Gamification of Education as an Addition to Traditional Educational Technologies at the University[*]

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Abstract. Gamification is the use of game techniques in the learning process, the purpose of which is to attract and strengthen the attention of students, the formation of cognitive interest, the desire to solve problems, increase motivation, and further modify external motivation into internal. Gamification in higher education has been used for a long time. At the same time, in the modern world, gamification in the higher education system, taking into account new digital opportunities, can become an integral part of traditional educational technologies, making it possible to take classes for students more interesting and productive in terms of educational effect. One of the popular online educational role-playing games that teachers and students can play in class is Classcraft. Using the principles of modern games enables students to improve their level of knowledge, form teamwork skills, and acquire abilities that interact with the real world. The work analyzed the results of a study of first-year students in the areas of training "Mathematics and Computer Science" and "Applied Mathematics and Informatics" at the North Caucasus Federal University. The following were investigated: motivation for learning, the degree of influence of various reasons on the level of motivation, as well as the experience of participating in didactic games during schooling. The second part of the article is devoted to the description of the experience of using the educational role-playing online game Classcraft on the example of teaching the discipline "Mathematical Analysis". Analyzed the results of gamification in the field of training and socialization of students.

Keywords: Gamification, Classcraft, Gaming Technologies.

1 Introduction

Every year the problems facing education are felt more and more sharply, and one of the most important problems is the lack of effective motivation of students to study. There is no universal solution to this problem, and each teacher solves it himself by his pedagogical talent. Using the conventional carrot-and-stick method, students can be forced to learn, sometimes even against their wishes. At the same time, the knowledge

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gained by force breaks the human psyche, because every pressure there is a response, which is unacceptable in the pedagogical process.

On the other hand, you can take a different path - try to turn each of your lectures or practical lessons into a work of art. But students quickly get used to constant "zest" classes and stop responding to a non-standard approach and miracles of pedagogical possibilities. Some of the students study with pleasure, they do not particularly need external motivation, it is easy and comfortable to work with such guys. In this case, there is always a part of the group, which, as a rule, is amorphous.

These students do their homework irregularly or do not do it at all, in their studies they are only interested in the presence of a positive assessment and/or the opportunity to receive a scholarship. Ignorance and misunderstanding of the material being studied do not upset these students, for them the main thing is to "survive" the next lesson in the local sense and "pass" the discipline in the global sense.

2   Analysis of Motivation and Incentives in Teaching Students

Before studying the discipline "Mathematical Analysis", first-year students of the areas of training "Mathematics and Computer Science" and "Applied Mathematics and Informatics" were conducted a complex questionnaire, one of the purposes of which was to identify motivation and incentives in learning. The questions overlapped each other, making it possible to exclude random, ill-considered answers. In particular, students were asked to rank different learning incentives according to their importance. As a result, it was possible to identify groups of reasons that are the priority, important, secondary, and completely irrelevant in teaching for each student and the two areas of training in general. The results of the survey are presented in Table 1.

Table 1. Results of ranking learning incentives by personal significance.

	The main reason	An important reason	Not a very important reason	One of the last reasons	Indifferent
Self ambitions	17	7	1	2	2
Fear of upsetting the parents	4	10	2	5	11
Get much knowledge	9	14		2	4
It's a shame to study badly	1	3	4	5	16
To become a great specialist	11	11	1	1	3
Career	16	8	1	3	1
The opportunity to get the scholarship	5	12		7	5

As it can be seen from the presented table, for the majority of the surveyed students, their ambitions and career are the main incentives for study. Median values point to them as the main reasons for learning. The important reasons, but not the main ones, are the opportunity to receive a scholarship and the desire to get maximum knowledge. The desire to become an excellent specialist can also be safely attributed to one of the main incentives. Note that the fear of upsetting parents divided all students into almost two equal groups, i.e. for half of the students, the opinion of the parents is important, and for the other half, it is indifferent, which allows us to admit the variant of parents' indifference to the marks received by their children. As we can see, the incentive "I'm ashamed to study badly" turned out to be irrelevant, the median value of which fell on absolute indifference.

Answering the question "What, in your opinion, helps you to learn?" only one respondent replied that he didn't know, the other answers were quite meaningful and varied: "incentive", "interest in learning is the main driving force", "interest and intrinsic motivation", "interest in the subject", "desire to get an education to be able to work", "the desire to gain new knowledge", "to please parents with good grades", "lack of missing pairs and own motivation" ,"I like to learn new things", "interest in mathematics", "- the negative attitude of the teacher and classmates", "a good mood after classes leave a positive mark during the day and there is an additional desire to study harder","the desire to be the first everywhere makes me learn".

Answers to the question" What, in your opinion, prevents you from studying? " were surprising, monotonous: the overwhelming number of respondents answered that they were just too lazy. Other answers were received: "YouTube ... there is a lot of things. Games, videos, books, TV shows, creativity, walks, etc."

The conclusion that we have made after analyzing the answers is that, as a rule, students have the motivation to learn, but when motivation is placed on one scale and laziness on the other, in most cases the latter wins. Thus, students need a mechanism that is more irritating than laziness. As such a mechanism, we can propose to use the gamification of the educational process, which will allow us to fully realize the three basic psychological needs of each individual: the ability to make decisions yourself, overcome obstacles and carry out socialization.

3   Gaming Technologies as Means of Enhancing Cognitive Interest and Increasing Involvement in the Learning Process

Quite a lot of pedagogical studies have been devoted to the comparative analysis of the results of game learning and learning on a traditional basis. Immediately after the end of the educational process, the participants in most of the experiments show almost the same results, but after a while, more information remains in the memory of those who studied playfully. In particular, a study by Dr. Arne May from the University of Regensburg (Germany) proves that, as a result of mastering a new skill playfully, the growth of gray matter occurs in a matter of weeks.

The concept of "game technologies" includes a wide group of methods and techniques for organizing the pedagogical process in the form of various pedagogical

games. Play is a good way to organize the student's activities since by placing him in the circumstances determined by the plot of the game, you can develop new personality traits, instill control over your behavior. Any pedagogical game should have a clearly defined goal and be focused on a specific pedagogical result. In this case, the achievement of a result during the game occurs in the following areas:

- the pedagogical goal takes the form of a game task;
- the educational activity is subject to the rules of the game;
- the motivational element is the effect of competition and competition;
- the game result is the achievement of the set pedagogical goal.

The following main features of pedagogical play are distinguished: activity in the process of play activity, its creative nature, the presence of rules, the emotional coloring of the activity (rivalry, experience, etc.), the ability to enjoy the process itself, and not only from its re- result. In the game, all psychological processes develop more efficiently than in other types of activity, and as a result of the implementation of the rules of the game in a training form, the assimilation of factual material on the academic discipline takes place. Thus, the game synthesizes the cognitive, labor, and creative activity of the student.

The students participating in the survey were asked the question: "Have you used gaming technologies in the classroom or extracurricular activities at school?" The results of a survey of two groups of students are alarming. 62% of respondents answered "No, never", 28% answered "Yes, quite rarely", 7% said they did not know, and only 3% of respondents admitted that gaming technologies were used quite often.

Thus, we can conclude that almost 70% of yesterday's schoolchildren do not imagine the use of games in school. There may be several reasons for this:

- teachers do not know gaming technologies, do not understand their importance in the learning process;
- teachers are proficient in gaming technologies, but do not see the need to use them, because the main purpose of the lessons is to prepare for testing at various levels and for state exams;
- teachers are familiar with game technologies, but there is not enough motivation to create game situations in the lesson or at extracurricular activities.

There have been many attempts in history to create a game that permeates the learning process. In 2004, the English programmer Nick Pilling proposed the term "gamification", which meant the use of game elements in the learning process. The most important goal of gamification is to increase sustainable interest and motivation for learning.

4　Using the Online Game Classcraft in the Learning Process.

Multiplayer online role-playing game Classcraft is an example of the implementation of game-mythification in education. This game was developed by Canadian physics

teacher Sean Young in 2013. Classcraft makes learning any discipline a fun game. According to the rules of Classcraft, the study group is divided into several teams, and each student must choose one of three characters: "warrior", "magician" and "healer".

For good results in training, you can get new abilities for your character. Negative results (unfulfilled homework, poor answer, etc.), on the contrary, can lead to a decrease in the character's rating. The team approach in the Classcraft organization stimulates the formation of corporate skills, the ability to be accountable to the team for their actions.

For three months, classes in the discipline "Mathematical Analysis" for students of the surveyed groups were held using the game Classcraft. Let us describe the specifics of the application of this game technology within the framework of the discipline being implemented.

To "enter" the game, each member of the group signs a "Hero's Pact", in which he undertakes to agree with all the game consequences and decisions of the Master of the game (teacher), as well as to respect the rules of the game. After registration, each student chooses a type of hero - "warrior", "healer" or "magician", and the team is formed. As a rule, teams are formed at will and consist of 3-4 people.

Each lesson begins with a specific task that the rider Wei brings. It usually takes from 30 seconds to 2 minutes to complete it, although there are tasks that are performed during the entire lesson. The task is always chosen at random and is quite unexpected. Students wrote in the questionnaires that "at the beginning of the lesson the rider leaves pleasant memories and positive emotions after the lesson," "it seems to me that we have become more open to each other, and this is the merit of the rider's daily tasks".

In traditional lessons, as a rule, the most prepared students come to the blackboard at will, and the majority, the least prepared, try to "sit out". In the game Classcraft, it becomes impossible to sit out a couple and not go to the board. The Wheel of Fate mechanism ("Wheels of Fortune") is an effective tool for the selection of one student or a whole team. In this case, there are practically no reasons for the refusal (you can only use "action points"), and all members of the group come to the board in random order. In the questionnaire, the participants of the game wrote:

- "practice has become more fun, all students are questioned, the material is better assimilated",
- "those students who usually sat at the end of the classroom and did not go out to work at the blackboard were forced to go and solve tasks, which increased their chances of mastering the material",
- "although the algorithm chooses a random player, everyone still goes to the board, it's convenient, since all students will answer in 2-3 classes, and not only excellent students".

If the general task does not require careful analysis, then the entire team is chosen to go to the board, while for each participant his task is given within the framework of the general one. In this case, the team (3-4 people) is interested in the correct solution of the task by each participant. Effective teamwork is observed within each micro group, each team strives to maximize the level of assimilation of the topic by all its members since it has to go to the board, and maybe more than once.

Each participant in the game has a goal - to "pump" the skills of the hero, which makes it possible to obtain additional rights, for example, to get an additional 5 minutes to write a test, a delay of 1 day when doing homework, or the opportunity to gain access to your lecture notes for a few minutes on the exam. In their questionnaires, students gave the following comments: "it became interesting to answer and earn points", "homework will be done more often", "the growth of the hero's level motivates", "there is an incentive to earn points".

After introducing Classcraft technology into the learning process, students were asked to answer the question: "Has anything changed in the learning process after using Classcraft?" Only one answer was negative, the rest of the guys noted the changes in a positive direction. The students' answers were as follows: "Yes, it became more interesting", "They began to prepare the homework more thoroughly", "The game brought a mood of positive competition", "There was motivation, competition", "Everything is fine, there is a little healthy competition "," Contacts have been established within subgroups "," It has become more interesting "," Academic performance has improved "," It has become more interesting to study together. " The results of the corresponding survey are shown in Tables 2 and 3.

Table 2. Results of the survey "Your attitude to" Classcraft "in the classroom".

	Like it, %	Don't care, %	Don't like it, %
Your attitude towards "Classcraft"	84	13	3

Table 3. The results of the survey «Would you like to continue using Classcraft next year?».

	Like it, %	Don't care, %	Don't like it, %
Would you like to continue using Classcraft next year?	84	13	3

5   Conclusions

From a teaching point of view, serious shifts can be noted in the learning process in the discipline

- students began to do their homework much more actively,
- most of the students began to worry about the grades (you can get "experience points" for positive grades or lose "health points" with a negative one),
- students began to take a more responsible attitude to the quality of answers at the blackboard (the group decides how many points a student receives when solving a problem at the blackboard; at first there was an attempt to "play along with their" team members, but after a few sessions no mistakes were observed in the assessment - all grades were extremely objective).

The main change took place in the attitude of students to classes in general: before classes, there is a slight impatience from the upcoming assignment of the rider Wei, which is unpredictable; the desire to go to the blackboard appeared not only among the "strong" students but also among the "weak" ones; the group freezes before the announcement of the name of the person coming to the board, one even feels disappointment that they have caused another.

The psychological climate at the lesson has changed enormously: equanimity, constraint disappeared, interest, "sparkle in the eyes" appeared. Classes are held "in one breath", everyone is in an excellent mood, and we must admit that such classes leave an excellent impression not only among students but also among the teacher. At the same time, it should be recognized that the teacher requires constant improvisation, more preparation for classes. Often you have to take unusual steps, for example, the first minutes of the class is spent on tasks that are not related to the academic discipline, but aimed at creating a positive psychological mood. In addition, a student who has reached a high level can use his "action points" and finish the lesson for himself five minutes earlier.

In general, we can conclude that the use of gaming technologies and, in particular, Classcraft increases the motivation of students, helps to tip the scales towards active learning, overcoming laziness, even when studying rather difficult mathematical disciplines.

References

1. Bannykh, G.A.: Gamification in University Education: a Comparative Analysis of Practices. Bannykh, G.A. Conference 2017, III International Scientific and Practical Conference Strategies for the Development of the social Communities, Institutions, and Territories. Yekaterinburg, (2017)
2. Belkin, F.A.: Gamification in Education. Modern Foreign Psychology. 2016.vol. 5 (3), p. 28-33 (2016)
3. Karpenko, O.M, Lukyanova A.V., Abramova A.V., Basov V.A.: Gamification in E-Learning. Distance and Virtual Training. 2015. No. 4. p. 28-43. (2015)
4. Karmanova, E. V., Starkov, A. N., Vikulina, V. V.: The Possibilities of Using Gamification Technology in the Implementation of E-Learning in Higher Education. Prospects for Science and Education 4(40), 462-472 (2019)
5. Khokhryakova, Yu. M.: Opportunities for Gamification of Educational Activities of University Students. Humanitarian Studies of Pedagogy and Psychology No. 1, 27-37 (2021)
6. Isupova, N. I.: Inverted Class and Gamification as Actual Forms of the Distance Learning Organization. Eurasian Scientific Association 1-7 (71), 527-530 (2021)
7. Isupova, N. I.: Application of Gamification Services for Updating and Consolidating Knowledge. Eurasian Scientific Association 6-6(52), 527-530 (2019)
8. Zolkova, A.V., Lomonosova, N. V., Petrusevich, D. A.: Assessment of the Demand for the Use of Gamification as a Tool to Improve the Effectiveness of the Educational Process. Science for Education Today. V. 10. No 3. PP. 127-143 (2019)

9. Shimanova, S. V.: Linguodidactic Potential of the Service "Glasscraft" for the Development of Sociocultural Competence of Students. International Student Scientific Bulletin. No 2. 185 (2021)

10. Maliataki, V. V., Vendina, A. A.: Implementation of Elements of Gamification in Training with the Use of the Moodle Distance Learning System. E-learning in Continuous Education. No. 1. PP. 287-291 (2016)

Belkin, F. A.: Gamification in Education. V. 5 No. 3. PP. 28-34 (2016)