

METHODOLOGY FOR PREPARING FUTURE MATHEMATICS TEACHERS TO WORK WITH MODERN DIGITAL APPLICATIONS

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Abstract

The article examines the methodology for preparing future mathematics teachers to effectively use modern digital applications in the educational process. It emphasizes the importance of developing digital competence among students of pedagogical universities, including the ability to select, adapt, and integrate digital tools into mathematics teaching. The study describes the stages and forms of educational activities aimed at developing professional skills in working with interactive platforms, mathematical simulators, and computer algebra systems. Examples of practical tasks and pedagogical situations are presented that contribute to the readiness to use digital technologies in mathematics education. The results demonstrate that systematic methodological preparation significantly improves the quality of mathematics education and enhances professional motivation among future teachers.

Keywords: mathematics teacher training; digital technologies; digital competence; teaching methodology; teacher education; educational applications; professional preparation.

Introduction

The modern education system is undergoing a rapid process of digitalization, which requires teachers to acquire new professional competencies. A mathematics teacher must not only master subject content but also be able to use digital tools, resources, and online platforms effectively in the teaching process. This necessity calls for a revision of the methodology for training future teachers at pedagogical universities.

The aim of this article is to present methodological approaches to preparing future mathematics teachers for working with modern digital applications and to determine the pedagogical conditions that foster the development of digital competence.

1. Theoretical Foundations of Digital Training for Future Mathematics Teachers

Digital transformation has redefined the teacher's role — from being merely a source of knowledge to acting as a moderator, organizer, and analyst of the learning process. According to UNESCO, a teacher's digital competence includes not only technical proficiency but also methodological, critical, and creative components.

For a mathematics teacher, this means the ability to:

- use applications such as **GeoGebra**, **Desmos**, **Mathematica**, **Wolfram Alpha** to visualize mathematical processes;
- design digital tasks that develop students' research and analytical skills;
- integrate digital tools into traditional teaching methods, for example when studying functions, geometry, or statistics.

2. Methodological Principles of Training

The process of preparing future mathematics teachers to use digital applications should be based on several key methodological principles:

1. **Integrativeness** — combining mathematical content with digital technologies.
2. **Practical orientation** — focusing on real pedagogical tasks and digital learning scenarios.
3. **Problem-based and research-oriented learning** — engaging students in solving creative professional problems using digital tools.
4. **Reflectivity** — fostering the ability to analyze and evaluate the effectiveness of digital resources in teaching.

3. Stages of Developing Digital Competence

The formation of digital competence among future mathematics teachers can be divided into three stages:

1. Informational and motivational stage.

At this stage, students develop awareness of the importance of digital technologies. They explore types of educational applications and analyze best practices of digital learning.

2. Practical and activity-based stage.

Students master specific tools such as GeoGebra, Desmos, Google Classroom, and Moodle through laboratory work, workshops, and teaching simulations.

3. Reflective and analytical stage.

Students analyze their own digital projects, discuss outcomes, and identify strengths and limitations of digital tools in mathematics teaching.

4. Examples of Practical Tasks

1. **Developing an interactive lesson** using GeoGebra on the topic “Graphs of Quadratic Functions.”
2. **Creating a digital mathematics laboratory** with Desmos or PhET for modeling physical or geometric phenomena.
3. **Designing an online course** on elementary algebra using Moodle or Google Classroom.
4. **Evaluating digital resources** according to pedagogical, technical, and accessibility criteria.

5. Pedagogical Conditions for Effective Training

Effective preparation of future teachers requires:

- the use of blended learning (combining classroom and online formats);
- methodological guidance and supervision by instructors;
- integration of digital competencies into the assessment system;
- inclusion of digital tools in teaching practice and internships.

Conclusion

Preparing future mathematics teachers to work with modern digital applications is a crucial component of contemporary teacher education. It requires a systematic approach that combines methodological, technological, and reflective dimensions. A well-structured methodology enhances both professional competence and the overall quality of mathematics education

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