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PRACTICAL CLASSES IN HIGHER EDUCATION INSTITUTIONS AS A FACTOR ENSURING THE PROFESSIONAL TRAINING OF UNDERGRADUATE MATHEMATICS STUDENTS

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Abstract: This article analyzes the role of practical classes organized in higher education institutions in the formation of the professional competencies of future mathematicians studying in undergraduate programs. The significance of practical classes in strengthening theoretical knowledge, developing logical thinking, forming problem-solving skills, and improving professional training based on modern pedagogical technologies is highlighted. The research findings demonstrate that practical classes are an important factor in improving the quality of education and enhancing the professional potential of future specialists.

Keywords: practical classes, mathematics education, professional competence, undergraduate education, higher education, pedagogical technology, professional training.

Annotatsiya: Mazkur maqolada oliy ta’lim muassasalarida tashkil etiladigan amaliy mashg‘ulotlarning bakalavr yo‘nalishida tahsil olayotgan bo‘lajak matematiklarning kasbiy kompetensiyalarini shakllantirishdagi o‘rni tahlil qilingan. Amaliy mashg‘ulotlarning nazariy bilimlarni mustahkamlash, mantiqiy tafakkurni rivojlantirish, muammoli vaziyatlarni hal qilish ko‘nikmalarini shakllantirish hamda zamonaviy pedagogik texnologiyalar asosida kasbiy tayyorgarlikni takomillashtirishdagi ahamiyati yoritilgan. Tadqiqot natijalari amaliy mashg‘ulotlarning ta’lim sifati va bo‘lajak mutaxassislarning kasbiy salohiyatini oshirishdagi muhim omil ekanligini ko‘rsatadi.

Kalit so‘zlar: amaliy mashg‘ulot, matematika ta’limi, kasbiy kompetensiya, bakalavr, oliy ta’lim, pedagogik texnologiya, kasbiy tayyorgarlik.

Аннотация: В статье рассматривается роль практических занятий в обеспечении профессиональной подготовки студентов бакалавриата математического направления. Проанализировано влияние практических занятий на формирование профессиональных компетенций, развитие логического мышления, навыков решения профессиональных задач и совершенствование качества подготовки будущих специалистов. Полученные результаты показывают, что практические занятия являются одним из важнейших факторов повышения качества профессионального образования.

Ключевые слова: практические занятия, математическое образование, профессиональная компетентность, бакалавриат, высшее образование

Introduction

At present, the reforms being implemented in the higher education system require improving the quality of specialist training and developing their professional competencies in accordance with the demands of the modern labor market. In particular, integrating the theoretical knowledge of undergraduate students studying mathematics with practical activities is considered one of the most important tasks.

Mathematics is not only a fundamental science but also constitutes the methodological foundation of many fields, including engineering, economics, and information technologies. Therefore, future mathematicians should possess not only profound theoretical knowledge but also

competencies related to solving practical problems, mathematical modeling, the effective use of information technologies, and the organization of pedagogical activities.

The relevance of this research is determined by the necessity of improving the professional training of undergraduate mathematics students through increasing the effectiveness of organizing practical classes in higher education institutions.

The purpose of this research is to provide a scientific justification for the influence of practical classes on the professional training of undergraduate mathematics students and to develop recommendations for improving this process.

Literature Review

The concept of competency-based education occupies a significant place in contemporary pedagogical research. In the scientific literature, practical classes are regarded as one of the primary means of reinforcing theoretical knowledge.

Pedagogical scholars emphasize the following advantages of practical classes:
strengthening theoretical knowledge;
developing independent thinking;
modeling professional situations;
fostering analytical and critical thinking;
developing competencies for teamwork.

In recent years, studies devoted to organizing mathematics education based on the competency-based approach have emphasized the necessity of integrating practical classes with digital technologies, interactive teaching methods, and project-based learning.

Research Methodology

The following scientific methods were employed in this study:
pedagogical observation;
analysis of scientific and pedagogical literature;
comparative analysis;
a systematic approach;
generalization;
logical analysis;
interpretation of statistical data.

The object of the research was practical classes organized within undergraduate mathematics programs at higher education institutions.

The subject of the research was the influence of practical classes on the professional training of future mathematicians.

Results

The analysis demonstrated that effectively organized practical classes lead to the following outcomes:

1. Strengthening of Theoretical Knowledge

Students reinforce the knowledge they acquire during lectures through practical examples. As a result, knowledge is retained in long-term memory.

2. Development of Professional Competencies

During practical classes, students develop the following competencies:
mathematical modeling;
algorithm design;
conducting scientific research;
using mathematical software;
solving professional problems.

3. Development of Logical Thinking

By solving complex mathematical problems step by step, students develop the competencies to:

analyze;
compare;
generalize;
draw conclusions.

4. Use of Information Technologies

The use of software such as GeoGebra, MATLAB, Maple, Wolfram Mathematica, Python, and other applications for modeling mathematical processes significantly increases the effectiveness of learning.

5. Development of Independent Learning

Practical classes encourage students to engage in independent research, develop the ability to work with scientific articles, and acquire new knowledge.

Discussion

The research findings indicate that practical classes are not merely a means of reinforcing theoretical knowledge but also constitute a pedagogical process that comprehensively develops the professional competencies of future mathematicians.

Within the framework of the competency-based education model, practical classes:
strengthen the integration of education and professional practice;
facilitate the implementation of innovative pedagogical technologies;
make it possible to prepare competitive specialists capable of meeting the demands of a market economy.

Furthermore, the study revealed that the use of project-based learning, the STEAM approach, and digital platforms can further enhance the effectiveness of practical classes.

Conclusion

Based on the findings of the study, the following conclusions were drawn:

Practical classes constitute one of the fundamental components of the professional training of undergraduate mathematics students.

They provide opportunities to integrate theoretical knowledge with practical activities.

They serve as an important pedagogical tool in the development of students' professional competencies.

The use of modern information and communication technologies increases the effectiveness of practical classes.

The application of project-based learning, problem-based learning, and interactive teaching methods significantly improves the quality of professional training.

In the future, integrating practical classes with artificial intelligence technologies, adaptive learning systems, and virtual laboratories represents a promising direction for further development.

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