DIGITAL GAMES AS AN EDUCATIONAL TOOL
KEY FACTORS FOR A SUCCESFULL INTEGRATION

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Abstract

Our first impression on digital games is that they are a "waste of time" oreven "sources of danger". However, digital games require from users to develop special skills to accomplish puzzles, levels or goals. Being at the same time extremely engaging and entertaining, they could be easily used to produce a more efficient educational framework. This paper analyzes the characteristics of the digital game and proposes some key factors to be taken into account for its integration into the learning process.

Key words:*video games, digital games, education, gamification, game based learning.*

1   INTRODUCTION

Digital games are quite misunderstooded, since they are at best considered as "just a fun way to spend our time" and at worst, a risk-bearing medium (addiction, delinquency, etc.). However, digital games are framed by rules and have plenty important characteristics that could positively enhance learning. Such as problem solving, interaction, feedback, communication between participants, multitasking, strategy, observability and logical thinking.

The combination of game and education is not a new idea. It is already known that game, having elements of interaction and active participation, is seen as an appropriate way of transferring knowledge. In recent years, due to the rapiddevelopment in fileds like IT and video games industry, studies have begun to research the positive influence that digital game could have on learning. As a result, seems that using games is an effective and desirable learning method, since it transforms learning into a less unpleasant and more fun process for students and educators (Jaramillo, Zapata, Losada, and Fekula. 2012).

2   RESEARCH METHODS

This research involves three stages of development. The first stage includes an extensive search of the literature on the use and effectiveness of digital game in education. The second stage includes a report to the educational advantages of the electronic game and the main reasons that engage is its greatest benefit. At the final stage we attept to search for these elements that can influence the integration of the electronic game into learning. These elements categorized on the basis of their common features and are proposed as the main factors for the successful integration of the digital game into the educational process.

3   DIGITAL GAMES &LEARNING

In the burst of electronic games in the 1980s, we came across the term "Edutainment" as the result of combination between two terms, entertainment and education (Šakić, Varga, 2015; ALBAR, 2014;Egenfeldt-Nielsen, 2006). Today, more

frequent terms for this combination, are the terms "Gamification" and "Game Based Learning". Although there is a confusion between these terms, in in fact they are two different ways of integrating the digital game into learning.

"Game-based learning" basically involves a learning process based on the use of game and some of its principles, while "Gamification" refers to the adoption of game'scharacteristics to turn a non-game process into a process that looks like game (Domínguez et al, 2013; Johnson et al., 2014). A typical example of gamification are some online lessons (e.g. MOOC's) or other web based applications (eg social media) that use game elements such as points, levels, awards, progress bars and ranking tables in such a way to engage users(Pho, Dinscore, 2015).

3.1 TYPESOFDIGITALGAMES

Digital gamesdivided into several categories, depending their content and gameplay: action, adventure, arcade, casual, simulation, strategy, sport, combat, driving, multiplayer, puzzle, role playing, shooter, Trivia. Many digital games can also combine elementsof more than one categories (Watson2007; Šakić, Varga, 2015). Of course, all of these games were not designed as educational, but conditionally could be used in education. There is another category of educational games. That category includes games specially designed for education purposes. We can also distinguish games in these category, according to how they integrate into the learning process. There are design-based games from trainees, games designed by trainers and commercial off-the-shelf games (COTS) (Van Eck, 2006).

3.2 EDUCATIONALBENEFITS OF DIGITAL GAMES

Most studies on the effectiveness of digital games in education, lead in positive results. It seems that the digital game could help to eliminate the dividing line between learning and fun. The game can turn a boring learning process into a pleasant process of skills and knowledge development(Griffiths, 2002; Mitchell, Savill-Smith, 2014;Prensky, 2007; Sitzmann, 2012).

A key element of their effectiveness is that they take place in an interactive environment,aiming to specific goals. Users can make mistakes without dramatic consequences until they develop skills to overcome them. This keeps them committed to the process, having a great interest in the learning procedure (Trybus, 2012). The features we develop as computer gamers, are equally important for our professional and social lives. Digital game helps to develop important features, such as co-operation, competitiveness, focus on the outcome, willingness to research, observation, multitasking and logical thinking (De Aguilera,Mendiz, 2003;Pivec,Dziabenko 2004;Zhang, 2010).

3.3 WHY THEY ARE ENGAGING?

The most important benefit of digital games, which we would like to integrate in education is that they are highly engaging(Squire, 2003;Van Eck, 2006; Mitgutsch, 2013). Often in education, and especially in adult groups, there are phenomena of resignation from an educational process (Klopferet al, 2009;Salen, 2011; Ritzko, Robinson, 2011). A successful digital game though keeps the user engaged, from beginning to the end. There are a few reasons why games are so engaging (Squire, 2003; Salen, 2011; Mitgutsch, 2013):

• Represent fantastic interactable environments

• Continuously provide challenges and goals
• Provide direct feedback and export results
• Use aesthetics, sounds and visual environments that can spark the attention
• Provide a variety of options to solve problems
• Follow the principle of competition (win or lose)

4 KEY FACTORS FOR A SUCCESFULL EDUCATIONAL FRAMEWORK

This chapter proposes some important factors which are expected toaffect the learning process and should be taken into consideration before integrating a digital game into an educational framework.

1. Educational Objectaligned with game type

Before selecting the digital game, it is necessary to have a research on its adequacyregarding the subject to be taught. It goes without saying that all types of game do not fit all the scientific fields.

2. Characteristics of learners

It is obvious that for any educational process the trainer should take into account the trainees' characteristics, as theseresult from demographics (eg, age, gender, ethnicity, educational status). In addition, should also take into consideration trainees'familiarity with technology and the educational tool they are asked to use.Technology could have opposite learning outcomes if it is difficult to use it.

3. Educator's role is still active

Digital game seems to have a predominant role in the educational process, but it does not replace the teacher. Furthermore,educator does nothave less responsibilities, neither less workload. Educator prepares the process, discusses the content with his team, and presents them the new way of learning. He also has a leading role throughout the processand remains the most important element of it. His role must not be underestimated either by the design of the game or of course by himself.

4. Gameplay, Difficulty and Duration

Game features regarding thegameplay, the difficulty and the duration, should be tested to match the learning object and group's characteristics. For instance, a very difficult game can lead to the resignation of a trainee without previous experience or any familiarity. The game should include clear goals, feedback to allow students to keep track of their progress, different levels of difficulty so not to be dull and fit into different learning abilities and a defined duration within the learning process.

5. Focusing on co-operation

Digital game, as an active learning tool, should be used to enhance co-operation. Nowadays the connectivity possibilities between the participants of an online game or an online community are unlimited. This should be taken into considerationin order to focus in a beneficial use of digital games regarding the communication and co-operation of trainees.

6. Learning goals and needed skills

Educator's key priority is to achieve the learning goals, so that the learners develop certain specific skills. Learning which involves the digital game is no exception. Game should be suitable to serve the learning objectives and the correct choice of gameis essential for a successful outcome of the learning process. Furthermore, some digital games are appropriately designed to deal with specific learning difficulties or educational obstacles. Even if there is no suitable game for all the above issues, educator can choose one with customization capabilities, as to shape it appropriately and according to classroom's needs.

7. Availability & cost of equipment / game

An obstacle to the adoption of digital game as education tool is the availability of both game and equipment, as well as their cost. Even if the educatorhas the technological and pedagogical knowledge to use the game in his room. However, no one guarantees that an educational institution can afford the game or the required equipment. Digital games do not yet have the same availability as other educational tools. Also their cost may in some cases be prohibitive. Even if the game is available for free, it may be impossible to support it with the required equipment.

8. Priority in learning, not in the game

Digital games incorporated in the educational process must be of educational nature or adapted in this direction. The desirable outcome of combining digital games with learning is not to spend our time having fun, but to having fun through learning.

9. Be a Gamer before being a teacher

Most decision-makers and educators teachers are most likely to have never played a video game. This certainly strengthens the negative attitude towards it and enhancethe inability to adopt it as an educational tool.

Educatorwho decides to use the game in the classroom, will have to change his attitude towards the medium and hence to tested it himself. This allows him to choose the right game, fitted to the learning objective and the classroom's needs. In addition, trying the game could help discoverits possible strengths and weaknesses. Based on the above educator could easily customizethegame, in order to design the appropriate educational framework.

10. It is not a panacea

Digitalgame is not the solution to all learning problems. Such an attitude can only have a negative impact on learning. All the above factors decisively influence the correct integration into the educational process and are of equal importance.Let's not forgetalso, that this is a new field of research with a relative difficulty of association between game designers and educators. It is logical that neither designers can think as educators nor educators as designers(Malykhina, 2014).

5 CONCLUSION

Digital games are a fairly fresh field of research in education. Research results so far are positive about their effectiveness and show that games are capable of overcome some practical obstacles and broadening the horizons in education. Their main advantage is that they can retain the interest of learners throughout an educational process.

Their effectiveness may not be the expected, if some important factors have not been prevented. Type of the game, learner's characteristics, available equipment and the role of the teacher are just a few of the factors that could influence the learning process.In addition,literature, shows that there is no exact match between education and electronic game industry, resulting only few successful educational digital games. This could be resolved if educators were used by video games industry as counselors during development of a game.

Certainly,digitalgame is not the solution to all learning problems, however it is proven to have great advantages when properly used. I believe that future studies should turn to the way which a video game could be properly used and integrated into the educational process.

Acknowledgement

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