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ГЕЙМІФІКАЦІЯ ЯК ІНСТРУМЕНТ ПІДВИЩЕННЯ ЕФЕКТИВНОСТІ ПРОФЕСІЙНОЇ ПІДГОТОВКИ У ВИЩІЙ ОСВІТІ

Анотація. Стаття присвячена питанням підвищення ефективності процесу вивчення методики викладання математики у вищій школі за допомогою ігрових технологій. Навчальна гра – спільна діяльність, яка є однією із важливих психолого-педагогічних основ процесу самореалізації здобувача освіти в навчальній діяльності. Ігрові методи належать до інтерактивних методів навчання. Вони практико-орієнтовані, спрямовані на активізацію студентів, сприяють їхньому професійному розвитку і відповідно підвищують якість освітньої діяльності та результативність професійної підготовки. Це зумовлює актуальність застосування ігрових технологій в освітньому процесі вищої школи. Проаналізовано різні підходи до класифікації ігрових технологій в освіті. Обґрунтовано, що досягнути основних дидактичних цілей навчальної гри можна за умови її ретельної підготовки з організаційної та методичної сторони. Описано приклади використання ситуативно-ігрових технологій навчання для розвитку професійної компетентності майбутніх педагогів. Завдяки організованому педагогічному експерименту встановлено, що ігрові технології навчання математики і методики математики формують активне, ділове, емоційне освітнє середовища. Вони допомагають студентам розвивати комунікативні вміння, сприяють глибшому розумінню математичних та методичних дефініцій. Проаналізовано роль викладача і його взаємодію зі студентами на різних етапах застосування ігрових технологій. Схарактеризовано його позиційне місце в процесі гри. Сучасні вимоги до професійної підготовки фахівців у закладах вищої освіти зумовлюють перманентне впровадження інноваційних технологій навчання, з-поміж яких важливе місце посідають ігрові технології. Гейміфікація освітнього процесу у вищій школі вдосконалює підготовку здобувачів освіти до майбутньої професійної діяльності в соціумі.

Ключові слова: заклад вищої освіти, початкова школа, ігрові технології, професійна підготовка, викладач, методика математики, майбутній учитель.

GAMIFICATION AS A TOOL FOR INCREASING THE EFFICIENCY OF PROFESSIONAL TRAINING IN HIGHER EDUCATION

Abstract. The article is devoted to issues of improving the effectiveness of the process of studying mathematics methods in higher education with the help of game technologies. An educational game is a joint activity, which is one of the important psychological and pedagogical foundations of the process of self-realization of an education seeker in educational activities. Game methods are interactive learning methods. They are practice-oriented, aimed at activating students, contribute to their professional development and, accordingly, increase the quality of educational activities and the effectiveness of professional training. This determines the relevance of the application of game technologies in the educational process of a higher school.

The article analyzes various classifications of game technologies in education. It is justified that the main didactic goals of the educational game can be achieved if it is carefully prepared from the organizational and methodological side. The possibilities of using situational game learning technologies for the development of professional competence of future teachers are described. Thanks to an organized pedagogical experiment, it was established that game technologies for teaching mathematics and mathematics methods contribute to the creation of an active, business-like, emotional educational environment. They help students develop communication skills. They also contribute to a deeper understanding of mathematical and methodical definitions. The role of the teacher and his interaction with students at various stages of the application of game technologies are analyzed. His positional place during the game is characterized. Modern requirements for the professional training of specialists in institutions of higher education lead to the permanent implementation of innovative learning technologies, among which game technologies occupy an important place. Gamification of the educational process in higher education improves the preparation of students for future professional activities in society.

Keywords: institution of higher education, elementary school, game technologies, professional training, lecturer, mathematics methodology, future teacher.

INTRODUCTION

The problem formulation. In institutions of higher education in developed countries, since 2010, the trend of involving gaming technologies in the educational process has been spreading. The gamification of education helped to increase students' motivation to study and increase the effectiveness of their learning results. The multifaceted nature of game activity, which develops, educates, socializes and concentrates on a specific goal, consists in enriching a person with knowledge, skills, and experience (which is the essence of the concept of "learning") and is a process of mastering knowledge, experience, taking into account the achievements and shortcomings of the past, acquisition of skills, the ability to perform certain actions, to educate and develop certain qualities, traits, skills (which reflects the meaning of the concept of "learning") (Great explanatory dictionary of the modern Ukrainian language, 2009, p. 706). Therefore, the main goal of games is the educational process. It is obvious that game technologies can be attributed to active, developing ones. Today, the importance and necessity of gamification of higher education is actualized. Game technologies occupy a prominent place among innovative educational technologies.

Analysis of recent research and publications. The theory of game activity is sufficiently fully presented in the studies of L. Vygotsky, O. Leontiev, S. Rubinshtein, and others.

M.Barber, T. Miller, K. Schrier, K. Werbach & D. Hunter and others wrote in their research about the high potential of game technology application in the educational space (Werbach & Hunter, 2012; Barber, 1996; Miller, 2008; Schrier, 2018).

The work of B. Ananiev, P. Blonskyi, I. Dychkivskaia, O. Zhukova, I. Sikorskyi, V. Shakhrai, P. Shcherban, etc. is devoted to the study of the educational game and its social essence.

A. Verbytskyi, N. Kichuk, P. Pidkasisty, O. Pometun, O. Savchenko, G. Selevko, G. Shchedrovytskyi and others investigated the theoretical foundations and practical features of the use of game technologies in the process of professional training of future specialists in their works.

Educational scientists consider the game to be a socio-pedagogical and socio-cultural phenomenon. Their arguments regarding this thesis are as follows: the game is a type of social activity, a form of assimilation of social experience through the reproduction of methods and methods of work. Also, an educational game is a type of personal-oriented activity, because it is related to learning and education.

H.Selevko studied the game from the following points of view: activity, process, teaching method. The game as an activity is structured into a chain of actions: goal setting, planning, goal implementation and analysis of results. The game as a process is a set of components: roles (in educational games performed by students); game actions (means of implementing roles); playful use of items; real relationships (between players); e) plot (reality is reproduced in the game). The game as a method of learning can be: technology; an element of another technology; by the method of conducting one of the forms of educational activity (Sadova, 2008, p. 241).

According to V. Shahray, games can be classified according to E. Dobrynska and V. Shashina, namely: according to the type of activity depending on what they develop - physical (motor), intellectual (mental), creative. (Shakhrai, 2012).

O. Savchenko proposed the structural components of game activity:

- motivational (needs, motives, interests, aspirations that determine the desire to participate in the game);
- indicative (choice of means and methods of game activity);
- executive (actions, operations that make it possible to realize the game goal);
- control and assessment (correction and stimulation of game activity) (Savchenko, 1999, p. 191).

M. Barber in his book «The Learning Game: Arguments for an Education Revolution» (Barber, 1996) recognized the task of transforming education with the help of games as a powerful means of personality development and an effective tool for spreading democratic values of society.

According to N. Shesiak, a business game is a form of reproduction of the subject and social content of professional activity, modeling of relational systems characteristic of this type of practice.

Pedagogical (educational) games are a large group of methods and techniques for organizing the pedagogical process. Machynska N. believes that «the main difference between a pedagogical game and a game in general is that it has an essential feature - a clearly set learning goal and a pedagogical result corresponding to it, which can be substantiated, clearly identified and characterized by an educational and cognitive orientation» (Machynska, 2011, p. 20). She suggests classifying educational games by:

- didactic purposes;
- organizational structure;
- age-related possibilities of their use;
- specificity of the content.

The optimal implementation of the didactic goals of the game is possible if the teacher understands the essence of the business game and is able to design it methodically and competently. The basic principles of designing and organizing a business game were formulated by A. Verbytskyi (Sadova, 2008, p. 242):

- the principle of simulation modeling of specific conditions and game modeling of the content and forms of professional activity;
- the principle of problematic content of simulation modeling and the process of its deployment in the game model;

- the principle of dialogic communication;
- the principle of duality of game learning activities.

By Shamsia Ismailova value of application of game technologies for development of cognitive activity of students, increase of interest to a profession, strengthening of communication of theoretical knowledge and practical skills is emphasize. (Ismailova, 2021, p.595).

AIM AND TASKS RESEARCH

The purpose of the article is to describe the experience of using game technologies in the process of learning mathematics methodology by future primary school teachers to activate students and develop their professional competence. for the purpose of development.

RESEARCH METHODS

In accordance with the purpose and objectives of our research, we used theoretical research methods, namely descriptive, comparative methods, generalization and interpretation of theoretical and applied aspects of game technologies, organizational and methodological features of their use in higher education.

RESULTS OF THE RESEARCH

We used game technologies in studying the elective course "Mathematical Methodology Practicum" for students of the graduation course of the bachelor's degree in Elementary Education at Vasyl Stefanyk Prykarpatsky National University.

Note that the State Standard of Primary Education provides «the organization of the educational process using an activity approach on an integrated basis and with a predominance of game methods in the first cycle (grades 1-2) and on an integrated subject basis in the second cycle (grades 3-4)» (State standard of primary education, 2019). Therefore, the initial games in the methodology classes at the university form skills for the application of game technologies in the future in the professional activity of the future teacher.

Thanks to our methodological experiment, we established that game technologies for learning mathematics and mathematics methods contribute to the creation of an active, business-like, emotional educational environment. They help students develop communication skills. They also contribute to a deeper understanding of mathematical and methodical terms. Students' search skills are developed in the process of finding the key to solving a problem in a game situation. Students learn to be more focused, gain confidence in their abilities, learn to express their thoughts.

The main goal of the educational game is to form students' ability to combine theoretical knowledge with practical activities. In the process of game situations on the methodology of teaching mathematics, students have the opportunity to assess their level of theoretical and practical preparation for the future profession.

Methodical management of the educational game process has its own characteristics. The role of the teacher and his interaction with students at different stages of the game is different. The leading role of the teacher is revealed at the stage of preparation and design of the game. At this stage, he can be in the role of a consultant who will help students in determining the content of their activities according to the role. The teacher's role at the stage of summing up and analyzing the results of the game is also decisive. At the main stage (the stage of the game itself), the teacher should create conditions for maximum self-organization of students.

The teacher's position in the process of conducting a pedagogical game can be as follows (see Fig. 1):

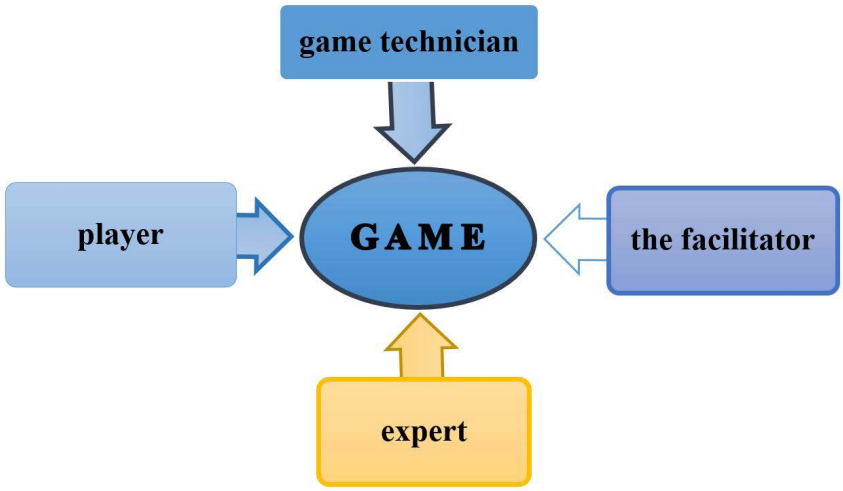

Fig. 1. The teacher's position during the game.

The game technician is the lifeblood of the game, the facilitator is an assistant and consultant. The expert observes the game process and evaluates the students' actions, notices positive and unsuccessful moments, and at the end of the game conducts a detailed analysis.

The «perceived passivity» of the teacher in the role of facilitator or expert contributes to the development of students' independence, self-organization, and responsibility.

«The game environment encourages the student to show «supersituational activity», when he goes beyond what is objectively required of him by a certain role, and on the basis of an initiative-creative approach produces new ideas, ways of solving professional tasks, etc. The use of didactic games contributes to the transformation of a student from an object of learning into a subject of professionally directed work, which causes his purposeful activity and creative participation in the independent formation of professional competence». (Machynska, 2011, p. 20).

Before studying the elective course, the students had already studied the normative course of Mathematical Methods in elementary school, had practical training at school for a month as at the first workplace. The main goal of the educational subject «Mathematics Methodology Practice» is to consolidate the acquired theoretical and practical skills and abilities in mathematics methodology.

Students are offered to choose a topic from the curriculum of a typical program for grades 1-4. Students choose the topic independently. You can join two or three in «teacher» groups.

The main tasks of the teaching group are to write an outline of the lesson on the chosen topic, to prepare a fragment of this lesson. Groups are given time to prepare before the next lesson (usually a week).

During the class, the teacher divides students into three teams: 1) «teacher» group; 2) a team of «students» of the class with whom the developed lesson will be implemented; 3) «experts» (1-2 students) who, at the end of the class, make a deep methodological analysis of the conducted fragment of the lesson.

At the lesson, the group first describes the method of presenting the chosen topic. Next, he conducts a fragment of the developed lesson with a team of «students». Experts evaluate classes, taking into account the level of methodical and organizational support of the lesson, the ability of «teachers» to activate «students», the interest of presenting new material, etc.

With this organization of the educational process, the teacher in the lesson acts either as a player (as part of the team of «students») or as a facilitator. In case of serious theoretical, methodical or organizational errors of the team of «teachers» or manifestations of bias on the part of experts, the teacher points out the errors of the teams. On the contrary, he notes the interesting findings of the «teachers», the high level of «experts».

At the end of the lesson, all members of the «teachers» and «experts» teams are evaluated by the teacher. During the course, each student acts in the role of a «teacher», and in the role of an opponent - a «student», and in the role of a reviewer.

An additional requirement, which the teacher informs at the beginning of the course, is the creation of an electronic case from lesson notes, sketches or descriptions of handouts, other methodical and informational support for the lesson. Thanks to this, after the optional course, the students received a ready-made case with developed topics.

Implementation of the described elective course for three years proved the effectiveness of using game technologies in classes. Students skillfully modeled lesson fragments during classes, used innovative methods, and worked with various types of technology to create the most informative and interesting lesson for elementary school students. Future teachers learned and gained experience from their fellow students, used the author's methods of other teachers (see the general impressions of the students of education from the elective course at https://pedagogical.pnu.edu.ua/2020/02/26/математика-це-легко-та-просто/)

The effectiveness of the use of game technologies was confirmed by the consolidation of knowledge of didactics and methods. In particular, the final testing of mathematics methods based on test tasks from the previously completed basic course in mathematics methods showed an increase in the average quality of knowledge by 18%. This confirms the opinion of O. Zhukova that «the use of gaming technologies in the educational process of a higher education institution is an indicator of the quality and thoroughness of student preparation for further professional activity in society, which integrates individual interests and goals with the socio-economic vector of the direction of the evolution of the state, contributing to the development of the of a person in various spheres of his life» (Zhukova, 2019, p. 14).

Thus, «one of the most promising ways to improve the training of future workers, arming them with the necessary knowledge, practical skills and skills is the mastering and implementation of active forms and methods of learning, among which the leading place is occupied by educational and pedagogical games». (Shcherban, 2016, p.286)

The teacher should emphasize to future teachers that the main principles of implementing game technologies are systematicity, functional expediency, universality, perspective, etc. Game technologies allow the teacher to make any lesson in primary school educational, interesting and exciting. (Maksimenko, 2021, p.175)

The relevance and effectiveness of game technologies in education was noted by the Ukrainian scientist-pedagogue V. Sukhomlynskyi: «Without play, there is no and cannot be full-fledged mental development». (Sukhomlynskyi, 1972, p. 25)

K. Werbach claims that modern game technologies can be applied in business processes to solve specific professional tasks with minimal expenditure of time and resources. (Werbach & Hunter, 2012)

CONCLUSIONS AND PROSPECTS OF FURTHER RESEARCH

The German educator Friedrich Froebel emphasized that «the game is the highest level of human development». Today's demands of the labor market present universities with the task of training highly educated specialists, creative and critical thinkers, ready for constant self-improvement. A modern student needs the most up-to-date knowledge, thorough practical training. At the same time, he must be able to work actively in a team to achieve joint success, be able to communicate, analyze, quickly adapt to changing working conditions and new challenges that arise.

The professional training of such a specialist requires the improvement of educational technologies, the active implementation of innovative learning technologies, among which game technologies occupy an important place. Therefore, one of the tasks of the higher school is also the creation of a progressive cognitive and game space in educational institutions.

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