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DEFINING THE ROLE OF EDUCATIONAL PLATFORMS IN MATHEMATICS IN THE EFFECTIVE TRAINING OF FUTURE MATHEMATICS TEACHERS

Abstract: The present study analyzes the results of a survey of teachers and students designed to identify the preferences and needs of universities in using educational platforms in mathematics to study the subject «Elementary Mathematics». The aim of the study was to determine the preferred characteristics and functionality of mathematics learning platforms that can contribute to effective learning and increase interest in mathematics for future mathematics teachers. To achieve this goal, questionnaires were developed, which were distributed among mathematics teachers and first-year students in the specialty «Mathematics» when teaching the subject «Elementary Mathematics» and third and fourth-year students when teaching the subject «Methods of teaching mathematics». The questionnaires included questions about preferences in using educational platforms in mathematics, the level of comfort and perception of educational material when working with technologies, preferred learning formats and expected learning outcomes. The analysis of the obtained results allowed us to identify the key principles that should be taken into account when using educational platforms in mathematics to study the subject «Elementary Mathematics» at the university. Following these principles contributes to the use of educational platforms in mathematics, and as a result, to improving the quality of mathematical education at the university and improving the learning ability of future mathematics teachers.

Keywords: elementary mathematics, educational platforms in mathematics, methodology, university, student, education technology, questionnaire.

Introduction

In modern education, the use of math learning platforms and online resources is becoming increasingly common and important. One of the areas where mathematics learning platforms can have a positive impact is mathematics education, in particular the training of future mathematics teachers in «Elementary Mathematics». «Elementary mathematics», being one of the key subjects at the university in the specialty «Mathematics», «Mathematics-Computer Science», requires innovative approaches to teaching in order to increase the interest of future mathematics teachers and improve their academic performance (Rozmat, et al., 2022; Tulentaeva et al., 2023).

In this study, the main focus is on the analysis of questionnaires filled out by future mathematics teachers in order to determine preferences and needs in using educational platforms in mathematics for studying «Elementary Mathematics», «Methods of teaching mathematics» at the university. The research is aimed at identifying key factors that can contribute to future mathematics teachers' effective learning and increasing interest in mathematics, the importance of teaching «Elementary Mathematics», «Methods of teaching mathematics», the role of educational platforms in mathematics in this process is considered, and the relevance of analyzing questionnaires to understand the needs of teachers and students in using educational platforms is substantiated in mathematics.

Methodology

The main thing is to collect data material for the current study, and to conduct a survey of teachers and students. Two questionnaires have been developed for this purpose. The first questionnaire was intended for mathematics teachers. The second questionnaire was used by the students. The questionnaires included questions related to identifying their experience in using math learning platforms, their functions, preferred learning formats, and expectations (Yunanova, 2016; Chekalina et al., 2018).

The study was conducted among two groups of participants. The first group consisted of 17 mathematics teachers working in various educational institutions. The second group included 56 students enrolled in the same institutions as the teachers.

The survey among teachers was presented in the format of an online survey available through a specialized platform. The questionnaire questions were aimed at researching the following:

- Experience using platforms for learning mathematics, including specifying specific platforms and the frequency of their use.
- Evaluation of the usefulness of various platform features, such as videos, tests and interactive tasks.
- Preferred learning formats (individual lessons, group lessons, mixed learning).
- Expectations from the use of platforms, including expected changes in interest in the subject and academic performance.

The second survey was also conducted in the format of an online survey, but it was adapted for schoolchildren.

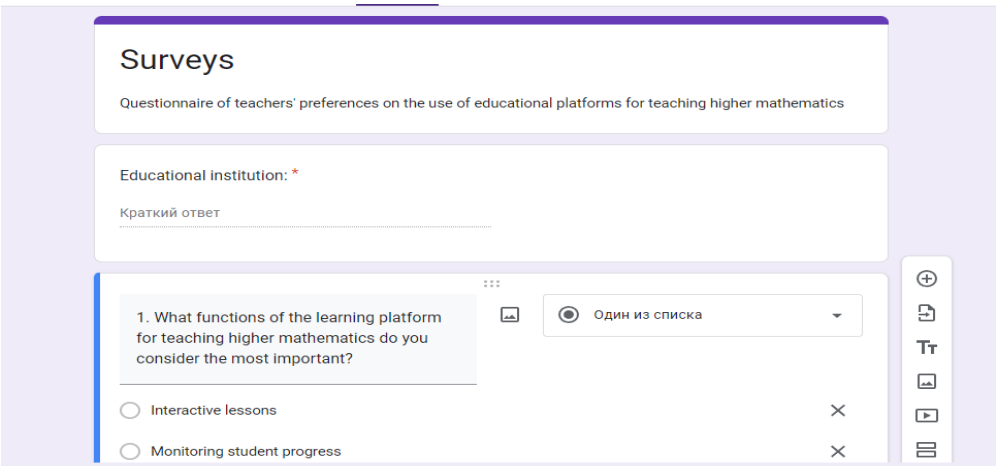
The questionnaires were sent to the participants by e-mail to teachers and through school groups in messengers to students. The participants received two weeks to complete the questionnaires, which provided sufficient time for answers.

The collected data was encoded for quantitative analysis. Qualitative responses are analyzed using content analysis to identify key themes and patterns.

All participants in the study were informed about the objectives of the study and provided with a guarantee of anonymity. The results obtained will be used exclusively for research purposes, which meets ethical standards.

The survey was conducted on the basis of the Google Forms platform. The interface of the questionnaire is shown in Figure 1.

Figure 1
Questionnaire interface



Future university mathematics teachers from various regions of the country took part in the survey. The survey was conducted anonymously.

The purpose of the survey was to identify the main trends and preferences related to the use of educational platforms in mathematics by the participants of the questionnaire. To interpret the results for the survey, a statistical analysis of the data was carried out using appropriate methods, including descriptive statistics, correlation analysis, etc. These methods made it possible to conduct a comprehensive analysis of the preferences and needs of teachers and trainees in using educational platforms in mathematics to study "Elementary Mathematics", "Methods of teaching mathematics" at the university and formulate the main conclusions and recommendations for the further vector of development of educational platforms in mathematics in the educational process (Abroskin et al., 2022; Belyakov et al., 2021).

The method of self-checking the independent work of future mathematics teachers in solving mathematical problems in "Elementary mathematics".

For example, the analytical solution of the following problem in "Elementary Mathematics" can be independently verified using the mathematics learning platform.

Task 1. Solve the system of equations and check the answer using the GeoGebra math learning platform

$$\begin{cases} 3x^2 - y + 1 = 0 \\ 3x - y + 7 = 0 \end{cases} = \begin{cases} 3x^2 - y + 1 = 0 \\ 3x - y + 7 = 0 \end{cases} = y = 3x + 7 = 3x^2 - 3x - 6 = 0 \div 3 = x^2 - x - 2 = 0$$

$$D = \pm\sqrt{b^2 - 4ac} = \pm\sqrt{(-1)^2 - 4 \cdot 1 \cdot (-2)} = \pm\sqrt{1 + 8} = \pm\sqrt{9} = \pm 3$$

$$x_1 = \frac{1+3}{2} = 2,\ x_2 = \frac{1-3}{2} = -1\ .$$

$$y = 3x + 7, \quad y_1 = 3 \cdot 2 + 7 = 13, \quad y_2 = 3(-1) + 7 = 4$$

Answers: $(\cdot)A(2;13), \quad (\cdot)B(-1;4)$

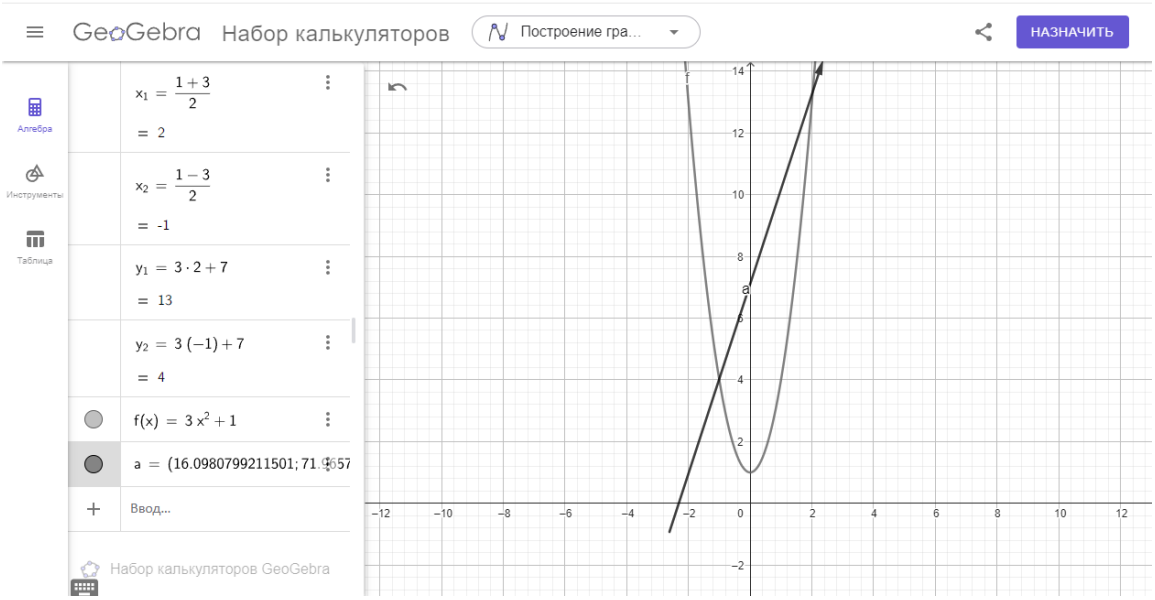
2) Verification by the GeoGebra learning platform (Figure 2).

$3x^2 - y + 1 = 0,\ y = 3x^2 + 1$ 3x-y+7=0, y=3x+7

X	Y
0	1
-1	4
1	4
2	13
-2	13

X	Y
0	7
1	10
-1	4
-2	1
2	13

Figure 2
GeoGebra calculator set



Results

As a result of the conducted surveys, data were obtained from 17 teachers and 56 students. The analysis of the answers revealed key trends and differences in the perception of platforms for studying mathematics.

76% of teachers reported that they actively use platforms to study mathematics in their practice.

The frequency of using the platforms varied: 41% of teachers used the platforms daily, 35% — several times a week.

85% of the students confirmed that they use platforms to study mathematics.

60% of students use the platforms on a daily basis, which indicates a high level of engagement.

In the answers of teachers to the question about the most useful functions of the platforms, the leaders were: interactive lessons (70%), monitoring of academic performance (60%), individual training (55%).

The students identified the following functions: A game approach (80%), Video tutorials (65%), Discussion forums (65%).

The majority of teachers (82%) expect that using platforms will increase students' interest in mathematics and improve their academic performance.

75% of the students expressed the hope that using the platforms would help them better understand the material and prepare for exams.

A comparative analysis of the responses from teachers and students showed that despite common preferences in using platforms, each group has its own accents. Teachers focus on functionality and methods, while students appreciate the interactivity and accessibility of materials. This difference highlights the importance of taking into account the views of both groups in the development and implementation of educational technologies.

As a result of the survey, the following quantitative characteristics were identified. More than 70% of teachers prefer to use educational platforms in mathematics with the ability to create interactive lessons. 60% of teachers consider it important to have a monitoring system for students' academic performance on the platform. Most of the teachers expressed interest in using tools for individualized learning. Table 1 and Figure 3 contain a tabular and graphical representation of the results of the teacher survey.

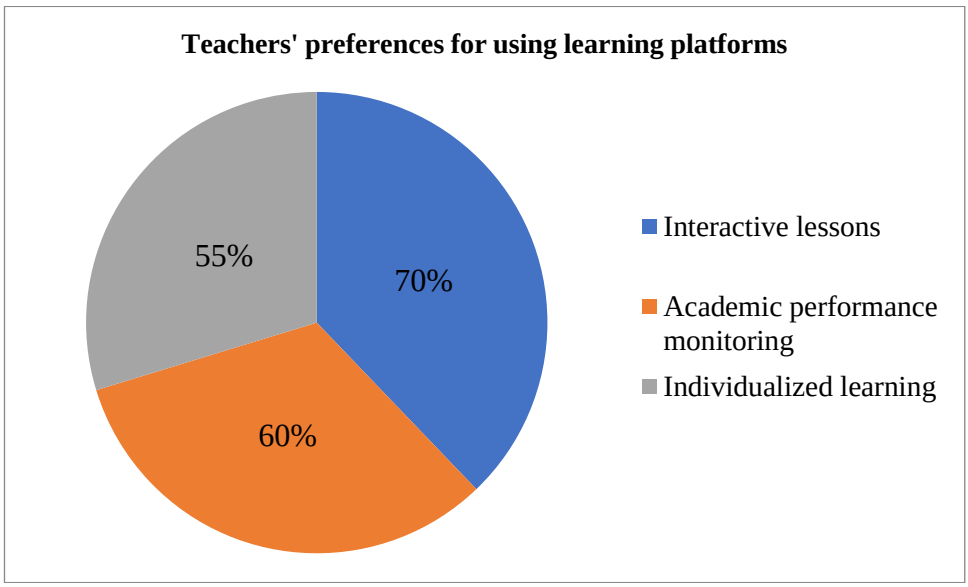
Table 1

Results of the teacher survey

Category	**percent**
Interactive lessons	70%
Academic performance monitoring	60%
Individualized learning	55%

Figure 3

The results of the teacher survey

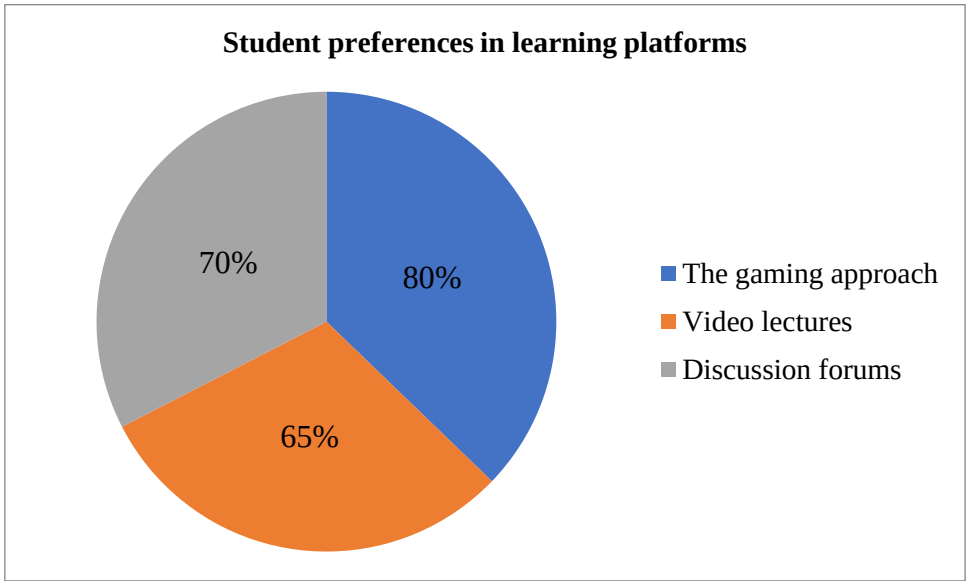


More than 80% of students would prefer learning platforms with a playful approach to teaching mathematics. About 65% of the students expressed a desire to have constant access to educational materials in the form of video lectures. Most students stressed the importance of having online forums to discuss math issues with teachers and peers. Table 2 and Figure 4 contain a tabular and graphical representation of the results of the student survey.

Table 2
The results of the student survey

Category	**percent**
The gaming approach	80%
Video lectures	65%
Discussion forums	70%

Figure 4
Results of the student survey



Summarizing the results of the survey, it can be argued that a larger percentage of both teachers and students are interested in integrating educational platforms into the process of teaching mathematics.

Discussion

Analyzing the results of the survey, it can be concluded that future mathematics teachers are highly interested in using educational platforms in mathematics in classes on «Elementary Mathematics», «Methods of teaching mathematics».

The integration of learning platforms in mathematics can bring great benefits to teachers by using them, making their learning process more interesting and interactive and, as a result, increasing the effectiveness of the learning process. The main aspects of mathematics learning platforms that are most attractive to teachers is the ability to support individualized learning. Teachers also appreciate the high level of interactivity provided by educational platforms in mathematics.

At the same time, the interviewed teachers acknowledge the insufficient amount of study time devoted to the use of educational platforms in mathematics. Also, in some universities, the integration of educational platforms in mathematics is hampered by technical reasons, such as the lack of finances for the purchase.

The majority of students demonstrate a positive attitude towards the use of educational platforms in mathematics. From their point of view, the use of educational platforms in mathematics makes it easier to master educational material compared to the traditional

approach to learning. One of the main aspects most appreciated by students is the possibility of a game approach.

The results of the survey showed that the integration of educational platforms in mathematics into the educational process can significantly improve its quality, interest and academic performance of students. Therefore, it seems advisable to increase the number of academic hours devoted to the use of educational platforms in mathematics.

Conclusion

During the analysis of questionnaires from teachers and future teachers of mathematics on the use of educational platforms in mathematics in the study of «Elementary Mathematics», «Methods of teaching mathematics» at the university, key preferences and needs were identified that should be taken into account when developing and implementing such educational platforms in mathematics. Teachers and future math teachers highly appreciate the interactivity, academic performance monitoring, and individualized learning opportunities provided by math learning platforms. They also demonstrate a high level of readiness to use educational platforms in mathematics, as a self-test of students' independent work in their educational process, which was considered on a specific example as a problem in «Elementary Mathematics».

The results of the survey showed the need to increase the amount of hours devoted to educational platforms in classes on "Elementary Mathematics", "Methods of teaching mathematics" at the university.

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