GAMIFICATION APPROACHES IN FOSTERING OF MODERN EDUCATIONAL ECOSYSTEMS

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Abstract: *A new impetus for the development of information technology in the educational process was given by the COVID-19 coronavirus pandemic and the quarantine imposed to prevent the spread of the disease. Due to the quarantine and the war in Ukraine, the educational process has moved to the online space, which has created conditions for remote learning using media content. Media education is designed to prepare students for life in the new information environment, to teach them to fully perceive different types of information, to understand and master the means of communication based on interactive forms of communication. It also improves the quality of information perception, students' engagement in interactive classes and the engagement of all participants in the learning process in the online environment. Thus, today's realities require new approaches and teaching tools that should be implemented by modern higher education institutions in the era of Education 4.0. In order to implement new approaches to the organization of high-quality online learning, it is necessary to adhere to the Concept of Digital Transformation of Education and Science, namely the Effective Usage of Digital Technologies in the Educational Process. In the context of long-term digital learning and the lack of live communication with students, as the result the new problem occurs - decrease of motivation to learn. For solving this problem teachers need to develop and apply new approaches to the organization of online learning. One of the approaches is implementation game-based educational technologies, namely gamification the*

educational process. Gamification is the process of using game design principles and mechanics in non-game contexts, such as education, to make the learning process more engaging and effective. Gamification is used to deepen learner engagement and motivation, enhance their learning experience and improve academic performance. Virtual gamified teaching is an effective approach to studying process in case if the right platform, studying material and tools are used. One of the approaches to gamification is the development and use of a set of video lessons with a virtual teacher, which helps to draw students' attention to important points of the lecture and diversify the explanation of infographic objects.

Keywords: *digital technologies; gamification; virtual teacher; interactivity.*

Introduction

The concept of gamification is popular today and is used in various ways. One of the most powerful of them is learning and acquiring new skills, improving one's own abilities, switching concentration, etc. Such training can be carried out in groups, at universities (classical education, higher education), in the process of acquiring special skills in short-term courses, during independent study of various disciplines, foreign languages, new practices, etc. A separate area is corporate training for company employees. Games generally help to change a person's state of mind - their mood, sense of self in different roles, teamwork, etc. That is why, in training, games allow you to acquire knowledge and practical skills in a particular area more quickly and efficiently. However, the systematic use of gamification meets such goals as unlocking new abilities of game participants, introducing new creative methods of generating new ideas, and acquiring new knowledge and skills. If gamification is introduced into the educational process, it is necessary to take into account its features and formats. The active introduction of distance and blended learning with the use of remote teacher-student communication (for example, in the context of the COVID-19 pandemic and wartime force majeure) requires new approaches to the introduction of game elements into learning management systems.

The environment of a learning management system has its own rules, roles, limitations and opportunities, and this partially coincides with the game environment. For students of various types of education, professional games related to their future profession and game

elements that will promote their activity in the learning environment are also important. Gamification has been used in the educational process for a long time and means the integrated use of game elements in education in accordance with the methodology for obtaining certain competencies.

Analysis of recent research and publications. Game elements have long been used in learning, both offline and online. The popular trend of gamification allows participants to create special characters, helps to form game thinking and introduce dynamic games. It is important to create active situational tasks, case studies, simulations, etc. for training. When analyzing professional disciplines, it is important to simulate future professional activities [1]. Among the different studies on gamification in e-learning, we can distinguish the following areas

- Identification of gamification processes and their impact on learning processes and outcomes,
- Psychological studies of the impact of gamification processes on learning outcomes,
- Development of gamification design models for the information environment,
- Development of educational games and gamification modules for the e-learning environment,
- Development of models for the evaluation of gamification tools and processes used in the electronic information environment.

If we talk about the areas of application of gamification in the learning process, it is advisable to distinguish between learning in an educational institution through an electronic information educational environment, corporate training, self-study using special platforms, etc. Let us consider the main definitions and approaches to the organization and implementation of gamification. Gamification in e-learning is the process of integrated use of game elements to gain new experience, test new methods, forms of organization, simulate various functions and actions implemented in the electronic information and educational environment [1-3]. Simple elements of gamification have been introduced in help systems for a long time (the famous paperclip in MS Office or another character that could be chosen by the user [4]. Interestingly, this approach was helpful for some users, while for others it only caused irritation). Such approaches ease the situation in circumstances that are not clear to the user, and reminders help them make the right decision about what to do next and how to do it. In

modern office applications, there are no game characters, although we believe they can also help in some cases. From this point of view, we believe that it would be advisable to retain such tools. On the other hand, the results of experiments on the personification of various objects (for example, geometric shapes) make it easier for the user to find information and understand their next steps in the electronic environment [5]. For example, in the Duolingo app, a game character motivates the user to continue and helps them. The character appears only after completing microtasks. In addition, such applications have many game characters that speak, answer, and confirm the correctness (Fig. 1) [6].

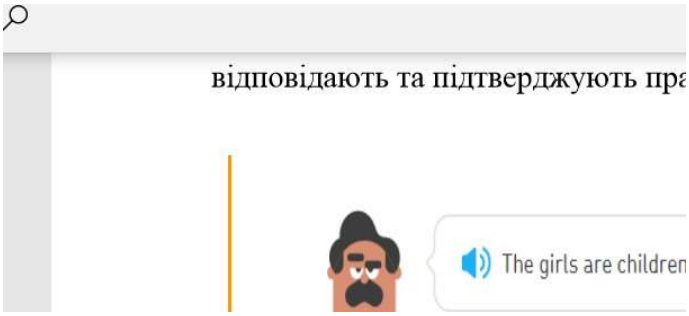

Fig. 1. An example of a game character [6] The application also implements the method of small steps and achieving micro-goals.

Gamification in education is aimed at increasing the motivation of students and pupils to acquire new knowledge and skills. Discussions about the introduction of game-based methods for different age groups have been going on for a long time. The game is the main tool for children and is already becoming an additional tool. Similarly, for adult higher education students, gamification is a tool for learning, but not the main method of learning [7]. The introduction of e-learning has contributed to the intensification of various studies and the introduction of gamification in various educational electronic systems. A number of problems with such use have not only remained, but also increased. Among them are:

- Low level of controllability of educational processes,
- Inappropriate motivational approaches.

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- Low level of control over educational processes,
- inappropriate motivational approaches,
- technical problems,
- insufficient levels and number of supporting technical staff,
- lack of close and high-quality connection between gamified elements of the general environment and individual lessons, disciplines, etc.

During the COVID-19 pandemic, distance learning has gained many opponents, due to the immediate need for its use by teachers without sufficient qualifications, lack of adaptive teaching methods, students' readiness to perceive information in new formats, etc. Game moments can become a trigger for students' interest and an impetus for increasing their own activity in learning. Increasing the efficiency, effectiveness, motivation and engagement of students in e-learning can be achieved through the use of game mechanics and game dynamics. The development of e-learning and gamification in the educational environment is not only related to challenges such as the pandemic and martial law. Game elements are used to support home learning, asynchronous learning, in various non-formal education courses, in distance and blended learning. The essence of the main approach to creating gaming services is that pupils and students learn best when they not only get acquainted with and absorb theoretical material, but also when they actively play with the help of special gaming services. This approach is based on the theory of motivation and the state of flow support. Game situations allow you to focus on a specific task and get the best results while being in the flow of the learning space [7-10]. The most common and generally accepted definition of gamification for learning can be formulated as follows: it is the organization of gamified educational processes using game thinking, mechanics, cases, special motivational mechanisms to obtain high-quality programm learning outcomes. That is, it involves people in a non-game context

[9]. If we consider business trends in the development of gaming, the goals of game-based learning are to engage employees in order to increase their productivity, improve their skills, personal development and create innovations [11]. The educational model, which is based on the goals similar to those of a business model, for example, Alex Osterwalder's Business Model Canvas, is focused on acquiring high-quality knowledge and skills that can be monetized and presented at a higher level in the form of various types of professional implementation. Elements of gaming should be tied to the goals of learning in general and studying a specific discipline, taking into account practical cases for future professional activities. First of all, this applies to professionally oriented disciplines. However, practical cases can also be used in classical disciplines such as mathematics, physics, Ukrainian language, and culture. The gamification canvas model consists of nine sections that break down the key elements in the development of gamification projects.

Methodology

Gamification is the process of introducing game elements to test and improve performance and achieve success. The well-known comprehensive model of gamification in education includes learning processes, target areas, accumulation of points and bonuses, performance of various learning roles and formation of a learning profile, and, most importantly, obtaining learning outcomes as a set of knowledge and skills that are formed and consolidated not only in traditional processes but also during educational games. Figure 2 shows a general model of e-learning supported by gamification. Such a model should be based on educational goals, form key indicators, and have clear rules for the target behavior of learners, which are presented in their profiles. The accounts or profiles of learners and players contain results (indicators). Each game has its own activity cycles, which are tied to the learning periods.

<table>
<tr><td colspan="5">Educational model</td></tr>
<tr><td>Educational objectives</td><td rowspan="2">Applicant profiles</td><td>Target behaviour</td><td>Game rules, gaming at different levels</td><td rowspan="2">Activity cycles</td></tr>
<tr><td>Key indicators</td><td>Electronic resources and their use, message</td><td>Game situations of the discipline</td></tr>
</table>

		dynamics		
Costs		Deployment		Support

Fig. 2. Educational model of gamification (improved by [11])

Problem-based Learning (PBL) models involve obtaining points and badges, forming a leaderboard, which encourages participants to become more active and continue their work in the EEIS. The game involves the introduction of emotionally positive and dynamic mechanics. There is a well-known formal approach to game design and game research by Hanicke R., Leblanc M. and Zubeck R. - MDA Framework). The template divides the game into three elements: mechanics, dynamics, and aesthetics [12-13]. This approach involves the introduction of special modules for activity monitoring, mechanical scoring of activity, and dynamic presentation of results using various design approaches. However, the context of the game at the discipline level should be formed by the teacher himself with the help of the elements he proposes. This can be an environment for creating crossword puzzles and quizzes or a testing environment, set deadlines for completing tasks, etc. The main thing is to remember to follow SMART principles when creating a gamified environment at different levels. Namely, the definition of a specific goal, the measurability of gamification goals, the availability of a team for implementation, the realism and time constraints of both the introduction and implementation of gamified educational processes [14].

Student learning in eLearning requires support for motivation to learn, to participate in social learning networks, as well as the interest of teachers and the management of the educational institution in the active work of both students and teachers.

The goal of introducing a comprehensive gamification system is to engage motivated students in games that simulate professional work, allow them to conduct experiments in accordance with the topic of study, and enable them to gain a new level of competence. Gamification built into learning systems also allows you to create a feedback loop based on the analysis of data on student actions and learning outcomes. This feedback can be used to adjust the educational process and improve game elements. A gamification system can be represented by three levels: components, mechanics, and dynamics. The component level allows you to organize gamification processes that engage players. It forms the dynamic monitoring of player activity. Dynamic monitoring involves the use of dynamic game elements. It is

important that all elements should be integrated into a single system and have functional outlines. Elements can be represented, for example, by time limits, scores, emotional contour, plot contour, progress contour, social interaction contour [15]. Processes for engaging applicants in the game include completing tasks, giving chances, organizing competitions, cooperation, feedback, accumulating points, evaluating results, etc.

Fig. 3 shows three levels of creating a gamified system.

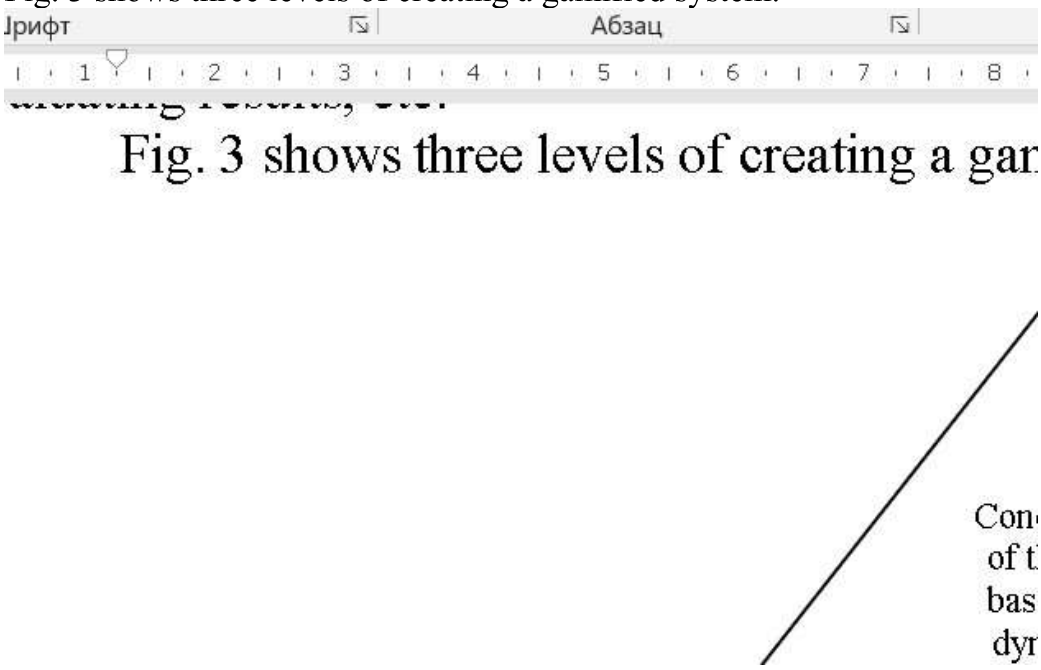

Fig. 3. Elements of a gamified system [15]

Processes for moving and engaging students in the game include completing tasks; giving chances; organizing competitions; cooperation, feedback; accumulating points; evaluating results, etc. Examples of the use of gamified systems include special courses on Moodle, Coursera, and individual gamified software applications. Such solutions can be the basis for creating a comprehensive gamified learning management system. Various classifications of gamification processes (gamification) indicate that it has penetrated various spheres of life. The main reasons for this are based on people's emotions and the formation of the feeling "The game is easy and fun!".

Conclusion

Known gamification methods involve covering various aspects of learning with gamification processes to positively influence students' motivation and learning outcomes. However, an analysis of the

implemented gamification software modules on individual educational platforms and in learning management systems shows that they are fragmented and do not cover all the identified properties. In addition, the proposed methods do not take into account the peculiarities of the educational process at the university in distance and blended learning. The purpose of improving gamification processes is to increase the level of students' motivation to learn, their activity, and practical skills in performing game exercises aimed at mastering specific topics of the discipline. In this process, it is important to develop a sense of satisfaction with working in an e-learning environment and an understanding of the need for their own activity, which should be taken into account and evaluated.

The new generation of students actively uses microlearning on modern platforms and expects similar tools in the information environment of their university.

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