

COMPUTER ROLE-PLAYING GAMES AS ONE OF THE MOST EFFICIENT METHODS OF TEACHING AND LEARNING IN HIGHER EDUCATION

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Abstract: Presently it becomes more and more typical and important to search for the new ways, methods and approaches for teaching students at higher education establishments, creating a new concept of the educational process. The method of using computer role-playing games in higher education provides immense training possibilities. Students naturally do not think about this. Computer role-playing games for them is, first of all, an exciting activity. In order to get practical data authors devised a questionnaire and asked students of Transport and Telecommunication Institute (Riga, Latvia) to fill in the questionnaire.

Keywords: education, new ways, gamification, computer role-playing games, exciting activity.

1. INTRODUCTION

There is no doubt that during the last couple of years the idea of creating and using new instruments in education and corporate training – becoming more and more popular and trendy.

Slashing development and evolution of technologies requires specialists and educators to adapt themselves to dynamically changing educational environment.

E. Dales' "Cone of experience" also known as the "Learning pyramid", pulls up the curtains. Only with the help of "active" actions such as performance and interaction, imitations, simulations and acting in all of its forms, this quintessence allows people to create and develop.

The modern educational challenge involves tasks of engaging students, stimulating their interests, retaining their attention, and maintaining a positive attitude in a nurturing environment.

The present paper aims to explore the possibility of role-playing games' implementation, as the element of gamification in the educational process in higher

education establishments and give recommendations regarding its organisational aspects.

The following questions are formulated to achieve the objective:

1) What is gamification and what is the role of gamification in educational process?

2) Computer role-playing games in education: advantages, disadvantages, perspectives.

3) What do students think and how do they feel about computer role-playing games being a part of education?

4) What should be taken into consideration when creating computer role-playing game-based method for teaching a foreign language in the higher education establishment for technical major students?

Key to these goals is the effort to maintain a rich communications environment that encourages feedback and reinforcement, not only between the instructor/-teacher and students, but also between the students themselves. These socially interactive mechanisms, with the proper level of control for encouragement and discipline, can be designed in effective ways to create “fun” learning situations [1].

Authors’ contribution is: 1) Highlighting the fact that modern higher education requires modern methods and technologies (such as computer games); 2) presentation of a theoretical substantiation for the efficient use of computer role-playing games for teaching in higher education establishments.

2. BACKGROUND

Originators and Key Contributors: In 1980, Thomas Malone published the study “What Makes Things to Learn: A Study of Intrinsically Motivating Computer Games” [2]. Later, the Woodrow Wilson International Center for Scholars (2002), based in Washington D.C., established the Serious Games Initiative to explore the application of game principles to public policy issues. From that initiative, gamification for education emerged and gradually evolved into a field of study. The term gamification was coined in 2003 by Nick Pelling. Today, many game researchers including Katie Salen, founder of the Quest to Learn public school, Jane McGonigal, Director of Game Research and Development at the Institute for the Future, and Joey J. Lee, Director of the Games Research Lab at Teachers College, Columbia University, have extended serious advancements in the application of gamification (or “gameful thinking”) to educational contexts [3].

In 2007 *International Journal of Teaching and Learning in Higher Education*, published the research of Rita Kumar and Robin Lightner: “Games as an Interactive Classroom Technique”, in which authors have actually measured the impact of games on student learning. The results were dualistic, both positive and negative. As for positive feedback, some students: “... emphasized the need for variety, that lecture can be boring and redundant with the book, and that activities appeal to

different learning styles”. However, these methods for teaching got some negative feedback as well – “Games and activities are silly and degrading. As a college student, I found it childish” [4]. Taking that into consideration it is clear now, that computer role-playing games should be carefully prepared in respect of contents and form, well organised and approved by all.

According to Professor J. Shapiro, the practical use of information technologies in education – is not necessarily the end of the age of books.

Blended teaching and learning does not have to replace traditional ways of teaching through the lectures and lecturers. The variety of game-based situations and simulations can improve and complete well-known time-tested pedagogical practice with the help of new tech-solutions. Something much more efficient can be created, by fusing both old and new.

3. THE HISTORY OF CREATION, CONCEPT AND PLACE OF GAMIFICATION IN HIGHER EDUCATION ESTABLISHMENTS

Nowadays, technology and social networks, both, form a huge part of human life – from early childhood to higher age.

With the invention of Web 2.0 technology, massive number of new websites, services, blogs and social networking platforms started to emerge. In the early 2000s, the main forms of ICT learning was formed by a broad media environment such as CD-ROMs, DVDs, Tape Medias etc. Then, learning with the help computer games started to get prominence by the use of personal computers (Second Language Learning at Primary Levels using Adaptive Computer Games). Nowadays, mobile phones and tablets overwhelm personal computer usage, and children of any age can use these highly portable devices easily, because of their user-friendly and easy-to-use nature [5].

Gamification can be used for the purpose of improving user engagement and instruction [6].

These game elements can be easily extracted from a game content and applied to almost any field. The idea is to take the engaging elements of gaming and implement them into the teaching process [7].

Computer games have become a facet of our everyday lives, and Richard Taylor, senior vice president for communications and industry affairs at the Entertainment Software Association (2012), shared how games are making the transition into the business world: “Today’s games drive technological and societal advancements that serve gamers and non-gamers alike. Teachers at all levels use games in the classroom to teach history and civics, build STEM skills and teach foreign languages. Healthcare providers use video games in physical therapy and treatment programs, and to educate patients about their conditions. Surgeons use video game simulations to help practice difficult procedures.” [8].

Karl M. Kapp (2012), professor of instructional technology at Bloomsburg University, sees an exciting trend in game-based teaching methods' implementation: "The commercial equivalent is something like *The Sims*, where the player has to weigh certain variables and make tradeoffs to keep his or her character healthy and happy." [9].

"UPS began using video games to train newly recruited drivers after finding that 30% of candidates failed the company's traditional training program, and the Hilton Garden Inn worked with Virtual Heroes to develop *Ultimate Team Play*, an interactive game that places employees in a virtual hotel." Taylor says. "Even the U.S. Department of Justice's National Institute of Justice has developed a training game, called *Incident Commander*, in which emergency responders practice coordinating disaster relief efforts." [8].

The evolution of gamers within the confines of gamification can be noticed, starting from 1996th, when 4 so called pillars were devised and presented for the 1st time – Bartles' Player Types. With the advent of new tools and areas where these tools can be applied to and used, in 2013th a new model was proposed.

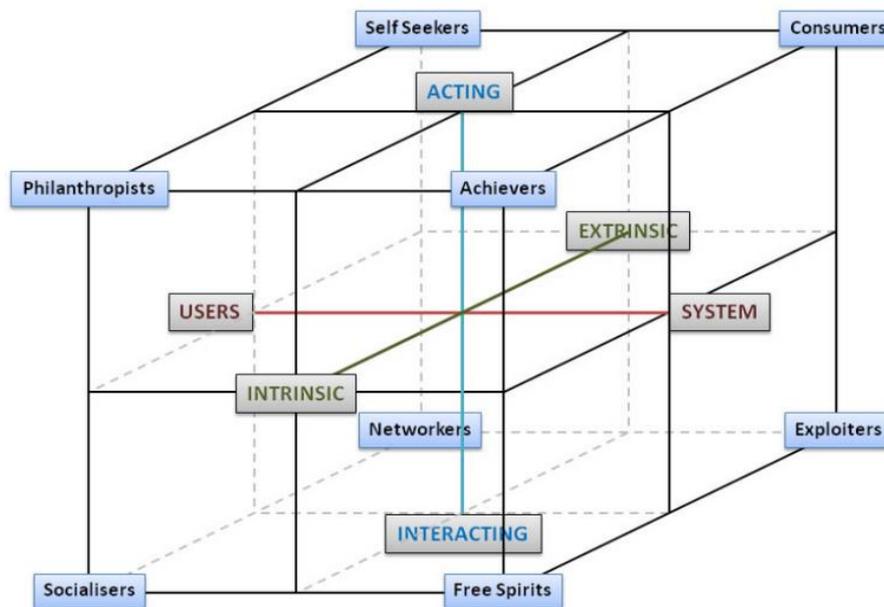


Fig. 1. Marczewski's Typology [10]

Marczewski's Typology consists of 8 user types: 4 – intrinsically motivated and 4 – primarily extrinsically motivated. Bartle's original axes help to describe whether a player is interacting more efficiently with real people or with the virtual world [10].

4. TRADITIONAL GAME-BASED APPROACH AND COMPUTER ROLE-PLAYING GAMES IN HIGHER EDUCATION: SIMILARITIES AND DIFFERENCES

Traditional form of education is setting an obvious goal: to give students as much information and knowledge as possible. Pedagogue in this case “translates” all the acquired and structured, by himself, information and determines the skills, which are, from his point of view the important and crucial for a future-specialist.

Students’ task is determined from the very beginning – to obtain as much information as they can, mostly theoretical, and then, to reproduce their knowledge in real-life building up their own set of skills, and to form their competence – becoming true specialists, making their “living” an area of expertise. But unfortunately this knowledge, as mentioned before, is theoretical and most of the time is encyclopaedic by its nature. In students’ consciousness, this information is basically formed as “thematic blocks”, which unfortunately do not always provide students with semantic load or practical use and connection with real-life.

In case of interactive education – knowledge is represented in different “forms”. The value is that these “forms” consists of information about our surroundings, the world and its mechanics in general. Peculiarity of this information is that students do not receive it in its finished form – “cooked” by the lecturer. Just in contrary, they are forming their knowledge and skills in the process of their own activities caused by the engagement of a game-based methods and “forms” mentioned before.

Recent research of American Psychological Association called: “The Benefits of Playing Video Game” (Isabela Granic, Adam Lobel, and Rutger C. M. E. Engels, 2014) shows the general view of the use of video games nowadays. Researchers identified and outlined 4 types of positive impact of video games on children: cognitive, motivational, emotional and social.

Table 1. Compares computer role-playing games and other game-based techniques, so popular among pedagogues (created by authors)

Comparison parameters	Computer role-playing games	Other game	Group competition
Rules	+	+	+
Structure	+	+	-
Goal	+	+	+
Collaboration (active interactions)	+	-	-
Opportunity to demonstrate results achieved	+	+	-
Spontaneous actions	-	+	+

Comparison parameters were: the presence of rules, structure of the game, specific goal, collaboration, opportunity to demonstrate results achieved and spontaneous actions. Generalizing results, it's safe to say that computer role-playing games have an incredible potential, effectiveness in real life teaching students.

Social competence, demonstrated by the necessary collaboration of students in order to reach the goal of the game, technical competence, demonstrated by dealing with technical content, methodical competence, which is necessary in order to structure the work to win the game, and personnel competence through individual actions can be acquired through the application of gamification and computer role-playing games [11].

5. THE RESULTS OF THE SURVEY OF STUDENTS AT TRANSPORT AND TELECOMMUNICATION INSTITUTE

In this section authors discuss the aspect whether the computer game-based method complies with the new requirements and for this purpose authors decided to create a questionnaire (Fig. 2.), consisting of 7 basic questions and 3 tasks, to throw light on the idea of using computer role-playing games in higher education.

Nº	Question /- task	YES!	NO!
1	Teaching methods in higher education (in Latvia particularly) are outdated, outmoded and require improvements?		
On a scale from 1 to 5 evaluate the level of your satisfaction with the teaching methods used in your higher education establishment (1 – is the lowest score, 5 – the highest score).			
<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5			
2	Did you play computer role-playing games (or any video game) as a child?		
3	Do you play computer role-playing games (or any video game) now?		
4	How do you think, computer role-playing games (CRPG) as one of the teaching methods in higher education – could improve the whole system of teaching students and support learning?		
5	Should computer role-playing games CRPG be implemented in higher education establishments as soon as possible?		
What do you think could be the main obstacle with computer role-playing games in higher education establishments (in Latvia particularly)? Choose only two (1 st priority, 2 nd priority):			
1. Cost & licensing; 2. Finding suitable games; 3. Maintenance & updates; 4. Poor interest of lecturers in CRPG; 5. Poor interest of students in learning; 6. Training & support.			
6	Should educational computer role-playing games be fun or severe?		
7	Educational computer role-playing games should be "single-player"?		
Do you support the idea of this research YES/- NO and why? (1-2 sentences)			

Fig. 2. The survey of students at Transport and telecommunication Institute (created by authors)

The survey took place at Transport and Telecommunication Institute (Riga, Latvia), period: 2017.03.01 – 2017.05.01. Total number of respondents: 50 students.

One of the tasks was to evaluate the level of satisfaction with the teaching methods at Transport and telecommunication Institute on a scale from 1 to 5, where 1 is the lowest score and 5 is the highest score.

Figure 3 represents the percentage of students, participating in the survey, and their answers.

Vast majority of participants (63%) are quite satisfied with the educational system used at Transport and telecommunication Institute, and they have rated it by giving 4 points. The level of satisfaction of 9% of respondents is only 3 points, and 6% of participating students are not very satisfied with teaching methods and techniques used in their course of studies – 2 points only.

These results reflect current situation – that, even now, there are blind spots in methods and techniques that educational process consists of, and it also shows that a new approach is needed.

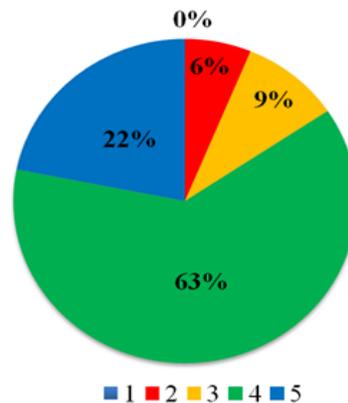


Fig. 3. Level of satisfaction with the teaching methods at Transport and telecommunication Institute (created by authors)

Since some students were aware of these blind spots it has also affected their answers.

For instance, they do agree that the teaching methods used in higher education are outdated, outmoded and require improvements. Computer role-playing games, in this case – might do this “improvement”. More than a half of respondents, which can be seen on Figure 3, think that computer role-playing games as one of the teaching methods in higher education – could improve the whole system of teaching and support learning, and these methods should be implemented in higher education establishments as soon as possible. They also think that educational computer role-playing games should be as fun as ordinary computer games are (Fig. 3.), even though these two have completely parallel goals.

It has been established in the course of the research that computer games can be adapted to various goals and targets, because players completely soak themselves in the world of games. The results of the survey shows that students played computer games on a daily basis at a very early age and more than 50% of them are still playing computer role-playing games now, being adults/- students. The com-

petitive element of any game is attracting players. Satisfaction from game creates a comfortable atmosphere in the room and enhances a desire to study;

A game leads to the effective cognitive activity of each student individually and all jointly, thus being an effective method for managing the educational process; A game is a free activity, providing for the possibility to choose, self-expression, self-determination and self-development of its participants; A game has a certain result and stimulates a student to reach the goal (to win) and to realize the way of achieving the goal.

Computer role-playing games should be carefully prepared in respect of contents and form. Fourteen students (majority) think that one of the main problem in bringing to life the idea of using computer games in education – is “Finding suitable games” (Fig. 4.), since computer games made mostly to entertain players, not to teach them.

Computer role-playing games should be well organised and approved by all – students and lecturers. That is the second obstacle and 10 participants agreed on that (Fig. 4. “Poor interest of lecturers in Computer role-playing games”).

Students genially believe that finding suitable games with appropriate content plus poor interest of group members in computer role-playing games, lecturers in particular, both could be the main obstacles for this approach to be implemented (Fig. 4.).

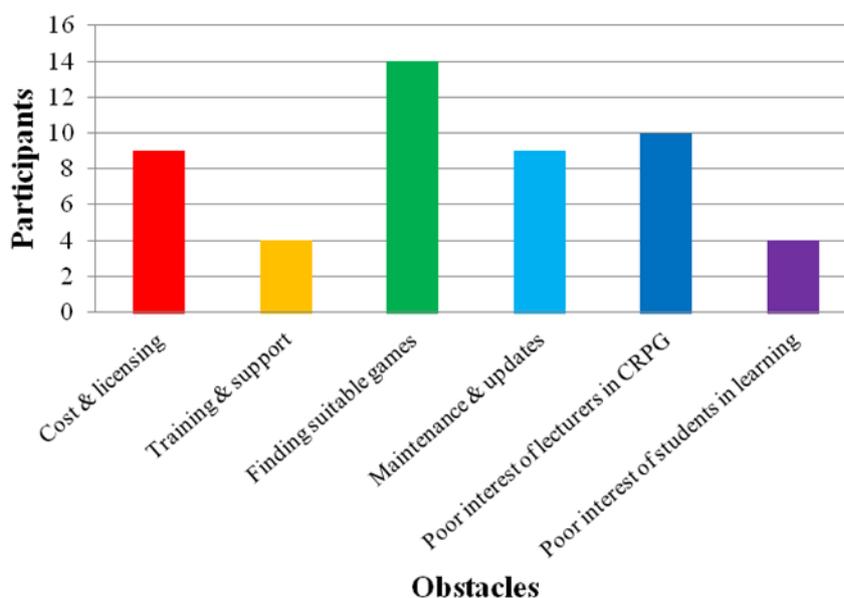


Fig. 4. Obstacles with computer role-playing games in higher education (created by authors)

Authors' vision is that in the course of game-based classes the situation can be played through for several times, each time with the new variant thereof. Lecturers' role in the process of preparing and organising a game is constantly changed. At the initial phase, a lecturer effectively controls activity of students, then gradually becoming only an observer. An intention to participate in such game, suppose to mobilize ideas and energy of players.

It will always have an element of surprise, since changing some parameter of computer role-playing games, establishing own teaching methods, it is possible to transform a standard computer games into exciting activity.

6. CASE STUDY: PLOTTING AND USE OF COMPUTER ROLE-PLAYING GAMES TO TEACH A FOREIGN LANGUAGE

Training computer is an instrument, organising and controlling an individual work of a student, in particular in the course of work with linguistic and verbal material.

Authors think that an educational computer game should consist of the basic elements. Such as:

a) Fictional character; b) Levels that could be improved; c) Menu-based combat system; d) Virtual world (a map with different locations); e) Central quest that runs throughout the game.

An educational computer role-playing game defines the nature of exercises and methodical approaches.

Among the most often used are:

1. Dialogue – questions and answers. The essence of a student's work is that he should give direct answers to the computer questions, using a linguistic material, which is included in a question, as a basis and a scheme.

2. Dialogue with elective answer. To answer a computer, a student selects one of the offered variants (England, Latvia etc. quizzes).

3. Dialogue with freely constructed answer. This dialogue is provided by the program with all possible variants of answers to each question asked by a computer for the latter "to get to know" and evaluate the correctness of an answer (considerable places in 2 states).

4. Filling blank space exercises. A computer offers a student a text or a set of sentences with blank spaces. Blank spaces should be filled in, using a list of student's native language words, which should be translated into a foreign language and used in a correct form. Blank spaces can be also filled with words or phrases, selecting them from those offered by a computer (grammar: articles, prepositions).

5. Vocabulary knowledge self-control exercises. The following variants of exercises are possible:

a) computer offers a list of words for translation;

- b) computer offers to compare two lists of words (in student's native language and foreign language) and to find equivalent pairs of these words in two languages;
- c) computer offers to compare two lists of foreign words and to find pairs of synonyms and antonyms;
- d) computer offers a list of foreign words and a list of definitions of these words. A student should combine each word with its proper definition.

6. Software (from foreign experience in computer-based training):

6.1. *Software to work with dictionary.* Software for independent compiling a dictionary. A student can record up to 1000 words with their definitions and examples. At any time he can look through a word and test his lexical knowledge: on a display there is demonstrated a word definition followed by a question on a word. An example with blank space can serve as a prompt. The program is very simple and ideal for individual training, as well as for group classes and information exchange.

6.2. *Compliance selection software.* This universal program is in constant demand. A student should correctly combine lexical units (from a word to a three-row paragraph in right and left column). Selection is made, looking through both columns and using arrow indicators. Printing equipment can copy exercises in a paper format for individual work and class work.

6.3. *Software for selecting variants.* This software is simple for creation of exercises with very large choice. Programmer can install 3-5 variants or various quantities for each example, and if necessary, can include error indicators, which register each incorrect activity. Questions can be demonstrated in succession or randomly. Drawing up exercises for a teacher, there is no need to have a certain number of questions. A person working on PC can choose a testing or a training mode. In the first case, until the exercise is fulfilled, a student does not know which of his answers are correct. The second mode ensures immediate answer and activations of an error indicator.

6.4. *Blank space filling software.* Software makes it possible for a teacher or a student to enter, record on disc or edit texts to 50 rows. A student selects a text according to title and, prior to its being demonstrated on a display, regulates which words should be omitted (from each fifth to each fiftieth word). After that, looking through the text with numbered blank spaces, he should fill them in. Texts in various languages with blank spaces can be got in printed format. Students can fill them in on paper with the speed and time as needed, and then can compare their results with the computer results.

6.5. *Cross-word puzzle software.* Software provides for creation, recording and solving cross-word puzzles, ensuring a working mode for two students. A cross-

word puzzle can be of any type – for educational or entertainment purposes, with own words or words taken from text.

6.6. *Substitution software*. Words or phrases previously selected in the demonstrated text are set off one after another in a brighter colour. A student should substitute them by other words or phrases.

6.7. *Textual software to work with dictionary*. In the program there is a list of all words of a text in alphabetic order and there is indicated frequency of use of each word. The list can be recorded on a disc or printed out. It can be used, preparing lexical explanations to certain texts.

6.8. *Blank space filling software*. Software makes it possible for a teacher to enter large texts and specify the element, which should be omitted - prefix, suffix, words or phrases. Text is entered through a special processor. A student can fill in blank spaces in any order and choose a testing or a training mode. Each answer can be supported by a key, which appears by each answer. Teachers select this software to strictly control the skills for using the language units.

6.9. *Guessing software*. The program is a widely popular game to restore a theme by means of a minimum context. It includes 60 text patterns with various subject-matters. In the program there is used one of six themes, which are displayed, and one word from this text is shown.

Other words of this text are omitted. A student should guess which of six themes is suitable for this text. He can ask for additional words while guessing a theme.

6.10. *Speed reading software*. Text is displayed in parts – 8 rows at a certain time (a student can choose the displaying time). The goal of the exercise is to master speed reading, understanding the general contents. After each page or the whole text is read, there can be asked questions of wide range.

6.11. *Software for working with text*. A text is printed on a screen. Using memory, logic and language skills, a student should recover this text on the screen. This exercise stimulates the educational activity. In practice, students try to recover all the text individually. There are also additional exercises for guessing prefixes and suffixes.

6.12. *Testing software in the form of questions and answers*. It is a universal, easy-to-use software for any school subject and level. A teacher can prepare pair chains question - answer of any length, providing for possible variants of correct answers. A student should print a full answer. He can answer questions in any order, and work in a testing or a training mode.

7. CONCLUSION

The result of this study is a basic elements of educational computer game.

According to Alice Mitchell and Carol Savill-Smith, computer role-playing games – is an excellent method for teaching and learning, because of method being interesting and cognitive in parallel, stimulating the enjoyment, motivation and engagement of users, increasing their mnemonic abilities and improving one's memory [12].

The computer role-playing games-based method is one of the most efficient methods for teaching a foreign language, with its psychological and pedagogical basis being a game-based activity, making a considerable contribution to the mental development of personality.

This method applied at English lessons (or any other areas) complies with the cognitive needs of students. During the game, their mental processes are activated, with the enhanced motivation to study a foreign language.

The result of studies is a free use of the new lexical and grammar structures for the purpose of communication. Forms and approaches of such method of teaching are variable and can be used at any phase of work.

This method of teaching is diverse, depending on pedagogical purposes, methods of organising, level of language skills. computer role-playing games can be presented as game-based elements, situations, exercises, with difference depending on the number of participants or time.

Computer role-playing games are often very simply organised, however, require a special base of technical means, extending the possibilities for presenting educational materials and making the process of studying a foreign language more interesting.

Gamification process doesn't have to "engulf" all the aspects of higher education, just a small part of it. Gamification, unlike classic form of educational process, creates the feeling of progress and satisfaction from the effort and the final result, which incredibly affects the motivation of students increasing it exponentially.

Personal learning environment is the future, where each student could build his own individual plan of how to obtain information, learn and follow his progress.

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