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CLOUD SERVICES AS A MEANS OF GAMIFICATION IN THE TRAINING OF FUTURE TEACHERS

The relevance of using cloud services as one of the means of gamification of the educational process is becoming increasingly evident in the context of modern challenges of higher education. The article analyzes the experience of domestic scientists in the implementation of gamification technology in the educational process of higher education institutions. The researchers focus on both game simulators as an effective means of gamification and the capabilities of cloud services, in particular Kahoot!, LearningApps and Wordwall. The article also examines such cloud services as Kahoot!, LearningApps, Wordwall, Educaplay, Classtime, explores their main functionalities and considers which elements of gamification technology (game rules, leaderboards, points, game aesthetics, etc.) are included in these environments and how they affect the learning process of higher education students. A comparative characterization of the mentioned services is made according to the following features: functionality, type of content, gamification elements, visualization, integration with other platforms, interface languages, free and paid tariffs. The article also highlights the results of a survey of first-year students of the Faculty of Physics, Mathematics and Informatics of Pavlo Tychyna Uman State Pedagogical University, specialties «Secondary Education (Mathematics. Computer Science)» and «Secondary Education (Computer Science)» of the 2022/2023 and 2023/2024 academic years, on their familiarity with the concept of «gamification technology», as well as on determining the most effective and convenient, in their opinion, gamified cloud tool. As a result of the survey, the majority of respondents chose LearningApps for its extensive and free tools, and Kahoot! for its interactive and visually appealing service. In addition, both services are well known to students from school, which played a key role in their choice. The study concluded that cloud services are a widely used tool in educational activities, they make it possible to make the educational process interactive and interesting, while gamification elements often serve as a motivating factor and allow students to fully immerse themselves in the game-based learning environment. This approach contributes to better assimilation and understanding of educational material, as well as to improving the efficiency and quality of the educational process.

Keywords: gamification, future teacher, professional training, gamification technology, cloud platform, cloud service, Kahoot!, LearningApps, Wordwall, Educaplay, Classtime.

Introduction. The process of training a modern teacher is a rather complex and complex concept that requires the use of various means, methods and technologies to implement a competence-based approach, which is one of the main ones in the modern education system. One of these technologies that has become widespread in the domestic and foreign educational space is the technology of gamification.

Given that gamification involves the use of game elements and mechanics in non-game situations, there are many tools (both digital and more traditional) to apply this technology in the process of training a future teacher. However, in our opinion, one of the most promising areas in this context is the use of cloud services that allow you to create specialized interactive environments, tasks, collaborative projects, and game scenarios that stimulate the activity and interest of future teachers in their own professional growth.

Review of scientific literature. The problem of future teacher training has been studied in various aspects by domestic and foreign scholars. The issue of introducing game technologies, gamification technologies was considered in the works of O. Vinnytska, O.Zhernovnykova, H. Kobernyk, O. Kobernyk, M. Kovtaniuk, A. Kovtun, V. Kolmakova, M.Korduban, T. Kornienko, K. Matveiev, M. Medvedeva, N. Nalyvaiko, O. Nalyvaiko, L.Peretyaga, S. Pereyaslavska, O. Smagina and others. The problem of using cloud services in the process of training a future teacher has been studied by T. Bondarenko, T. Vakaliuk, D.Voznosymenko, T. Godovaniuk, M.Kovtaniuk, T. Makhometa, M. Medvedeva, O.Pidhornyi, S. Rudnytskyi, O. Spirin, V. Stetsenko, H. Tkachuk, I. Tyagai, and others.

Researcher M. Kovtaniuk proposes the use of interactive services, including cloud services, in the educational process of a higher education institution. In his opinion, this allows to create conditions for self-realization of students, makes learning more interesting and dynamic. For a teacher, such services provide a wide range of tools for creating interactive tasks that help to intensify the learning activities of students. Among the online services, the researcher identifies ClassTools.NET, BrainFlips, Flashcard Machine, Wixie, and LearningApps [3].

Scientists M. Medvedeva and S. Rudnytskyi also testify to the benefits of using cloud services based on Web 2.0 technology. In particular, the researchers, considering the LearningApps online service, argue that interactive services can increase students' interest in learning [6].

H. Tkachuk and M. Medvedieva, studying the problem of using information and communication technologies as a means of forming the information and digital competence of future teachers, separately highlight cloud-based tools that can be accessed from any location and any device [9].

Thus, modern research shows that cloud services are an easy-to-use learning tool that allows to increase the level of cognitive activity of students and make the educational process interactive and interesting. Therefore, in our opinion, it is necessary to consider cloud services that allow introducing elements of gamification technology into the educational process.

The purpose of the article is to explore the possibilities of using cloud services as a means of gamification in the training of future teachers.

The main part of the research. In today's world, learning as a process is constantly transforming, requiring teachers to adapt to the requirements of the present and exposing their activities to the latest technologies. One of the innovative practices that has found wide application, including in the field of education, is gamification. Educational gamification involves the use of game elements in learning activities to engage students and create a stimulating environment for their active learning and development. This approach brings changes not only in the ways of teaching, but also in the approaches to assessment and motivation of students.

According to G. Kobernyk, one of the main advantages of introducing gamification technology into the educational process is that it allows to move from maximum teacher involvement to independent and motivated activities of higher education students. This is due to the presence of a learning problem that helps to increase the mental activity of students [2].

Game simulators are one of the means of gamification that can be used in the educational process. For example, researchers M. Medvedeva, O. Zhmurko and M. Kovtaniuk

suggest using game simulators to study programming-related disciplines: «Programming», «Specialised programming languages», «Java programming». Among the simulators proposed by the researchers are CodinGame, CodeCombat, CodeMonkey, Codewars, Hacker.org, Vim Adventures, Elevator Saga. According to researchers, the use of such tools significantly contributes to increasing the level of motivation to learn programming and cognitive activity in higher education students [5].

However, in our opinion, most game simulators are specialized tools, i.e., they are designed to study a particular discipline or field of science, while a significant number of cloud-based tools can be used to study various educational components.

According to the researchers S. Pereiaslavska and O. Smahina, it allows to interest students in learning, activate attention, interest and thought processes. However, the use of gamification technology in education should be clearly planned, and it is important to take into account the individual characteristics of students. As a means of gamification, scientists suggest using educational services that have recently been widely developed and implemented in the educational process. Among them, researchers note the cloud service Kahoot [7], one of the elements of which is a «pedestal», i.e. a kind of leaderboard that serves as a component of gamification and motivates students to give the right answers as quickly as possible. This approach points out gaps in students' knowledge and promotes interest in learning the material.

K. Matveev, among the characteristic features of the introduction of gamification technology in the process of training future teachers in higher education institutions, along with the inclusion of game elements, the development of clear and logical game rules and the preservation of game aesthetics, highlights the creation of favorable conditions for the preparation of future teachers to use in their future professional activities various online services and platforms that involve the use of gamification elements, in particular: MotionMathGames, CodeSchools, Spongelab, Foldit, Radix, etc [4].

We agree with the opinion of O. Vinnytska and T. Korniienko, who argue that gamified learning in higher education institutions allows students not only to achieve learning goals, but also to develop their creativity, ability to make decisions independently, to carry out interpersonal communication, etc. In addition, researchers consider cloud services such as Wordwall, Kahoot! Wordwall, Kahoot! and LearningApps, noting that they provide a wide range of tools for implementing gamification technology in the educational process [1].

Let us consider cloud-based educational services that include gamification elements.

Kahoot! (https://kahoot.com/) is a cloud-based platform that allows you to create interactive tests and quizzes. The platform is conditionally free, but the free access is enough to work during a class. Kahoot! allows you to conduct quizzes in real time, assign them to students for a certain period of time, and play single-player games. Single games in Kahoot! are designed for self-testing or self-preparation of the applicant, that is, they can find gaps in their own knowledge or use previously created tests to study or repeat the educational material [10]. A single game can be played in 4 modes: cards, classic mode, relaxation art, treasure trove, and tallest tower. As for the collective modes, the most significant elements of gamification that Kahoot! includes are the "pedestal" - that is, the leaderboard, which is displayed after each question and shows the top three leaders, as well as the points by which this top three is determined. Points are awarded to the "player" not only for the correctness of the answer, but also for the speed. In our opinion, such elements create a competitive effect and motivate applicants to give the correct answer.

LearningApps (https://learningapps.org/) is another online platform that allows you to create and conduct interactive learning games in the process of preparing a future teacher. The biggest advantage of this platform is that it is completely free. The user can either create a game on their own or use or improve an existing one [6]. LearningApps does not contain

virtual rewards or leaderboards, but it does include elements of moral encouragement in the form of motivating text messages. The aesthetics of the game are also partially present in certain interactive exercises.

Wordwall (https://wordwall.net/) is a game platform that has a wide range of templates for creating interactive exercises. Wordwall is a conditionally free platform, and free access is limited both in the number of exercises that a user can create and the number of templates that he or she can use. As for the gamification elements, this platform uses game aesthetics and simple game scenarios, and after completing an exercise, a leaderboard is available, which again serves as a motivating factor in increasing the level of cognitive activity of higher education students, including pedagogical specialities.

Educaplay (https://www.educaplay.com/) is a platform that allows you to create interactive educational games, quizzes, presentations, etc. One of the features of this platform is the ability to use artificial intelligence technology to create various quizzes, but this is limited. As for the gamification elements included in Educaplay, these include game aesthetics, game rules, points and virtual awards, and a leaderboard that is available to the teacher. In addition, some exercises feature game characters, which allows students to dive deeper into the learning process while better absorbing the material.

Classtime (https://www.classtime.com/) is a cloud-based platform for creating and administering tests and quizzes. The free version only provides for the direct creation and delivery of simple test tasks and the display of a table of students' answers in real time in the teacher's account. However, with the purchase of the paid version, the user has the opportunity to conduct collective games that have a suitable game scenario and game aesthetics. Most of the scenarios are dedicated to global issues of humanity, including urban pollution, endangered species, etc. This allows us not only to conduct ongoing testing, but also to introduce students to important issues that exist in society.

Here is a comparative description of the services presented.

Table № 1.
Comparative characteristics of cloud gaming services

Criterion	Kahoot!	LearningApps	Wordwall	Educaplay	Classtime
Functionality	Quizzes, surveys	Exercises, didactic games	Quizzes, games, exercises, teaching materials	Games, exercises, teaching materials	Quizzes, polls, discussions
Content type	Ready-made templates, the ability to create your own	Ready-made templates, the ability to create your own	Ready-made templates, the ability to create your own	Ready-made templates, the ability to create your own	Ready-made templates
Elements of gamification	Points, competitions, leaderboard	Motivating text messages	Points, competitions, leaderboard	Points, badges, competitions	Game scenarios in the paid version
Visualisation	Bright and dynamic	Simple, straightforward	Varied, depending on the type of content	Bright, cartoonish	Simple, elegant
Integration with other platforms	Google Classroom, Microsoft Teams, integration via HTML code	Integration using HTML code	Google Classroom, integration via HTML code	Moodle, Canvas, Google Classroom, Microsoft Teams, integration via HTML code	Google Classroom in the paid version

Interface languages	Ukrainian, English and other	Ukrainian, English and other	Ukrainian, English and other	English, Spanish and French	Ukrainian, English and other
Free plan	Available, limit on the number of participants	The service is completely free of charge	Available, limit on the number of games	Available, limit on the number of games	Available, limit on the number of participants
Paid tariffs	Additional features, more participants	Not available	More features, more games	More features, more games	Additional features, more participants

In order to find out whether applicants are familiar with gamification technology, gamification tools and which of these services is the most appropriate and convenient for use in pedagogical activities among first-year students of the Faculty of Physics, Mathematics and Informatics of Pavlo Tychyna Uman State Pedagogical University, specialities «Secondary Education (Mathematics. Informatics)» and «Secondary Education (Informatics)» Several surveys were conducted in the academic years 2022/2023 and 2023/2024. A total of 73 respondents took part in the survey, which was conducted both at the beginning of the academic year and at the end of the year as part of the study of the discipline «Informatics», which is provided for in the above educational and professional programs. When the survey was conducted at the beginning of the discipline, only about 47% of respondents answered affirmatively to the question «Do you know what gamification technology is?». The questions «Have teachers used gamification technology in their lessons?» and «In which lessons?» showed that in most cases, teachers used this technology or some of its elements, most often in computer science, mathematics and language lessons, i.e., Ukrainian and foreign languages. In the survey, students also noted that the most popular activities were quests, quizzes and educational computer games. The question «What software and online tools were used?» showed that there are a significant number of such tools, including Kahoot!

Upon completion of the Informatics course, one of the content modules of which was the study of cloud and mobile tools, students were offered another survey aimed at identifying the most effective and convenient gamified cloud tool, in their opinion. The evaluation was based on the criteria presented in Table 1. There was no unanimous opinion; in terms of functionality, the students identified LearningApps and Wordwall, in terms of visualization of interactive exercises – Kahoot!, Wordwall and Educaplay, in terms of cost, the advantage was clear – LearningApps, etc (fig. 1).
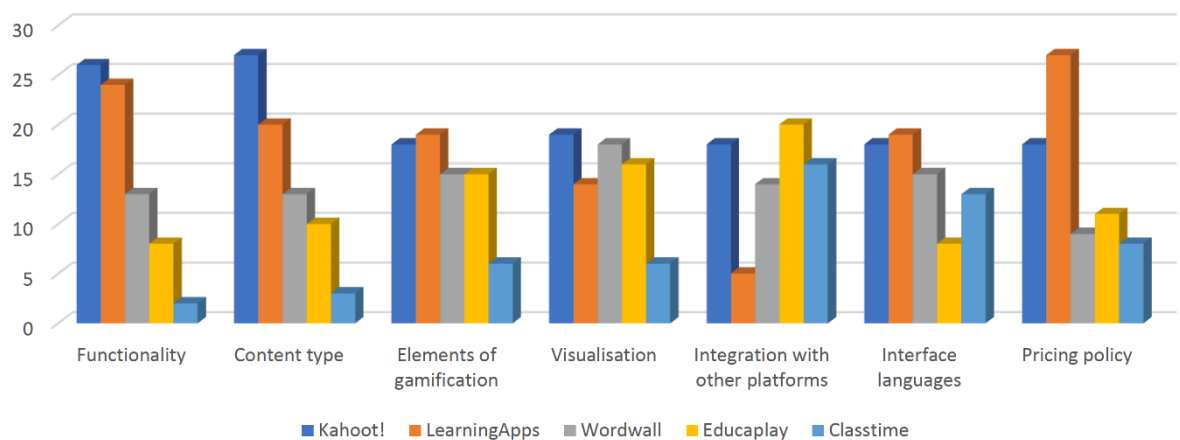

Figure 1. Evaluation of cloud services based on specified criteria

Another question in the survey was «Which of the following services would you use in your teaching?» the respondents could choose 1 or 2 options and justify their answer in the next question. As a result of the survey, the majority chose LearningApps for its wide range of free tools and Kahoot! as an interactive and visually appealing service (fig. 2). In addition, both services are well known to applicants from the school, which played a key role in their choice.
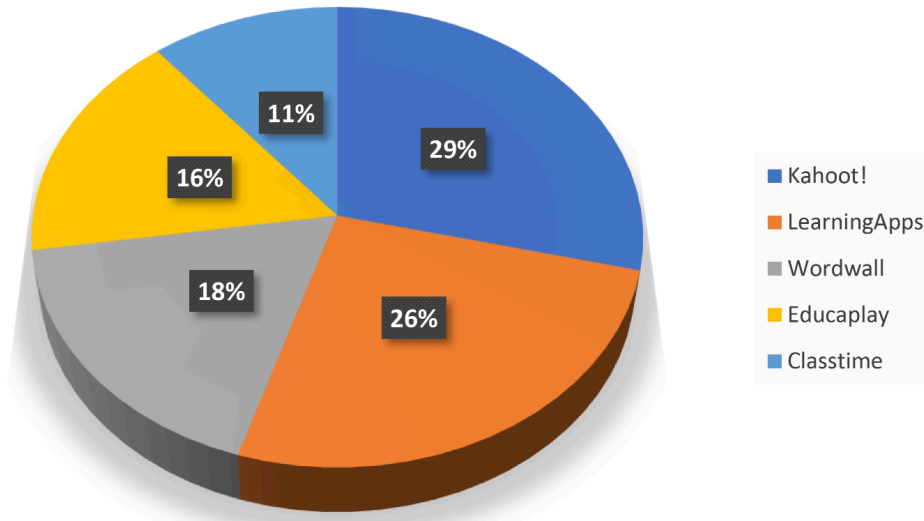

Figure 2. Results of the final survey of students

Conclusions. Cloud services are a widely used tool in educational activities, they make it possible to make the educational process interactive and interesting, while gamification elements often serve as a motivating factor and allow students to fully immerse themselves in the game learning environment. This approach contributes to better assimilation and understanding of educational material, as well as to improving the efficiency and quality of the educational process.

We see prospects for further research in the study of the possibilities of using game simulations in the process of professional training of future teachers.

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ХМАРНІ СЕРВІСИ ЯК ЗАСІБ ГЕЙМІФІКАЦІЇ У ПІДГОТОВЦІ МАЙБУТНЬОГО ВЧИТЕЛЯ

Актуальність використання хмарних сервісів як одного із засобів гейміфікації освітнього процесу стає все більш очевидною в контексті сучасних викликів вищої освіти. У статті проаналізовано досвід вітчизняних науковців у питанні впровадження технології гейміфікації в освітній процес закладів вищої освіти. При цьому дослідники зосереджують увагу як на ігрових симуляторах як ефективному засобі гейміфікації, так і на можливостях хмарних сервісів, зокрема Kahoot!, LearningApps та Wordwall. Також у статті розглянуто такі хмарні сервіси, як Kahoot!, LearningApps, Wordwall, Educaplay, Classtime, досліджено їх основні функціональні можливості та розглянуто, як із елементів технології гейміфікації (ігрові правила, таблиці лідерів, бали, ігрова естетика тощо) включено до даних середовищ та яким чином вони впливають на процес

навчання здобувачів вищої освіти. Зроблено порівняльну характеристику згаданих сервісів за такими ознаками: функціональність, тип контенту, елементи гейміфікації, візуалізація, інтеграція з іншими платформами, мови інтерфейсу, безкоштовний та платні тарифи. Також у статті висвітлено результати опитування здобувачів вищої освіти першого року навчання факультету фізики, математики та інформатики Уманського державного педагогічного університету імені Павла Тичини ОПП «Середня освіти (Математика. Інформатика)» та «Середня освіти (Інформатика)» 2022/2023 та 2023/2024 навчальних років щодо їх ознайомленості з поняттям «технологія гейміфікації», а також щодо визначення найбільш ефективного та зручного, на їхню думку, гейміфікованого хмарного засобу. У результаті опитування більшість респондентів обрали LearningApps за його широкий та безплатний інструментарій, а також Kahoot! як інтерактивний та візуально привабливий сервіс. Крім цього, обидва сервіси добре знайомі здобувачам зі школи, що зіграло ключову роль у їх виборі. Проведене дослідження дозволило зробити висновок, що хмарні сервіси є широко використовуваним інструментом в освітній діяльності, вони дають змогу зробити освітній процес інтерактивним та цікавим, при цьому елементи гейміфікації часто слугують мотивуючим фактором та дозволяють здобувачам повністю зануритись в ігрове навчальне середовище. Такий підхід сприяє кращому засвоєнню та розумінню навчального матеріалу, а також підвищенню ефективності та якості освітнього процесу.

Ключові слова: гейміфікація, майбутній вчитель, професійна підготовка, технологія гейміфікації, хмарна платформа, хмарний сервіс, Kahoot!, LearningApps, Wordwall, Educaplay, Classtime