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I.O. Zolotaryova, O.B. Plokha

Simon Kuznets Kharkiv National University of Economics, Kharkiv

MODEL OF USE SERIOUS GAMES AND SIMULATIONS IN EDUCATION: METHODOLOGICAL APPROACH

The paper is devoted to the further development of the methodology of serious games. To ensure the effectiveness of serious games is necessary to consider the problem of finding a balance between the creation of "learning fun" acquisition of learning outcomes. To achieve this balance is offered the conceptual model of use serious games and simulations in learning. In accordance with the proposed model, a serious game have to comply with the requirements, which are combined in the following groups: information technology, organization of training, gameplay, learning process.

Keywords: *serious game, business simulation, model, educational process, gamification, learning objectives, information technology, organization of training.*

Introduction

The problem of increasing of the training effectiveness specifically professional higher education becomes very important today. There is a need to improve the students' steady practical skills. The level of development information technologies allows to create interactive, electronic and video educational content to simulate as much as possible actual production situations and scenarios of various business processes. It's necessary to focus on the active training forms, namely training, based on games or incorporating elements of the game. In this case, the learning process takes place not only in the form of a passive listening or reading but in the form of steps, so-called "learning through doing". An important feature of the game for education is their ability to motivate student, promote their development, enabling the test in practice and develop their skills and abilities. The use of serious games and simulations opens up many new opportunities for complex skills learning in higher education.

Serious games are often used for non-formal education and adult education, but in the field of professional education, they are not popular enough. Why there's a such situation? It is necessary to analyse the essence of the meaning and characteristics of serious games that the situation will become clearer. Using this term, you must always remember the pedagogical basis of serious games and the principles of their use.

Main part

The phrase «serious games» accurately reflects the essence of the product: on the one hand – this is a game aimed at creating interest, and on the other hand – this is training aimed at solving serious problems. In the [1] are emphasized the possibility of serious games as a tool integrated in the important educational elements: «Model of serious games using and simulations in e-learning – is designed concept that visually represents what possibilities in terms of technology, training,

gameplay and learning process have computer simulations and "serious games". In the [2] is noted: There are two key themes common to the development of games for education, namely:

1. The desire to harness the motivational power of games in order to "making learning fun".
2. A belief that 'learning through doing' in games such as simulations offers a powerful learning tool.

Thus, the use of serious games for educational purposes is based on the following: motivational component as needed to achieve any educational purposes is provided by four essential characteristics of good games: control, challenge, fantasy, and curiosity [3]. The educational component is more difficult and complex and it requires more detailed research. An important feature of educational simulations – their ability to motivate student learning, promote their development, enabling the test in practice and develop their skills and abilities.

In modern pedagogical literature offers many exercises for teaching students, but the use of interactive simulations cannot guarantee 100% success teaching process. Anyone who wants to work with "serious games" must understand that it is a tool that requires proper use, so as not to cause a useless activity group. Teachers should assess the benefits and disadvantages of simulations before offer their students [4]. Can distinguish the following advantages of "serious games" [5]:

- 1) motivate learning, because growing interest in the job;
- 2) facilitate personal development, creating a lasting interest in self-disclosure and potential;
- 3) help students see the features of its decisions;
- 4) encourage better understand and learn to use knowledge to solve the task (to win).

Facilitating the learning experience of the student, similar to that which it will implement in their professional life. The disadvantages are: immersion students in the virtual world and the false perception of reality; simulation results do not guarantee unambiguous as one might think; use simulations require technical training

of students and teachers; using simulations can lead to large financial costs.

Thus, the "serious game" is a universal form in which there are powerful processes of self-expression, self-determination and self-examination. Games develop intelligence, logic, spatial imagination. That's why games are used in various areas of public life, including game theory is a branch of mathematics in which we study models of decision making under conflict. In the process of serious games can be used supporting material that may contain additional information or forms to be completed for processing results. Using simulations teacher education in the classroom can be divided into 3 stages [6]:

1. Preparation for the classes used "serious game". Teachers should provide all necessary information to the student define the purpose, time limit and provide the audience with necessary equipment and materials also need to develop a clear step by step instructions for students.

2. Conducting simulations. Students are required to study all the material and implement tasks in using simulations, and they shall be required to write down the results for further analysis and evaluation of their teacher.

3. Analysis of the results. Summary of work, report writing, students determine the positive aspects and usefulness of the simulation, installation deficiencies teacher and answers to all the questions that have arisen in the course of employment.

Training programs, seminars and workplace learning courses are widely used today by organizations of all sizes looking to develop employee skills sets and build competence in performing different tasks. Many universities in Europe and the United States have been using similar simulations for student learning and acquisition of modern required skills. So the main question is whether Ukrainian universities use serious games in education and how they are better than conventional training?

Serious games are the dominant entertainment form of modern times because they powerfully motivate behaviour. Game mechanics can be applied outside the immersive environments of games themselves, to create engaging experiences as well as assign rewards and recognition [7]. Efficiency of SG is checked by using the evaluation procedure. The process of analysis and improvements of serious game would not be necessary if it initially has a structure that meets certain requirements. Study of different methodological approaches to the creation of serious games given the opportunity develop the model of use serious games and simulations in e-learning. This model consists of four groups of elements, which should include a serious game to achieve the learning objectives. Model of use serious games and simulations in e-learning is designed concept that visually represents what possibilities in terms of technology, training, gameplay and learning process have computer simulations and "serious games".

Group 1 – Information technology. The new generation of business simulation allows them to make

almost perfect learning tool for employees of enterprises and students. Their most important advantage that they interact with the student. Information technologies, which are based on networked computers, provide a basis for involving the deployment and interactive learning. The main elements of this level are: Input and storage of information; Possibility of on-line interaction with remote network users; The opportunity to interact with virtual objects; Easy and intuitive interface.

Input and storage of information. Today, the computerization of all spheres of social life gives you almost unlimited possibilities for entering and storing information. That existing technical capacity to capture, store and transmit information and determine the basic property information, namely the fact that in today's society information in most cases is not meaningful and substantive, and above all – operational. Information today – its broadcast operation symbols, communication, encourages people to take action. In other words, it is information justifies the actions of modern man. It is the operational nature of the information in modern conditions is the basis, the key to "open" the higher levels of the hierarchy – the organization of training, the gameplay and the learning process.

Possibility of on-line interaction with remote network users. Networking – a way of sharing activities resources. In this case, if earlier under the resources most often understood material resources: disk space, printer, scanner, modem, data files, programs, at the present time it is more informative resources, these resources may be modified during the interaction [8].

The opportunity to interact with virtual objects. As a result, memory capacity and speed of computers, as well as the creation of new software occur not only qualitatively new forms of data transmission and processing, but is primarily achieved by increasing similarities between the work on the computer and managing real objects, as well as the similarity of communications online communicating in real space-time.

Easy and intuitive interface. Any student can quickly learn the training program and get started with it. It should comply with the following conditions: to work with the SG does not require special training, easy navigation; easily view the results of the game.

Group 2 – Organization of training. Basic features provided by information technology to shape the organization of training. This level – the level of organization of training – primarily includes: Opportunities to gain knowledge and skills; Opportunities for communication between participants; Opportunities for self-directed learning; Opportunities for large situational capacity.

Opportunities to gain knowledge and skills. Like Wiki or e-learning, simulation and "serious games" are "carriers of content", i.e. specific knowledge and skills required to master the party. But in this case, the content comes with not boring lecture-text format, but

with the illustrations, and in the format of a bright and involving game play.

Opportunities for communication between participants. Like virtual worlds, simulations and team "serious games" provide participants with the opportunity to carry out communication training and interpersonal interaction. However, the main difference between communications implemented in the game or simulation of communication in the virtual world, it is interpersonal interaction takes place with a clearly defined purpose – to address specific challenges faced by the participants.

Opportunities for self-directed learning. Using a serious game for learning the student should be able to choose the level of difficulty. If a serious game is too difficult, the student will lose motivation. If the game is too easy, the learning objectives are achieved.

Opportunities for large situational capacity. Computer simulation and "serious games" allow participants to receive and apply the necessary skills in an environment that can be very similar to the one from the day they exist in the workplace, and perhaps more difficult, or even completely unusual, adventure or detective. Various scenarios solutions allow you to create the most unexpected and unusual situations to use the acquired knowledge and skills [9].

Group 3 – Gameplay. Level training organization provides building involving gameplay. Gameplay is usually translated as the gameplay. Creating gameplay in other words can be designated as the design of the gameplay or the process of obtaining the gaming experience with the knowledge and skills to be transferred to the learner. Scenario gameplay design allows you to create mechanisms and situations in which later will be "embedded" has just the process of learning. At the level of the design and development of gameplay, implements the following features: Opportunities for the application of the new knowledge and skills; Opportunities for the organization of work in a team and achieving common goals; Interactivity.

Opportunities for the application of the new knowledge and skills. Computer simulations and "serious games" provide an opportunity for a dynamic, vibrant, multimedia and dramatic presentation. However, their ability not limited thereto. At the design level of gameplay, developers are able to create a situation in which participants will have to directly use the resulting new knowledge and skills. This, of course, is very different from traditional testing, supplementing the conventional e-learning courses.

Opportunities for the organization of work in a team and achieving common goals. Interpersonal interaction in the game is not limited to just talk, in other words – communications for communications. In this case, these communications are made in order to address the challenges facing the team. There are single and batch simulation. In the simulations the team must join forces to achieve common goals and determines the

value of virtual collaboration. And if this participant have personal likes and dislikes to the rest of the team, so he will only make it more like what happens in the game, on what is happening in his life [10].

Interactivity, it is possible the student to intervene and change the situation. Everyone knows that computer games have become so popular because they represent the player to influence events in the game, and use a variety of objects, events and processes that are present in the game, for your benefit. Educational simulation and "serious games" make the player an active participant of the events occurring in the game, and involve its process of overcoming all obstacles standing in the way to the goal. All that does or does not do player in the passing game, has consequences that makes the game truly experimental action.

Group 4 – Learning process. Consistent use of the opportunities offered by level of information technology, the level of training and level of gameplay design, implement learning process necessarily includes: Obtaining direct experience; Get detailed feedback; Emotional involvement.

Obtaining direct experience as a result realization possibilities of application of the new knowledge and experience and capacity to intervene and change the situation in the game to achieve the goals. Computer simulation and "serious games" enable participants to apply the knowledge and skills to solve specific problems. This step is crucial in adult learning and equips them with the ability to adapt skills for each particular situation, and not the exclusive use of the ability to train specific skills in a particular situation. It lived experience is the basis for training adults. Accordingly, in a virtual reality of a serious game or a simulation participant gets an experience that can be easily translated into a situation occurring with him in his real life. In other words, the game show to what results these or other actions of the participant.

Get detailed feedback as consequence of the implementation of team interaction capabilities, as well as the opportunities and the application of knowledge and skills. Feedback and evaluation by other members of the team or tutor about the action taken is designed to help participants reflect on actions they have taken. It does not matter whether the tutor takes a direct part in team work with a group or an "outside" observer of the events – in any case, it is the stage of "critical thinking and discussion" makes observations and reflections in the abstract concepts or conclusions. A practical application of theoretical conclusions launches new training cycles [11].

Emotional involvement, as a consequence of work and opportunities for interactivity. The emotional component of learning is particularly important in e-learning. Ability to work in a team and co-solving tasks, achieving the desired goal and the dependence on estimates of other team members, experiences and overcoming unexpected situations inherent in the gameplay as much as possible

involve participants in an event, causing them to forget that they are in a virtual reality! In a game or simulation, students receive an unforgettable emotional experience like nothing else is able to serve as a basis for the process of learning and motivation to learn. After all, the games give the opportunity to feel like a winner. Although the value of serious games in education is undeniable and the potential benefits of using video games as ideal companions to classroom instruction is unquestionable, there is still little consensus on the game features supporting learning effectiveness, the process by which games engage learners, and the types of learning outcomes that can be achieved through game play.

Serious games open up many new opportunities for complex skills learning in higher education. The inherent complexity of such games, though, requires large efforts for their development.

The major advantage of business simulations is their influence on the minds of students. Not much training methods to attract and interest. When properly used, the simulation rejects unnecessary details that often distracting, and enables you to focus on the essentials. Teachers who are interested in "serious games" for today are able to use the new generation of programs that allow you to quickly integrate business simulation in the learning process [12]. Serious games use instructional and video game elements for no entertainment purposes. Serious games attempt to create instructionally sound and relevant learning experiences for a wide variety of audiences and industries. For serious games to be effective, instructional designers and video game designers need to understand how the game characteristics, competition and goals, rules, challenges, choices, and fantasy, used in both edutainment and serious games, can influence motivation and facilitate learning.

Summaries

There is a need to develop a methodology of serious games and the most challenging aspect is to find a balance between fascinating aspect of an exciting game of the teaching aspect, aimed at the achievement of learning objectives. In this paper developed the model of using serious games and simulations in educational

process. The purpose of this paper was to improve the methodology for the development of serious games, namely aspects of finding a balance between making "learning fun" and achievement of learning objectives. Proposed four groups of elements to be used in the development of serious games to create a balance between "good games" bring "good pedagogy".

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Рецензент: д-р техн. наук, проф. М.Д. Годлевський, Національний технічний університет «ХПІ», Харків.

МОДЕЛЬ ВИКОРИСТАННЯ СЕРЬОЗНИХ ІГОР ТА СИМУЛЯЦІЙ У НАВЧАННІ: МЕТОДИЧНИЙ ПІДХІД

І.О. Золотарьова, О.Б. Плоха

Робота присвячена подальшому розвитку методології серйозних ігор. Для забезпечення ефективності серйозних ігор розглянуто питання щодо знаходження балансу між грою та отриманням результатів навчання. Для досягнення такого балансу запропоновано концептуальну модель використання серйозних ігор і симуляцій в навчанні.

Ключові слова: серйозна гра, бізнес-симуляція, моделі, гейміфікація, цілі навчання, інформаційні технології, організація навчання, ігровий процес, процес навчання.

МОДЕЛЬ ИСПОЛЬЗОВАНИЯ СЕРЬЕЗНЫХ ИГР И СИМУЛЯЦИЙ В ОБРАЗОВАНИИ: МЕТОДИЧЕСКИЙ ПОДХОД

И.А. Золотарева, Е.Б. Плохая

Робота посвящена дальнейшему развитию методологии серьезных игр. Для обеспечения эффективности серьезных игр рассмотрен вопрос о нахождении баланса между созданием игровым компонентом и приобретением результатов обучения. Для достижения такого баланса предложена концептуальная модель использования серьезных игр и моделирования в обучении.

Ключевые слова: серьезная игра, бизнес-симуляция, модели, геймификация, цели обучения, информационные технологии, организация обучения, игровой процесс, процесс обучения.