , distance learning

INTRODUCTION

Digital transformation in the education system requires not only technological innovations, but also a fundamental change in pedagogical approaches. The Strategy of the Republic of Uzbekistan "Digital Uzbekistan-2030" has identified the introduction of digital technologies in education as a priority. Today, the problem of training future primary school teachers as specialists who possess not only traditional pedagogical skills, but also the foundations of digital competence is gaining relevance.

The Sustainable Development Goals call for promoting quality education, which requires the effective use of digital technologies. In Uzbekistan, the New Uzbekistan Development Strategy for 2020-2026 has made improving the quality of education a priority.

Primary education is the foundation of the entire education system , and its quality organization determines the successful formation of the future generation. In this regard, the development of digital competence of primary school teachers is of strategic importance not only for improving the quality of education, but also for determining the future of our country.

In this article, we study the effectiveness of integrated electronic didactic support in developing digital competence of primary school teachers. The main goal of the study is to develop an effective methodology for developing digital competence through a combination of design, gamification and distance learning methods based on a blended learning model and to experimentally prove its effectiveness.

LITERATURE ANALYSIS

BSAbdullaeva has studied the specific features of pedagogical technologies in the digital learning environment. Her research shows that the digital learning environment changes the forms of interaction between teacher and student, creating new pedagogical opportunities.

developed methodological foundations for the introduction of digital didactics in higher education institutions. Her work clearly defines the criteria for the selection and use of digital didactic tools.

U.Sh. BegimkulovConducted research within the framework of "Digitalization of Education: Theory and Practice", Current Issues of Digital Transformation in the Education System of Uzbekistan, Scientific and Methodological Foundations of Creating a Digital Educational Environment, Adapting International Experience to Local Conditions , "Developing Digital Competence in Vocational Education", The Role of Digital Technologies in the Professional Training of Teachers , Digital Pedagogical Competence Assessment System, Didactic Properties of Electronic Educational Resources.

Research by NA Muslimov"Developing digital competence in professional education", The role of digital technologies in the professional training of teachers , The system for assessing digital pedagogical competencies, The didactic characteristics of electronic educational resources were revealed.

In his research, MEMamarajabov has deeply studied the issues of integrating digital technologies into the educational process. In his opinion, the modern educational process is unimaginable without digital technologies, but their effective use requires special methodological approaches.

Mamarajabov's research shows that new roles and responsibilities for teachers emerge in the digital learning environment. He identifies the following key areas:

1. Creating and using digital educational resources
2. Application of distance learning technologies
3. Implementing digital assessment systems
4. Development of interactive learning materials

Mamarajabov believes that it is important to train future teachers as specialists with a foundation in digital competence. His research shows that digital competence includes not only technical skills, but also pedagogical and methodological knowledge.

CIScountriesof scientistsdigitalcompetencein the fieldresearch . Russiafederationresearch :

LA Dunayeva's research :
- The digital learning environment is an important factor in developing the professional competence of teachers should be based on a combination of traditional and digital methods
- Teachers' digital culture determines their professional success

Research of Ye.S. Polat:
- Pedagogical possibilities of distance learning technologies
- The combined use of digital technologies with traditional education is effective
- Teachers' digital competence is an integral part of their methodological preparation

Robert IV's research:
- Pedagogical possibilities of information and communication technologies and using digital educational resources
- Developing teachers' information and communication competence

Research by Kazakh scientists: Research by AE Ibraimov:
- Organization of the pedagogical process in a digital learning environment
- Criteria for assessing teachers' digital literacy
- Strategies for implementing digital technologies in local educational institutions

Research by GS Ergasheva: - Specific features of the use of digital technologies in primary education
- Psychological and pedagogical aspects of digital tools in working with young students
- A regional model for developing teachers' digital competence

Research by SM Kashuk :
- Professional training of teachers in the context of digitalization of education
- Theoretical foundations of digital pedagogy
- Building a digital culture for teachers

Comparative studies of CIS countries: Research by the CIS Center for Educational Strategies:
- General trends and specific features of the development of digital education in the CIS countries
- Opportunities for regional cooperation in developing digital competence
- The importance of exchanging experiences between CIS countries

General conclusions of the CIS countries' research:
1. Cultural Adaptability: Digital competency models should be adapted to local cultural and educational traditions
2. The importance of infrastructure: The successful implementation of digital education depends on the provision of a modern technical base
3. Staff training: Continuous professional development of teachers is key to digital transformation

4. Methodological support: System of practical guides and methodological recommendations for teachers
5. Assessment system: Clear criteria and indicators for assessing digital competence
6. Social Responsibility: Nurturing ethical behavior and civic responsibility in the digital environment

These studies serve to create a scientific and methodological basis for the development of digital competence in the CIS countries and help develop approaches adapted to local education systems. In recent years, valuable research has been conducted by Uzbek scientists on improving pedagogical conditions in the e-learning environment.

International research has proposed various models for developing digital competence. According to the European Commission's "DigCompEdu" study, teachers' digital competence should be assessed in 6 key areas:
- Professional Activities: Professional Development and Collaboration Using Digital Tools
- Digital Resources: Selecting, Creating , and Evaluating Learning Materials
- Teaching and Learning: Integrating digital technologies into the learning process
- Assessment: Assessing student knowledge using digital methods
- Empowering Learners: Personalized and Inclusive Education
- Digital Competence of Students: Developing Students' Digital Literacy

US research: ISTE (International Society for Technology in Education) has set the following standards for teachers:
- Researcher: Solving problems using digital tools
- Designer: Designing learning in digital environments
- Leader: Implementing digital transformation
- Active: Developing digital citizenship

UK research: Research from the British Educational Communications and Technology Agency (BECTA) shows that:
- Digital competence includes not only technical skills, but also a pedagogical approach
- For successful integration, teachers need to have a comfortable environment and ongoing support
- Digital technologies should be a means to improve the quality of education, not a goal

Finnish experience: The Finnish model of "Teacher Digital Competence" prioritizes the following aspects:
- Pedagogical-technological integration: Incorporate technology organically into lesson design
- Research-based approach: Engaging teachers in conducting scientific research
- Collaborative learning: Sharing experiences between teachers

South Korean model:
Research on KOREA's "SMART Education" strategy:
- 87% of teachers' digital competence level directly affects the quality of education
- Successful implementation requires a systematic approach and continuous professional development
- Digital technologies significantly increase the possibilities of individualized learning

Chinese research: Research conducted based on the "Internet Plus" concept shows that:
- Developing digital competence is a multi-step process and requires long-term planning
It is important to take into account cultural and regional characteristics
- Motivation and positive attitude of teachers are the main factors of success

Foreign studies show that developing digital competence:
- A multifaceted and long-term process
- Must be adapted to the local cultural and educational context
- Requires a systematic approach and ongoing support
Includes not only technical, but also pedagogical and communicative skills
- Necessary to improve the quality of education and meet the demands of modern society

These conclusions can serve as a basis for developing digital competence development programs in the education system of Uzbekistan. However, the methodology for organizing electronic didactic support for the development of digital competence of future primary school teachers has not been sufficiently studied. In particular, the effectiveness of developing digital competence through a combination of design, gamification and distance learning methods based on a blended learning model has not been comprehensively studied.

RESEARCH METHODOLOGY

was conducted among 1st-2nd year students of the "Primary Education" major at Tashkent, Kokand , and Bukhara State Pedagogical Institutes in 2022-2024 . Students were divided into experimental and control groups.
was a systematic, activity- and person-oriented approach. The study was carried out in the following stages:
1. Preparatory stage:
- Determining the level of initial digital competence of students
- Conducting diagnostic tests and questionnaires
- Planning experimental work
2. Experimental stage:
- Implementation of integrated electronic didactic support

- Implementing the blended learning model
- Design, gamification , and the use of distance learning methods
3. Conclusion stage:
- Processing and analyzing results
- Evaluation of the effectiveness of the methodology
- Development of proposals
The following methods were used to collect and analyze data:
- Pedagogical observation
- Testing and questionnaires
- Expert assessment
- Statistical analysis (using SPSS 25 software package)

RESEARCH RESULTS AND ANALYSIS

The following main results were recorded during the study:
1. Growth dynamics of digital competencies
The digital competence of students in the experimental group increased significantly. The average score at the initial assessment was 42.3%, but at the end of the experiment this figure reached 72.1%. In the control group, an increase was observed from 41.8 % to 49.5%.
2. Skills in using electronic didactic tools
The following changes were observed in students' skills in using various electronic didactic tools:
- Use of GeoGebra: 28% → 85%
- Mathematica usage: 35% → 82%
- Creating a project on the Scratch platform: 47% → 89%
- Use of the "Savodxon.e-resurs.uz" platform: 52% → 94%
3. Pedagogical activity indicators
The use of integrated methodology significantly increased the pedagogical activity of students:
- Independent working skills: 45% → 78%
- Participation in project activities: 38% → 82%
- Creative approach level: 41% → 76%
- Professional reflection skills: 39% → 71%
4. Ability to create digital content
Students' ability to create digital learning materials has increased to the following extent:
- Interactive presentations: 32% → 79%
- Electronic tests: 41% → 85%
- Video tutorials: 28% → 68%
- Multimedia resources: 35% → 72%
The results of statistical analysis showed that there was a difference in all indicators at a significance level of $p < 0.01$. This confirms the effectiveness of the integrated methodology.

DISCUSSION

The results obtained show that integrated electronic didactic support is highly effective in developing the digital competence of primary school teachers. This approach serves to develop not only theoretical knowledge, but also practical skills.
When the results of the study were compared with international studies, the advantages of our methodology were revealed. For example, compared to the model proposed by UNESCO, our approach showed 15% higher efficiency. This confirms the importance of a methodology adapted to the Uzbek educational context.
The use of a blended learning model allowed students to learn at their own time and place, which helped meet their individual needs. The design approach allowed students to develop their creative abilities and develop skills in using digital technologies in real pedagogical situations.
The use of gamification elements enhanced the motivational aspect of the learning process. Students maintained their interest in learning through competitive elements, a reward system , and leveled tasks.

CONCLUSION AND SUGGESTIONS

Based on the research results, the following conclusions were drawn:
1. Integrated electronic didactic support is highly effective in developing the digital competence of primary school teachers.
2. The combination of design, gamification , and distance learning methods based on a blended learning model allows for the comprehensive development of digital competencies.
3. The proposed methodology helps to develop not only digital, but also pedagogical competencies of students.

The following proposals were developed:

1. Incorporating a digital didactics module into curricula
2. Organization of teacher retraining programs
3. Development of digital infrastructure in regional pedagogical institutions
4. Creation of a collection of scientific and methodological manuals and electronic resources

The following can be indicated as directions for future research:

- Development of automated digital competence assessment systems
- Creating personalized training programs using artificial intelligence technologies
- Studying the long-term impact of digital pedagogy

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