



Videogames for Teachers: Analysis of Videogames for Education

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Abstract

Since 2003, after the movement/initiative related to videogames, people have started to create and use them for teaching and training purposes. In fact, the way educators meet the needs of the Y generation has changed and they are suggested new methods for teaching by using videogames and Apps. Nevertheless, during the Communication Opening up Education (2013), the Commission highlighted that most of the teachers still do not consider themselves as 'digitally confident' or able to teach using digital tools at their full potential. Even if a high percentage (around 70%) of them is interested in using innovative digital based approaches, still there is the need to promote more trainings to provide them with skills and competences on ICTs and on how to use videogames in the educational field.

This article focuses on the analysis of game-based teaching and videogames used as practical tools for the improvement of education and students' motivation. The article presents the analysis made during an international Erasmus+ KA2 Strategic partnership "Videogames for Teachers" project and also good practices related to the usage of gamification in "Devbridge Group", which is a Chicago-based digital products company. The aim of using games in educational process is to empower future educators to use educational videogames and Apps in terms of development of essential emotional and intellectual skills that support academic achievement.

Keywords: *Videogames in education, videogames for teachers, gamification, game-based learning/teaching, educational videogames, educational Apps;*

1. Videogames in education

Gamification is one of the components that has the potential to contribute to modern education [1]. Regarding highly motivational media, gamification is on the cutting edge of innovation in the ever-changing education system. Since information can be distributed far more cheaply on digital readers and tablets than in books, and since computer programmes can offer instant feedback, educational systems depend much less on the number, cost, and time availability of teachers [2].

Currently, gaming is one of the biggest industries as well as one of the most powerful learning tools that is considered to be in the first place regarding future perspectives. According to Oxford scientists, in the near future, digital learning tools will substitute books, whereas the combination of an increased focus on student engagement as well as the possibilities provided by digital learning will make gamification a powerful tool for educators [2].

The aim of this article is to present reviews of educational videogames and Apps analyzed in the project "Videogames for Teachers". Analysis was carried out according to adaptability of games and Apps in education and their benefit of being used by future teachers. Moreover, these reviews are provided regarding business sector where videogames have already been used to teach pupils coding and basics of programming.

1.2 EU project-based initiative "Videogames for teachers"

"Videogames for teachers" (V4T) is an international 2-year (2017-2019) project under Erasmus+ KA2 programme Strategic Partnership in the field of Higher Education for innovation development, which is addressed to future teachers, trainers and researchers/professors of higher education institutions interested in applying videogames to innovate teaching methodologies. The project developers are mainly from European Universities: 7 project partners from 5 different EU countries. The main objective is to provide the project's target group with the necessary skills, competences and tools to effectively exploit videogames in education. Regarding this main objective, an online database of two kinds of videogames and mobile Apps will be created: for educational purposes and leisure games

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with potential for education. There will be highlighted the thematic areas covered by the videogame, the age target group of students, educational potential, technical solutions adopted as well as risks to be considered while using the product with the students. Furthermore, the suggested methods will be used to assess and improve the skills, competences and knowledge and eventual possibility to recognize Credits for the fulfilment of the game and internal assessment tools.

The project foresees intellectual outputs such as the manual of using videogames and Apps in education and e-learning training package to provide target group with the basic knowledge of programming languages and authoring tools thus making them autonomous in developing their own educational videogames/Apps.

2. Analysis of Videogames and Apps

Before the development of the manual, each research team from 6 EU universities will provide 20 reviews of videogames and Apps which are related with education: 5 educational videogames and 5 videogames for leisure but with educational potential, 5 educational Apps and 5 Apps for leisure with educational potential. In total, the repository will be filled by 120 reviews of videogames and Apps. This online database is an ongoing process and at the moment (in the first stage of the project) more than a half of reviews can be found on the project's website (<https://v4t.pixel-online.org>).

In this article, we provide a summary of the analysis of 68 videogames. Almost the same amount of free of charge (32 of 68) as commercial (29 of 68) videogames and Apps were analyzed, also, 7 freemium games which allow to play for free just a small part of the game or with less features.

Most of the analyzed games (56 of 68) are dedicated to single players with no interaction to other players and offer competition with yourself or an individual learning process. Yet, it should be kept in mind that present and upcoming labor market requires people with strong social skills.

Videogames include action games as well as simulations, strategy, role playing, sports, puzzles and adventure [10]. Videogames cause participants to become excited and thus produce a whole host of confounding variables such as motivation and individual skills [6]. These skills could be improved and developed by means of simulations. Apart from the colorful, motion-filled, visual appeal, many games such as Bridge Constructor Portal, MineSweeper, Clickcritters, Doodle God, Heart of Iron, Atomas or Make Me Ten offer situations which require children to try various strategies aimed at overcoming the obstacles and challenges presented in the game, and at incrementally more challenging levels (School of Education, UWI, St. Augustine).

Educators have used simulations and games to foster learning for decades, and many are already leveraging advancements in gaming and technology [7]. The authors of a National Research Council report argued that science is the discipline that should convey skills required for a 21st century workforce, such as non-routine problem solving, adaptability, complex communication/social skills, self-management, and systemic thinking [8].

Regarding the project's V4T analysis of videogames and Apps designed for educational purpose, it is clear that part of the provided online descriptive presentations regarding "Skills and competences" was very important because it covered other competences and knowledge that are very important for future students. This part was acquired by the ECVET learning outcomes model. In total, there were 13 possible soft skills: critical thinking, problem solving, creativity, self-confidence, resilience, time management, team working, entrepreneurship, leadership and mentoring, coaching, innovation.

According to the analysis, the majority of videogames and Apps improve critical thinking, problem solving and creativity skills (Elevate, Europa Universalis, Geometria Montessori, Tetris, Bridge Constructor Portal and others). Scientists claim that game players may become exceptionally skillful in solving problems in real life as they do so in games [5].

Leisure App with educational potential Thinkrolls 2 is based on simulations teaches Physics as well as improves many soft skills: problem solving, logic, memory, spatial sense, power of observation. Comparing leisure videogames and Apps with games for education, it obvious that certain activities, even if they have strong relations with a certain school subject, have much less influence on implementation of soft skills. Leisure videogames and Apps with potential for education employ more than 4 soft skills, while videogames and Apps with only educational purpose has from 2 to 3 mentions of soft skills.

According to scientists, computerized simulations improve soft skills, develop other competences and allow learners to manipulate otherwise unalterable variables. With simulations of natural systems, such as KerbalEDU, learners can observe the effects of changing the oxygen levels of the globe [10]. Some games, such as Hearts of Iron and Europa Universalis, enable students to view phenomena from new perspectives. Learners can take command of any nation in World War II, learn economics, history, politics, sociology, and culture in the process.



Encouraged by game-based motivations, students have less need of teachers' constant discipline and supervision to conduct their work. However, teachers are likely to have a more important role in education in terms of deliberate and evidence-based method: they will be responsible for supervising students' activity remotely, creating flexible educational experiences, and managing the social needs of students in new and challenging social game environments [2]. The current analysis revealed that it was possible to choose a degree of required tutoring. Most of the analyzed videogames and Apps have an option for autonomous use by students and just several of them can be used through supervision or autonomous use after the teacher's introduction.

There is an increasing business–education partnership that has been reshaping education very effectively. The global economy is increasingly dependent on science and technology [11]. So far there have been several initiatives driven by big programming companies to take an important part in developing the Next Economy. These initiatives make use of educational videogames and Apps for this purpose.

US programming-service company “Devbridge Group” initiative called “Sourcery for Kids” (SFK) is one of the initiatives based on business-education partnership. SFK seeks to inspire and educate kids by giving them the opportunity to learn and apply technological skills of product development. For the entire academic year, children study key aspects of programming, from logical concepts and functions to variables, sequences, coordinates, and movement; they also learn to apply them in practical projects.

The main aim of this academy dedicated for 6-12 year-old pupils has a long-term target in this area: to increase the number of students entering IT studies tenfold in the next ten years. It might be achieved by teaching kids programming with a programming language called Scratch, analyzed in the “V4T” project and which allows learners to create their own interactive stories, games and animations that lead to learning important mathematical and computational concepts, as well as how to think creatively, reason systematically, and work collaboratively: all essential skills for the 21st century.[12]

This App has computerized simulations and edutainment videogames which can be a powerful learning tool. Furthermore, the content of SFK consists of technical and creative tasks that improve school subjects (Math, Natural Sciences, ICT, Technology, Arts and Music) as well as soft skills (creativity and innovation).

There is a risk, however, that a player can create a game with inappropriate content and share it publicly with everybody. However, even if players might use this educational App without supervision, usually autonomous usage after educational introduction and explanation is a more advisable practice for kids to avoid before mentioned risk.

Conclusions

Videogames, as one of the first, best developed, and most popular truly digital mediums embody a wealth of knowledge about interface, aesthetic, and interactivity issues. Therefore, future creators, teachers and students will be strongly affected by business-education partnership that has been already in an effective progress right now. Analyzed videogames and Apps are suitable and could be played not only for leisure but what is the most important as well for educational purposes. Such games could develop various soft skills. Accordingly, it is important to find correct and useful videogame and use it as a attractive, motivating learning/teaching tool.

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