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The Use of Gamification in Teaching Algebra and Fundamentals of Mathematical Analysis in Academic Lyceums

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Abstract. *This article analyzes the advantages and effectiveness of using gamification technologies in teaching Algebra and Fundamentals of Mathematical Analysis in academic lyceums. Gamification contributes to enhancing students' motivation, making the learning process more engaging, and facilitating the comprehension of complex mathematical concepts. The study examines the impact of interactive game-based platforms, point systems, leaderboards, and reward mechanisms on the educational process. The findings indicate that gamification plays a significant role in increasing student engagement and strengthening knowledge acquisition.*

Key words: *Gamification, Wayground, algebra, mathematical analysis, academic lyceum, motivation, interactive learning, game technologies.*

INTRODUCTION

Nowadays, the use of modern educational technologies and digital tools in teaching Algebra and Fundamentals of Mathematical Analysis serves to enhance the efficiency of the learning process. The integration of gamification elements into practical lessons fosters students' mathematical thinking, encourages quick and accurate responses, and contributes to the creation of a healthy competitive environment.

By combining interactive platforms, point systems, and reward mechanisms with traditional teaching methods, educators can make abstract mathematical concepts more accessible and engaging. This approach not only strengthens students' motivation and active participation but also supports the development of analytical skills and collaborative learning within academic settings.

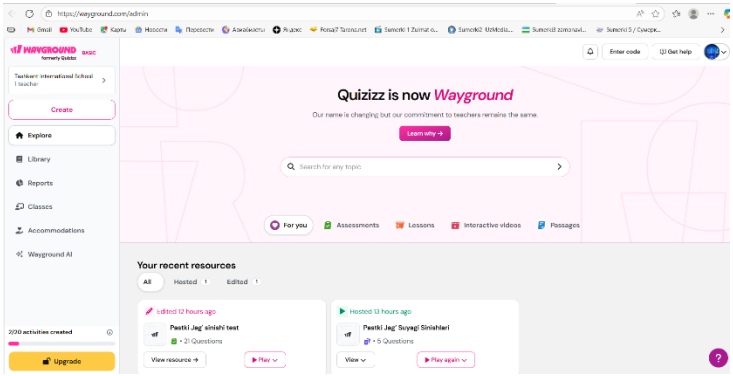
Gamification refers to the application of game elements and mechanics in non-game contexts, such as the educational process. Its primary purpose is to enhance motivation, increase participation, and make learning more interactive. Simulation-based games and game mechanics stimulate cognitive motivation within the education system, foster the development of digital competencies, and create an engaging interactive learning environment. By integrating these approaches, teaching becomes not only more effective but also more appealing to students, encouraging them to actively engage with complex concepts.

Gamification elements make the learning process more enjoyable, interactive, and efficient. Each element serves a distinct function: points provide motivation, levels demonstrate progress, badges recognize achievements, leaderboards strengthen competition, and missions transform learning into an adventure. In addition, in-game currency develops management skills, feedback loops support self-correction, and simulations cultivate practical thinking. Together, these components contribute to a dynamic and student-centered educational experience that bridges theoretical knowledge with practical application.

METHODS

In contemporary education, numerous gamification platforms are widely utilized, among which Kahoot, Wayground, and Mentimeter occupy leading positions. Among these, Wayground stands out as a convenient platform for designing interactive tests aimed at enhancing mathematical knowledge. Its functionality allows educators to create engaging assessments and enables students to participate actively in online sessions, thereby fostering a dynamic and motivating learning environment.

Wayground.com is an online platform designed for creating interactive tests and quizzes, facilitating real-time participation, and assessing students' knowledge levels while conducting lessons in an interactive format. With the support of artificial intelligence, the platform offers opportunities to optimize test design, analyze results, and identify students' weak areas. It is extensively applied to make the educational process more engaging and effective. Through the integration of game elements, real-time feedback, and a visually appealing interface, Wayground.com strengthens the connection between teachers and learners, ensuring that lessons are both interactive and pedagogically effective.



The platform possesses several pedagogical advantages that contribute to making the educational process more effective and interactive. First and foremost, by encouraging active participation, students become more engaged in lessons through game-based elements such as collecting points, advancing in rankings, and receiving rewards. This process fosters a healthy competitive environment and enhances learners' motivation. In addition, the provision of immediate feedback after each response—indicating whether it is correct or incorrect—enables students to quickly recognize their mistakes and provides opportunities for timely correction.

Another important advantage is flexibility. The platform allows the creation of customized tests for different subjects and age groups, thereby supporting differentiated instruction. Teachers can take into account the individual characteristics of students and select exercises appropriate to their level of knowledge. As a result, the learning process becomes not only engaging and interactive but also tailored to the specific needs of each learner.

The platform is often compared with Kahoot, which is considered highly popular today. The following table presents a comparison of the features of both platforms.

Features	Wayground	Kahoot
Game Elements	Avatars, Points, Rankings	Music, Speed-Based Assessment
Question Types	Text, Image, Video, Text-Based Tests	Primarily Multiple-Choice Questions
Response Speed	Speed is Not Important	Quick Response is Important
Homework Mode	Available	Limited

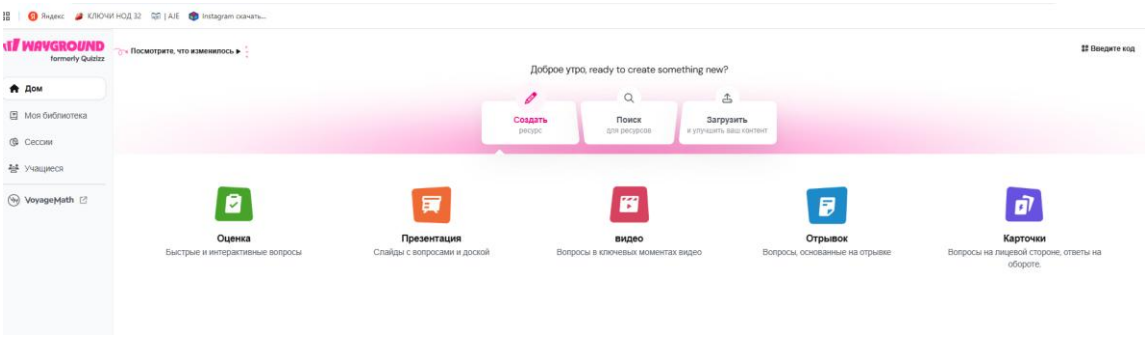
RESULTS

At present, the platform automates functions such as lesson planning, assessment, translation, and adjustment of difficulty levels through artificial intelligence. In addition to tests, teachers can utilize interactive lessons, text-based assignments, video-based exercises, and many other tools. Within the system, after registration, flashcards were created to present problem situations related to the topic

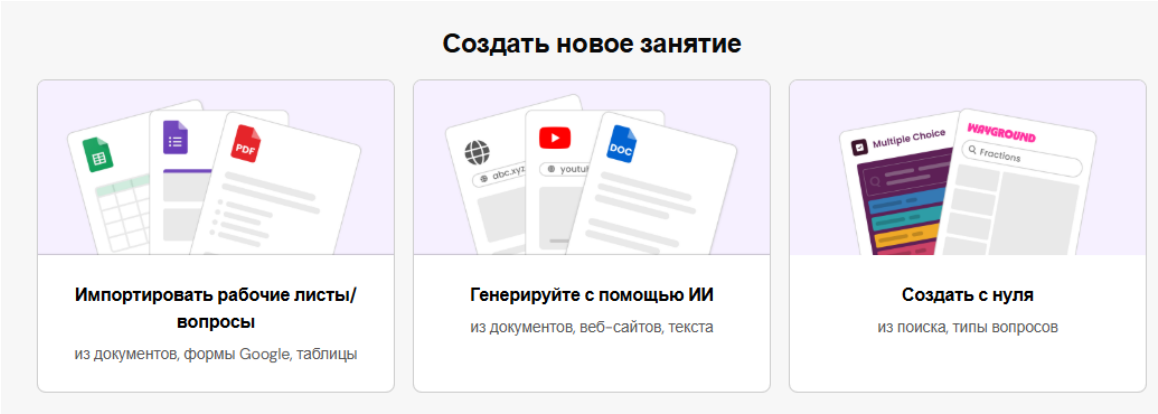
and their solutions to students, while test questions were generated to evaluate students' knowledge and conduct real-time monitoring. These assignments were generated in the Wayground system based on the input of existing materials. The developed digital educational resources are applied during lessons through the use of gamification methods.

Let us examine the process of creating a test on the Wayground.com platform:

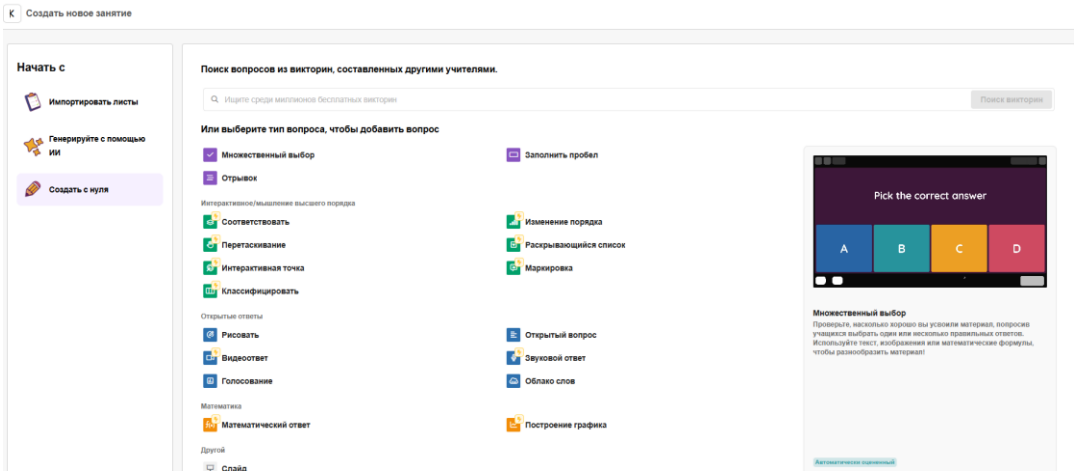
By clicking the **"Create"** button, one enters the **"Assessment"** section.



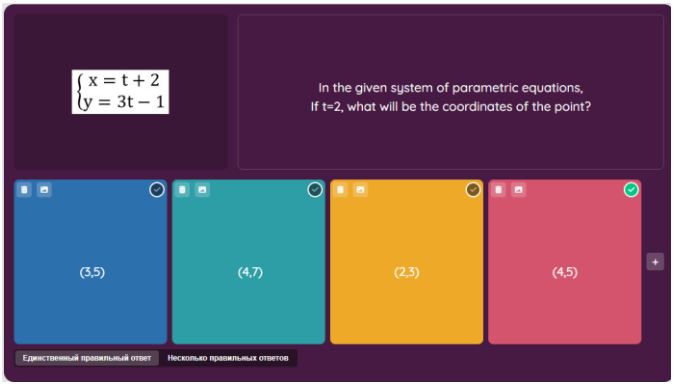
In the resulting window, a quiz can be created in three different ways: by uploading documents, Google Forms, and spreadsheets; through the use of artificial intelligence; or entirely from scratch.



The process of creating a test begins through the **"Create from Scratch"** section. In this step, it is necessary to select the type of question to be developed. For a traditional test, one should enter the **"Multiple Choice".**



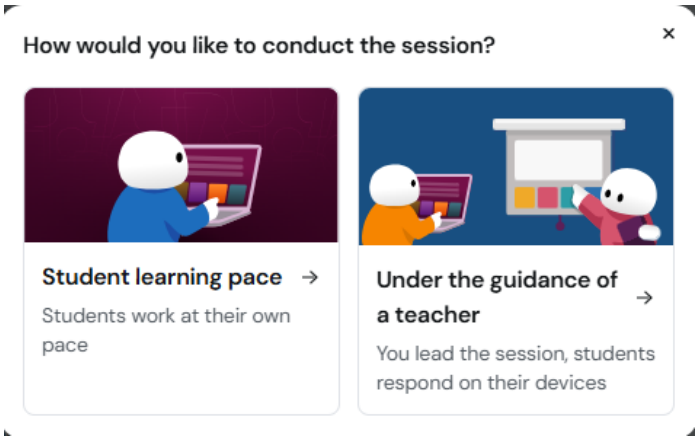
In the current window, the question field and four option sections are completed. The possibility of inserting mathematical formulas contributes to enhancing the quality of tests created in this subject. To add an image, the **"Add Image"** button is used, allowing the selection of the required picture either from the device or from the internet.



Settings such as time allocation and evaluation for the question are configured. The **Save Question** button is then clicked.

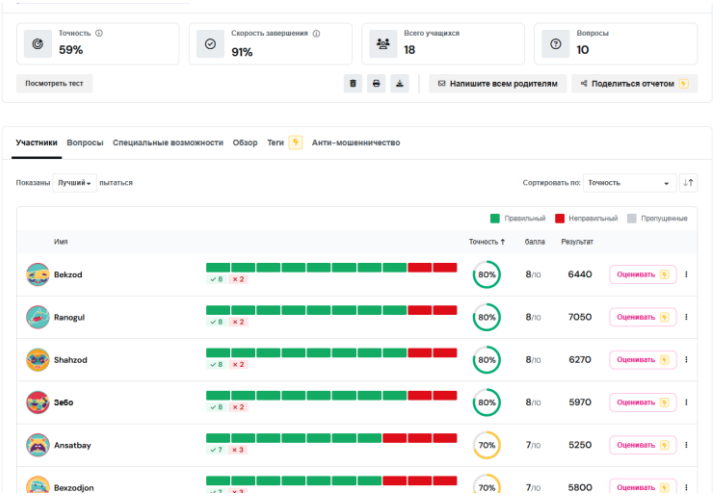
Once all the questions have been created, the **"Publish"** button is clicked.

For use during the lesson, the **"Start Now"** button is clicked. The process can be conducted in two ways: according to the learner's pace or under the teacher's guidance.



It is advisable to conduct the lesson under the teacher's guidance. When the **Start** button is pressed, a QR code and a game code for website access are provided. Students join the game by entering their names. Participants who respond quickly and correctly to the questions can earn higher scores. The analysis of results after each question contributes to enhancing the effectiveness of the educational process.

At the conclusion of the competition, participants who achieve the highest positions are elevated to the podium. This process contributes to enhancing students' motivation during the lesson. Moreover, after the test is completed, the monitoring of participants' activities assists the teacher in evaluating the performance of all students.



DISCUSSION

The Wayground platform has proven to be an effective tool for digitalizing and gamifying the educational process. Through game elements such as points, levels, badges, and missions, students actively participate in lessons, more easily comprehend complex concepts in visual form, and gain opportunities for independent practice. This process enhances their motivation, supports the consolidation of knowledge, and transforms the learning experience into an engaging and interactive format. Particularly in complex subjects such as algebra and mathematical analysis, the use of graphing calculators, simulations, and step-by-step solutions contributes to a deeper understanding of the material.

At the same time, effective use of the platform requires adequate technical resources—such as internet access, computers, or mobile devices. The methodological preparedness of teachers is also of critical importance, as they must adapt Wayground tools to the objectives of the lesson. Considering students' individual characteristics, levels of knowledge, and interests ensures the provision of differentiated instruction. Thus, although Wayground possesses significant potential to make education innovative, interactive, and effective, its full impact is closely dependent on technical infrastructure, pedagogical approaches, and the needs of learners.

CONCLUSION

In conclusion, the Wayground platform significantly enhances students' motivation in teaching the fundamentals of algebra and mathematical analysis. Through game elements, visual materials, and interactive exercises, complex concepts are assimilated more easily, thereby ensuring active student participation in the learning process. At the same time, the platform helps save teachers' time, as AI automatically generates ready-made resources, step-by-step solutions, and opportunities for differentiated instruction. This process takes into account students' individual characteristics and provides exercises tailored to each learner's level of knowledge.

Thus, the Wayground platform holds significant importance as a tool that enables the introduction of modern, interactive, and effective methods in teaching algebra and mathematical analysis. It not only makes the learning process engaging and efficient for students but also provides methodological support for teachers. Through elements of digitalization and gamification, the educational process takes on an innovative form, which expands opportunities for deeper comprehension of subjects, independent practice, and the application of theoretical knowledge in practice. Therefore, the integration of Wayground into the educational process constitutes an essential component of contemporary pedagogical approaches.

REFERENCES

1. Jarrah, A. M., Wardat, Y., Fidalgo, P., & Ali, N. (2025). Gamifying mathematics education through Kahoot: Fostering motivation and achievement in the classroom. Research and Practice in Technology Enhanced Learning, 20(10). Retrieved from ResearchGate
2. Jarrah, A. M., Wardat, Y., Fidalgo, P., & Ali, N. (2024). Gamifying mathematics education through Kahoot: Fostering motivation and achievement in the classroom. dblp Computer Science Bibliography. DOI: 10.58459/RPTEL.2025.20010. Retrieved from dblp
3. Mohammadi, M., Khoshneshin, Z., & Mohammadhasani, N. (2021). Gamification with leaderboard: Effect of educational tools based on competition and cooperation in learning and approach motivation of math lesson. Journal of Technology of Education, Kharazmi University. https://doi.org/10.22061/tej.2021.7996.2606
4. Sofroniou, A., Oguntola, O., & Premnath, B. (2025). Efficacy of Gamification in Mathematics Education: A Meta-Analysis of Its Effects on Student Engagement and Achievement. Journal of Education, Society and Behavioural Science, 38(6), 74–91. https://doi.org/10.9734/jesbs/2025/v38i61442

5. Mayrhofer, J., Weinhandl, R., Baldinger, S., Bleckenwegner, V., & Riegler, V. (2025). Current State of Gamification Design in Secondary Mathematics Education: A Systematic Literature Review. International Journal of Mathematical Education in Science and Technology.
6. Shakadirova N. (2025). The Role of Blended Learning in Preparing Digitally Competent Educators. American Journal of Language, Literacy and Learning in STEM Education (2993-2769), 3(10), 78-83. https://doi.org/10.1080/0020739X.2025.2555333
7. Sánchez-Arévalo, B. M., Valenciano Valcárcel, J., & Fernández-Cézar, R. (2025). Analysis on the Use of Gamification in Mathematics in Primary Education: A Literature Review. Journal of Research in Mathematics Education, 14(1), 30–55. https://doi.org/10.17583/redimat.16133