



Integrating gamification and gaming technologies into Ukrainian education: Transforming the learning experience

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Abstract Changes in the field of education in Ukraine are necessary for integration into the European space. The personality of the learner, pedagogy of partnership, and the constant need to motivate and engage students drive teachers to search for modern forms of work. Gaming technologies can be effective tools for stress relief, adapting to specific situations, and fostering relationships within a collective. The aim of this research is to examine and analyse the impact of gamification and gaming technologies on the educational process in Ukraine. This study employs both theoretical and empirical methods. The theoretical methods include analysis, synthesis, and generalization, while the empirical methods use comparison and description. The study analyses different scientific perspectives on gaming technologies and gamification in Ukrainian education, paying special attention to the implementation of relevant gaming forms of cooperation with students during the period of changes in Ukrainian education, particularly in the educational process. Research has shown that gamification and gaming can have a positive impact on the development of a learner's personality, motivation for learning, relationships within the student community, academic performance, and acquisition of necessary knowledge and skills for future development and career. The research results highlight the usefulness of incorporating gaming technologies in the educational process, particularly in the context of the digitization of Ukrainian education. The study shows the effectiveness of group cooperation, quests, quick quizzes, situation modelling, business games, and other teaching methods. The article provides evidence of qualitative improvements in the educational process within the Ukrainian education system. These changes are primarily driven by the need to cultivate a new type of personality that can develop essential skills and competencies for the future during their secondary education. Gaming technologies and gamification play a significant role in transforming learning by attracting learners' attention and motivating them to complete tasks.

Keywords: educational process, students, game technologies, gamification, critical thinking, digital education

1. Introduction

Teachers are constantly seeking pedagogical teaching technologies that promote camaraderie among students, ensure academic success, motivate them to learn, and keep every participant engaged in the learning process. Therefore, the organization of work in the educational environment needs to be structured in a way that makes every part of the school day interesting, cognitive, and active for the student. A. Verkhovetskiy (2018) suggests that changing activities every 10 minutes is effective for learners. Therefore, it is advisable for teachers to plan lessons that systematically change various work formats, such as group work, pair work, quests, quizzes, and discussions. This approach helps to maintain the class's attention, exercise disciplinary behaviour, and spark interest in the subject, teaching style, and the teacher's personality. A new type of learning emerges – multisensory, which operates on novelty. Educators, adapting to innovations in general secondary education, also need to recognize the necessity for innovative teaching methods for contemporary learners in higher education, understand the importance of implementing various teaching technologies, and be able to work with these technologies. Multisensory



approaches can lead to changes in behaviour based on previous experiences. Skills, abilities, hobbies, and interests are the result of successful learning organization (Diomina, 2018). To understand the content of the modern educational process and the needs of students, teachers must realize their own pedagogical potential.

Gaming technologies and gamification are also significant for modern Ukrainian education undergoing reform. The phenomenon of gamification in education is viewed from pedagogical and psychological perspectives. Research shows that learners engaged in gaming technologies experience a significant increase in motivation (Sagan, 2023).

Therefore, the use of gaming technologies in education is both relevant and necessary. However, it is important to understand the purpose of applying gamification and gaming technologies for learners. It is necessary to distinguish between these two definitions to develop not only motivation but also students' creativity, social skills, and critical thinking (Krutsevich et al., 2021).

Due to the growing interest in gaming technologies in education and their potential for the future, this study aims to analyse the transformation of the educational process through the use of gamification and gaming technologies in Ukrainian education.

Objectives of the study. This study attempts to describe the scientific basis for the differences in the definitions of "gamification" and "game technologies". Additionally, it analyses changes in the educational process in Ukraine, including the introduction of gamification and game-based learning technologies. The study also aims to systematize the game-based learning technologies most often used by Ukrainian teachers and to consider their impact on students' academic performance, abilities and personal characteristics.

2. Literature review

The evolution of the educational space in modern Ukraine is progressing towards accessibility, dynamism, and flexibility. Gaming technologies and gamification of learning provide auxiliary effects on this path. However, it is important to note that these phenomena are not etymologically equivalent or synonymous, despite often being encountered in literature. In their study of gamification in education, V. Gorelov and S. Dariusz (2017) identify the components of this learning process as implementation, resources, learning tasks, learning goals, target audience, and conditions. N. Kravets (2017) describes the following stages of gamification: goal setting, player description, target behaviour description, player path definition, entertainment strategy definition, and tool selection. O. Salata and O. Trukhan (2023) highlight the significant aspects of the gamification process, including the goals, means of enhancing motivation, tasks, and outcomes.

However, we consider the following components of gamification, as defined by J. McGonigal (2010), to be the clearest:

1. concrete goals that ensure high motivation for participation;
2. logical, sequential, and discussed rules among participants that establish specific boundaries for achieving the goals;
3. feedback system (reflection), which ensures the achievability of set goals and the honesty of participants;
4. voluntary consent to participate, perform, and adhere to the rules of the game.

It is important to consider gamification and gaming technologies from various scientific perspectives. Sociologist O. Dyadikova (2018) defines gamification as one of the main methods for enhancing work or learning efficiency. The researcher argues that daily work and educational tasks can become automatic, no longer providing emotional satisfaction from the process, causing fatigue, and turning into routine. Gamification of any educational or work process, as confirmed by numerous scientific studies, research, and experimental sources from psychologists, sociologists, educators, and comments from representatives of other scientific fields, increases motivation, strengthens focus, directs behaviour, overcomes barriers, helps solve life situations, breaks down social and psychological limitations, and so on (Gurieiev et al., 2020; Popov et al., 2021).

According to N. Machunska and M. Oprysk (2019), gaming technologies are effective tools for educators to use daily. N. Kish (2016) discusses the use of pedagogical play as a means of creating a situation that accurately reflects reality. According to the researcher, the essential characteristic of pedagogical play is a clearly defined goal. She identifies several types of games that can be applied in the educational process, including business games, educational games, game situations (simulations of situations), discussions, and training.

A key feature of game-based learning is the sustained engagement of the participant with the topic at hand. Unlike traditional learning, where attention can be easily diverted, game-based learning maintains a constant level of interest and engagement.

Deterding et al. (2011) propose four styles of processes based on varying degrees of game application: serious games, pastimes, game design, and gamification. Among these, gamification exhibits the lowest level of integration of game elements, with the main process remaining classical. Gaming technologies are used in the educational process to exchange knowledge, experience, skills, and abilities in pre-modeled situations with clear rules, tasks, and set goals. Game-based pedagogy is considered an innovative method. However, this method has always been relevant in folk pedagogy, where folk games were used to acquire national experience, values, and behavioural norms. Gamification is a contemporary strategy in education that involves the application of game elements alongside traditional teaching methods, essentially modernizing classical education. Gaming technologies and gamification share common features such as emotional engagement, interest, and excitement in acquiring or testing knowledge, activation of thinking, creativity, critical thinking, and behavioural characteristics, and a focus on the learning process.

Educational transformation processes in Ukraine became noticeable at the beginning of European integration. The country has oriented itself towards Western development indicators and improved the quality of education. However, the formation of the “New Ukrainian School” concept presented the greatest challenges. Additionally, the pandemic has led to the emergence of blended learning, combining remote and offline methods. The digital educational environment has also seen active development, including digitalization, and competition among educational institutions, primarily higher education institutions (Bakhov et al., 2021).

The personalized learning approach known as High Touch High Tech involves the teacher taking on the role of coordinator, coach and mentor. Their primary focus is on developing students' soft skills. The main goal of the learner is to develop creative and critical thinking skills, and to apply acquired knowledge while continuously seeking new ideas and information. It is important to embrace change, understand its necessity, and possess the ability to adapt to it. The quality of educational services is the primary objective of educational institutions.

The integration of gamification and gaming technologies can be a valuable tool for reforming Ukrainian education. Modern teachers do not fear implementing collaborative forms of learning with students, as supported by experience, sociological surveys, and research that utilizes cutting-edge technologies. Nowadays, educational institutions are well-equipped with technical devices and gadgets, including Wi-Fi access. Digital educational centres, computer academies, STEAM centres and laboratories, and IT schools for children of all ages, from elementary school, are actively being created. Interactive science museums are also developing, and e-textbooks and e-journals are being introduced. The digitization of education has created additional prerequisites for the application of gaming technologies in teaching (Kubitskyi et al., 2022; Dobroskok et al., 2023).

J. Bludova and O. Ilyina (2020) discuss the main focus of educational reform, which includes changes in the educational process aimed at developing students' individuality, fostering partnership relations with all participants in learning, updating the content of education, applying knowledge in practice, gaining life experience, and developing new skills and ways of thinking. Complex innovations must be implemented using work formats that do not overload students, but instead relieve tension, stress, eliminate rote learning, inattention, and negative behavioural manifestations.

Research should focus on e-textbooks, which are part of the educational process transformation and are being actively implemented with gaming technologies. Trojan I. (2023) tested e-textbooks in mathematics and computer science for 5th and 6th graders in the New Ukrainian School. These textbooks are designed based on the principle of microlearning, which involves presenting educational material in small parts without overwhelming students with theoretical content. Practical exercises presented in such textbooks prepare students for the realities of everyday life. The discussed textbooks utilize a range of optional apps for gadgets, smartphones, and other multimedia devices. These apps serve as auxiliary tools, provided that the educational institution has insufficient technical innovations. In the integrated course textbook “Exploring Nature” for 5th and 6th grades, each unit includes gaming innovations such as STEM projects, mental maps, tasks for establishing sequences, blanks, creating diagrams, graphs, schemes, and crosswords.

Higher education institutions, tasked with preparing teaching professionals who are highly proficient in quality digital knowledge, teaching techniques, assessment, and student development, experience additional challenges on the path of educational system changes. Such educators, according to O. Vlasii O. (2021), must develop the ability to navigate the information-digital space, create and use various educational digital resources, apps according to the needs of learners and the educational institution. In our opinion, the introduction of the first online platform for the development of digital literacy “Diia. Digital Education” by Ministry of Digital Transformation of Ukraine (2021), has become relevant for the development of digital competence among citizens, civil servants, and educators in particular. The platform offers a range of educational resources, including guides, directories, simulators, and podcasts, covering topics related to science and technology, IT, as well as sociological, school, and family issues. At the same time, users can create their own trajectory of digital literacy development and test their knowledge with online assessments.

A. Stepanova-Kamysh (2023) highlights the importance of changes for the educator's personality, professional growth, systematic development, and learning. Additionally, the researcher identifies five digital skills that should be inherent to modern teachers:

- managing a relevant social media account, both personal and for the class or educational institution, highlighting only interesting relevant events and materials with emphasis on good quality photos (video material), as well as creating QR codes, using hashtags;
- ability to produce high-quality video lessons, manage a YouTube channel, edit video lessons, create “live” photos;
- ability to demonstrate these lessons to students, i.e., skilfully integrating parts of previously recorded video lessons into the lesson;
- ability to use various virtual whiteboard and platform tools, services; creating online whiteboards;
- using links; conducting own webinars.

An example of analysis is that of Oleksandr Pidhainyi, a history and law teacher at a school in Dnipro, as described by J. Kokoshko (2024). Pidhainyi uses neural networks and artificial intelligence to support and stimulate the learning process in his classes. For example, the educator creates chatbots using the SendPulse service. Additionally, he generates graphic content for presentations and comics with ImageCreator. Teacher also uses a project-based approach for 3D modelling on the Tinkercard

platform. Undoubtedly, this approach to changes in the educational process has a positive impact on communication with students, increases their interest in the subject, encourages learning and achievement, motivates research, and activates critical thinking.

The digitization of Ukrainian education has a positive impact on the development of teachers, their professional growth, and creates conditions for friendly, collegial communication between students and teachers. Additionally, it shapes quality personal characteristics of children.

Ukrainian teachers actively use gaming formats, seamlessly integrating them with the digital capabilities of modern education. For example, lapbooks are a simple teaching tool that can be collaboratively created by students and educators. They consist of a thematic booklet with inserts, postcards, and drawings. This cooperative group activity is suitable for younger schoolchildren and can be enhanced with multimedia tools (Gilberg, 2020; Semenets-Orlova et al., 2022).

Another popular form of collaboration between teachers and students is storytelling, also known as informational-gaming projects, as defined by researchers O. Vasilets and N. Bilousova (2019). Like other gaming forms, storytelling aims to reduce tension in the classroom, increase motivation for learning and knowledge acquisition, focus attention, and evoke emotions and associations. It involves presenting lesson material through an engaging story.

Role-playing games hold a unique position among gaming projects. According to I. Golter (2018), this type of game is the most engaging, involving all members of the student body and the teacher in joint activities. Role-playing games can be implemented in various ways, such as through imitation games, success situations, and situation simulations. Depending on the lesson type, educational goals, and tasks, this can include conferences, discussions, project defences, meetings with notable individuals, and more. Educational games and gamification are frequently used in student preparation. R. Kravec (2018) recommends using business, organizational-activity, and role-playing games when working with students. This varied use of different technologies and forms of learning can make the professional training of future specialists in various fields much more effective. Games can be used to help students acquire basic professional skills and consolidate specialized knowledge. This idea is supported by several researchers, including J. Rudenko (2019), V. Starosta (2021), V. Kyrlyenko, N. Kyrlyenko, A. Kryzhanovsky (2023), O. Vinnytska, T. Kornienko T. (2022).

Gaming technologies and gamification of the learning process expand the teacher's opportunities in presenting educational material, adapting it to the needs of learners, accumulating the best personal qualities of student and student youth in acquiring quality knowledge.

3. Methods

The research process employed the following methods: theoretical (analysis, synthesis, generalization) and empirical (comparison, description). The scientific basis was developed through the study of literary sources, statistical and experimental data, and information from Internet publications and social networks. The studied game technologies in education were compared in terms of their frequency of use and impact on the student's personality. The description of transformation processes in modern Ukrainian education was carried out objectively.

4. Results

Based on the analysis of scientific sources, sociological studies, experimental reviews, and observations, this selection presents relevant gaming and gamified methods, technologies for collaborative work with learners, mobile applications, and interactive platforms commonly used by Ukrainian educators in modern education:

1. WebQuest, Among Us, Fortnite, augmented reality (AR) and virtual reality (VR) technologies, artificial intelligence, interactive whiteboards (Jamboard, MIRO, IDroo), virtual laboratories, robotics, sketchnoting (replacing outdated presentations), mind maps, timelines, mental maps, diagrams, rebuses, online libraries, online surveys (technologies and video games);
2. LearningApps.org, Google services (including Meet), Moodle, Genially, Kahoot, AR Book, Zoom, Classroom, ClassMarker, Padlet.com, Canva, Bubbl.us, ClassDojo, Mindomo, Thinglink, Glogster, LanguageTool, CatBoost, Flippity, WordItOut, Mentimeter, NZ.UA, e-school, Wordwall (web services, platforms).

Educators in Ukraine have started to incorporate digitization into education, not only through the Concept of the 'New Ukrainian School' or other regulatory acts adopted by the Ministry of Education and Science of Ukraine or the Cabinet of Ministers of Ukraine aimed at modernizing education in the country, but also out of necessity. Real-life circumstances are more effective in pushing for changes than virtual ones.

5. Discussion

The modern conditions of educational transformations in Ukraine and the world have prompted changes in the educational process. These changes aim to ensure that education provides quality knowledge and skills, fosters self-sufficient individuals and future competitive professionals, and promotes creativity and critical thinking in learners. Consequently, the assessment of a teacher's professional competence now heavily relies on their ability to implement digital learning, interactive methods, and innovative forms of collaboration with students. These qualities are essential for a teacher to be considered an

innovator in the modern era. A teacher must possess contemporary knowledge and skills that meet the demands of the time. Nowadays, it is essential for educators to possess digital skills. Without them, the teaching process and its evolution would be unimaginable (Balci et al., 2021; Pet'ko et al., 2021; Bakhov, 2021).

It is still too early to evaluate the effectiveness of the reforms that are changing the Ukrainian education system. However, scientific research and educators' experience suggest that it is necessary to preserve both classical forms and methods of educating learners. Negating the experience of traditional Ukrainian pedagogy, teachers, and scholars is not recommended as it may not yield the desired result. One of the important scientific issues in pedagogy is the combination of traditional teaching methods with innovative ones, which is of a debatable nature and requires thorough experimental research.

6. Conclusion

Based on the analysis of scientific sources, the experience of modern Ukrainian teachers, and experimental observations, the following remarks can be made regarding the transformation processes in education, the introduction of game technologies, and the use of gamification. Changes in Ukrainian education are occurring due to the state's need to join the European integration processes and enter the global market, which involves competition in various fields. The digitalization of education meets the requirements of modern times and serves as a necessary link between all participants in the educational process. It facilitates communication, learning, and increases motivation to acquire knowledge.

Ukrainian teachers are actively using interactive forms of work with students, mobile applications, platforms, and services. Game-based learning technologies and gamification are particularly important as they are suitable for use in the rapid digitalization of learning. Higher education institutions should focus on training teachers with professional digital skills. Game technologies can greatly facilitate communication between teachers and students, create an atmosphere of ease, and motivate learning. They are a popular form of work for students of all ages and can encourage critical and creative thinking. Additionally, they are appropriate for use in modern transformations in Ukrainian education.

Ethical considerations

Not applicable.

Conflict of Interest

The authors declare no conflicts of interest.

Funding

This research did not receive any financial support.

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