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“SERIOUS GAMES”: WHAT IT IS AND HOW THEY ARE CHANGING EDUCATION

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The USA hosted one of the largest exhibitions in the world in the field of education – the International Society for Technology in Education (ISTE). More than 24 thousand people come to the event every year to understand how technologies in education will develop. One of the main trends of recent years, which was also discussed at the last ISTE, is the increasing penetration of games into education. But is it realistic to put really useful and effective educational content into smartphones and still make everything look as cool as WOW or Fortnite?

Serious games are born from the combination of pedagogy with the three main elements of computer games – plot, imagery, and software. The term "serious games" itself was introduced over forty years ago to characterize military simulations and computer games that were used in education. “They have elaborate and articulated teaching goals. The main goal is not entertainment, although this does not mean that games should not be entertaining” – this statement is the subject of discussions that continue to this day.

Can games really be useful?

In recent years, the number of adherents to the use of games in education has been growing. In open sources, you can find quite a lot of studies, the authors of which are trying to analyze the influence of games on the learning process, and a number of them are to prove the benefits of introducing certain game mechanics or finished products. However, in order to assess the results obtained most adequately, it is necessary to take into account a number of factors.

Like any other learning format, games are good in some ways and not so good in others, says Eric Klopfer, professor and director of MIT's Scheler Teacher Education and Educational Games Program. The outcome is influenced by game design, how the game is introduced into the educational process, the overall context, and what metrics are used to measure progress. In addition, a large role in this process is assigned to the teacher, who is responsible for choosing from the available games that are most suitable for students, as well as for specific educational purposes.

At the same time, he adds that it is necessary to clearly separate the gamification of education and educational games. Gamification is often understood as a way to take game mechanics and apply it to any educational activity. That is why in one case it can be useful, and in another it is not. Learning games are complete games with mechanics deeply integrated with learning objectives. For more

information on how to create engaging learning games, Eric Klopfer and his colleagues at MIT's Education Arcade Program talk in Resonant Games.

Serious games market: everything is really serious

Often in the English-speaking press, the concept of serious games is applied to educational games. In a general sense, "serious games" are games whose main purpose is not fun, but learning or practicing a skill. In addition to education, the term "serious games" is used in sectors such as defense, science and health.

For example, this is how Metaari, an analytical company that tracks cutting-edge education technologies, captioned its 2018 report on the global game-based learning market. In the study, analysts offer a forecast for the development of the industry over the next five years, looking at educational games from developers in 122 countries. The game-based learning market will reach \$ 17 billion by 2023, according to Metaari. According to the company, the rapid growth is due to, among other things, constant innovations in the field of AR and VR technologies, as well as artificial intelligence. The mobile games market will continue to grow, where Apple ARKit and Google ARCore technologies will play an important role.

Another factor that analysts back up their predictions is the rise in private investment in educational games. Over the past two years, according to the company, private investment in this area has amounted to more than \$ 1.7 billion worldwide, which is a record high.

Who Develops "Serious Games" and How: Five Examples

The development of educational games and the integration of their capabilities with educational tasks have long been of interest to global technology giants and recognized industry players. So, one of the veterans in the field of educational games is Minecraft – a popular game where you can construct unusual buildings and mechanisms from cubes of different types, build ancient cities, plant cacti and even program Minecraft inside Minecraft.

A few years ago, New York City computer science teacher Joel Levin and Finnish computer science teacher Santeri Koivisto came up with the MinecraftEdu platform. It is now a special version of Minecraft for teachers, as well as an online teacher community. The educational version differs from the usual Minecraft by the presence of a special account for teachers, which allows you to control what is happening in the game: for example, receive unlimited resources or protect constructed buildings from destruction. Community educators (mainly from the USA, Sweden and Finland) use the game in a wide range of disciplines. For example, in the version in history and geography, you can create models of cities of the past, in physics – to study the theory of probability, in chemistry – to conduct experiments with chemical elements, and in biology – to model the structure of the human body.

At Viktor Rydberg's Stockholm School, after an experiment that the school management considered successful, Minecraft even became a mandatory academic discipline. In these lessons, 13-year-old students can build their own cities, learn about ecology through the example of deforestation and changing the soil in the game, and also learn the basics of network security.

There are examples of the use of the game in Russian schools. For example, Svetlana Sadakova, a biology teacher at the Baumansky Lyceum (Yoshkar-Ola), suggested doing homework using Minecraft. First, students independently build models and diagrams from cubes on the topics covered, after which the work is checked and refined together with the teacher. As a result, you get visual cribs for the lessons. On the network, you can even find a video recorded at that time by a fifth-grader Nikita Isaev, who, under the guidance of a teacher, developed a model of the movement of an erythrocyte along one of the branches of the systemic circulation.

Collaboration between NASA and Microsoft

Recently, educational games have been supported by large players who, until recently, had nothing to do with the education market.

Microsoft is developing its own educational platform. According to the company, Microsoft Education offers a whole range of tools for organizing an effective educational process, including in the field of personalized learning and STEM disciplines. In addition, the company recently collaborated with NASA to develop eight lesson plans that explore various situations relevant to astronauts on the International Space Station.

The collection of lessons and materials is designed for middle and high school students and combines basic academic concepts with practical experience. Students are challenged to design in 3D, analyze data, create sensors, use virtual reality, and work with machine learning, while engaging in discussions about the challenges of life in space.

Among the developed lessons:

Two design tasks. As part of the Astro Socks project, students are exploring solutions to reduce the zero gravity load on astronauts' feet. In addition, as part of another task, they need to create a 3D model of their own module for the International Space Station.

A lesson that introduces the effects of microgravity. It includes hands-on experiments and experiences in virtual reality.

Four lessons in data collection and analysis in which students conduct hands-on experiments to prove a number of laws. As part of these lessons, you will use sensors to collect data, as well as correlate your observations of life in space with life on Earth.

A lesson that introduces the ecosystems of the Earth through photographs taken from space. Here, students also learn the methods that scientists use to predict climate change using algorithms.

Another commercially successful space education project is the VR game Apollo 11. Its authors describe the project as "a new type of documentary." Here you can not only look at the events of 1969, but also take control of the command module, explore the lunar surface and deploy lunar experiments before returning to Earth. Since its launch in 2016, it has sold over 120,000 copies and has brought in over \$ 1.2 million to its creators.

Google

Students need an adaptive skill set to tackle the most challenging future challenges, according to Google.

"More than 65% of young people will work in professions that do not currently exist. Learning computer science skills helps students thrive in a rapidly changing world. However, our research with Gallup shows that many students are not getting the computer science education they need, and teachers do not have the resources to provide it," the company notes.

To expand access to knowledge, the company is implementing a number of educational initiatives in the field of Computer Science. In particular, these programs are designed to provide digital literacy for both students and teachers, as well as to expand opportunities for learning programming.

And Brazilian developers from the Catholic University of Pernambuco decided to take on the popular genre of survival games to spark an interest in history among schoolchildren. The goal of the game is to survive in a hostile prehistoric environment. Here you need to get food and learn how to make a fire, escape from predators, and also explore caves with rock paintings in order to understand what they represent for humanity. All player decisions affect the course of the game's history. In addition, the game provides real-time feedback, promotes problem-solving skills, and rewards the learner.

Using computer games allows you to:

- to increase the level of cognitive development;
- to form a positive attitude towards activities;
- perceive a computer game as an assistant in various activities;
- develop fine motor skills by coordinating movements when working with a computer mouse;

- to form the finest coordination of eye movements.

The inclusion of a computer exercise in an entertaining form in teaching helped to develop in children not only cognitive activity, but also arbitrary behavior and independence.

All "serious games" have extensive teaching potential and can be widely used within the framework of teaching. The effectiveness of their use directly depends on both students and teachers. There is every reason to believe that in the future there will be a unified effective methodology for using computer games in the educational system. And they will be developed in accordance with all the requirements and criteria of the educational community.

Regarding the structure of the game, its world should be integral, coherent and harmonious. There must be an element of randomness and uncertainty in it, which makes it even more fun and exciting. The game must be an interactive process, and its decisions must have consequences. Actions in the game must hold the attention of the player and have feedback. The process of the game itself must be continuous and coherent, all tasks must be fundamentally feasible. And regarding the elements of reality, they depend on the context. The bottom line is to define the learning goals so precisely that they are clear to the player. The game challenge implies that without the absolute study of all tasks, the game process will stop. The player is most likely interested in this, and the game truly reflects his living conditions. Finally, it should be noted that all serious games have great educational potential. They can be widely used in training. However, the effectiveness of their use directly depends on both the players and the teachers. Today there is every reason to believe that in the future there will be an effective methodology for using games in the learning process. And they will be developed in accordance with the new requirements of the educational community.

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THE INCLUSIVE EDUCATION AS AN INNOVATIVE TECHNOLOGY TO USE IN ENGLISH LANGUAGE LESSONS

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Inclusive education is increasingly taking leading positions in teaching children with disabilities in the education system of Kazakhstan, as well as in other countries of the world.

All people are different, everyone has the right to be different from others, to be different from everyone else. And modern society must be ready for this. One of the innovations is inclusive education, which allows children with disabilities to study in regular classes on an equal basis with everyone else. To be more precise, *inclusive education* is a process of development of general education, which implies the availability of education for all, in terms of adaptation to the different