

VIDEO GAMES IN THE CLASSROOM

Stolyarevska Alla

The Eastern-Ukrainian Branch of the International Solomon University

Abstract

Video games are used in nearly all domains for learning. Video games for learning do not only excite and entertain, but also motivate and educate. This paper pays attention to video games, in which participants learn through experience acquired.

Анотація

Відео ігри використовуються практично в усіх областях навчання. Відео ігри для навчання не тільки пробуджують і розважають, але й мотивують і навчають. Ця робота укладає увагу на відео ігри, в яких учасники навчаються за допомогою отриманого досвіду.

Background

Video game is an electronic game that involves human interaction with a user interface to generate visual feedback on a video device. Video games for learning are defined as digital learning games. The video games for learning or educational video games are interactive and involve some form of problem-solving: the player is given a goal of some form that does not match their current state and must overcome obstacles to accomplish the goal. According to investigation of the National Research Council [1], "Simulations and games have great potential to learning goals, including motivation to learn science, conceptual understanding, science process skills, understanding of the nature of science, scientific discourse and argumentation".

There are many different types and styles of educational games all the way from counting to spelling to games for kids and games for adults. Numerous subgenres exist among educational games, each for a different field. The website [2] represents the best games in geology, estimation, ecosystem, painting, reading, cultural appreciation, biology, shape identification, mathematics, music, etc. Among them are the PC games, the games for the Wii, Xbox 360, Nintendo DS, and for other platforms. One can see the games for all ages: preschoolers (2-4), little kids (5-7), big kids (8-9), tweens (10-12), and teens (13+). The website [2] also gives the recommendations for teachers and families in choosing games for kids. For students a campaign called "Education for Innovation", aimed at improving the scientific, technological, engineering, and mathematical (STEM) abilities of students, was initiated in 2009 in USA. The campaign plans to harness the power of interactive games to help achieve the goal of students excelling in these departments. The campaign follows many new opportunities for the field of video games.

As for the elderly, the studies conducted by the neurologist Adam Gazzaley from the University of California, San Francisco, showed that special games help older people to improve their capacity to multitask. We all expect a certain amount of multitasking to be normal, if not mandatory. And also experts say video games may not only stave off the mental deficits that come with age, but could also help in the diagnosis and treatment of mental problems. The studies show that a specially designed video game may help sharpen mental skills that fade with age. The example is NeuroRacer, a video game that was created by brain scientists.

The current state of research and design in games for learning was examined in the massively open online course "Video games & Learning" (Coursera, 2013) [3]. Constance Steinkuehler and Kurt Squire from University of Wisconsin Madison, USA, the tutors of that course, discussed research on the kinds of thinking and learning that go into video games and gaming culture, benefits and drawbacks of digital gameplay, and new developments in video games.

They defined games for learning as a voluntary activity structured by rules, with a defined outcome (winning/ losing) or other quantifiable feedback (points) that facilitates reliable comparisons of in-player performances...that target the acquisition of knowledge as its own end and foster habits of mind and understanding that are generally useful or useful within an academic context. Games for learning may be associated with formal educational environments, places of informal learning, or self-learners interested acquiring new knowledge or understanding.

The examples of video games with designed experiences

The video game for little kids (5-7): Sushi Monster is an entertaining and challenging math app from Scholastic corporation. Kids (since 7) can practice addition and multiplication skills by feeding the monster numbered plates of sushi, creating a number sentence to arrive at the monster's requested number. Correct answers earn kids points, stars, and trophies. It uses the gamification techniques. The kids learn math and acquire some thinking & reasoning skills.

The video game for big kids (8-9): the game BrainPOP Featured Movie is produced by the educational organization BrainPOP Educators. The content of the game changes daily. Each day, there is a new animated documentary, and it could be on just about any topic you can think of. Film topics have included the planet Mars, dogs, asthma, blogs, and Mexican artist Frida Kahlo. These films and the information within are geared toward big kids (8-9). The game can be characterized as daily films from educational group provide tons of learning. The kids learn such subjects as language & reading, math, science, social studies, arts, hobbies. The kids acquire such skills as thinking & reasoning, self-direction, health & fitness.

The video game for tweens (10-12): the website Khan Academy is the great academic videos with math practice for skills mastery. It can be used since 12 years old. A free website Khan Academy comprises thousands of educational videos aimed at self-paced instruction. It is known for its math videos. For math concepts - from upper-elementary through college-level - the site offers an almost unlimited number of practice exercises, organized by topic, with instant feedback and progress data.

The video game for teens (13+): the website Get the Math gears toward middle and high school students. It helps students to build problem-solving skills and solve real-world problems with algebra by watching video clips of professionals using math in their jobs. Then they get a chance to try it themselves with the mathematical challenges the site poses. It's hip and fun and teaches algebra.

The video game for students. StarCraft, a real-time strategy video game developed by Blizzard Entertainment, has been labeled by many of its participants as the chess of the twenty-first century. In the spring of 2009, the University of California, Berkeley offered a democratic education course "Game Theory with Applications to Starcraft", which took a theoretical and computational look at how battles within the game are conducted and on what basis strategic choices are made. Alan Feng, the instructor, applied a variety of upper-level mathematical concepts including vector and matrix mappings, differential calculus, and finding levels of uncertainty using graphs in three-space. The University Florida took a different take on using Starcraft as a means of education. Offered as an honors only online course titled, "21st Century Skills in Starcraft", the course required no math, and instead focused on a hands-on approach to developing adaptive and quick decision-making and critical thinking skills by analyzing replays of Starcraft matches. In the course description, instructor Nathaniel Poling noted that these skills would "undoubtedly" be needed in the 21st Century workplace and "are fundamental in Starcraft and therefore make the game a highly effective environment for students to analyze and take action in complex situations."

The video games for adults. Playing a car-racing video game NeuroRacer boosted older adults' brainpower. The results suggest that brain training games might stave off mental decline that comes with age. After playing for 12 hours over a month, volunteers between ages 60 and 85 got so good at the game that they beat 20-year-olds playing it for the first time. And the benefits stayed for at least 6 months, even though the older volunteers had stopped playing

NeuroRacer. Other mental functions also improved: Lab tests revealed that participants' working memory increased, as did attention.

Video games as educational research tools

Currently, advances in technology have allowed designers to create rich digital worlds with greatly improved sound and graphics. Video games and simulations are becoming more and more widespread in education, but very little is known about how they work [3].

Much of the research in this area has focused on a comparison of game play to lecture, which is often inappropriate, because each is a different teaching technique that typically embodies different values by instructional designers and suitable for different types of learning experiences. Educational technologists will benefit from learning programs using simulation in the form of case studies, or design experiments. More careful research is needed to help educators understand the dynamics of using simulation to facilitate learning. The greatest benefit of studying the game may not be as much in the creation of theoretical understanding of the human experience in technology or guidelines for instructional design, but rather to inspire us to create new designs.

The use of video games for learning has its advantages and drawbacks (pros and cons). *Pros:* 1) games outperformed more traditional methods in terms of both cognitive and attitudinal effects; 2) meta-analysis found that games - compared to traditional classroom controls - resulted in 20% higher self-efficacy, 11% higher declarative knowledge, 14% higher procedural knowledge, and 9% better retention – but only when the comparison treatment was passive and not active learning. *Cons:* 1) serious games are not more effective than traditional classroom instruction methods; 2) video games cause participants to become excited and therefore produce a whole host of confounding variables such as motivation and individual skill. *Pros & Cons.* Video games are the new silver bullet. Games can indeed create good learning, because they often teach in powerful ways. However, what many people miss in the rush to bring games to school is that the teaching methods good games use can be implemented with or without games (though games are one good tool to be used with others).

In general, video games have a large positive potential in addition to their entertainment and there has been considerable success when the games are designed to solve a specific problem or teach a certain skill.

Video games are a technique that may be available for a classroom teacher. Care should be taken that enthusiastic use of this technique does not displace other, more effective methods.

References:

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