KONAKA

KONFERENSI AKADEMIK 2016

Pengkongsian Ilmu Dari Perspektif Islam

30 November 2016 | Rabu
UiTM Cawangan Pahang
Kampus Jengka

The Effects of Digital Games on Student's Learning Experience: A Review of Literature

Mahathir Mahali[1*], Junaidah Jamaluddin[2], Norlaila Mohd Din[3],
Mohamad Azmi Nias Ahmad[4], Faizan Abdul Jabar[5],
Nur Syazwani Mohamad Fadzillah[6]

[1,5] Faculty of Business Management, Universiti Teknologi MARA Cawangan Pahang,
Kampus Jengka, 26400 Bandar Tun Razak Jengka, Pahang, Malaysia
mahathir241@pahang.uitm.edu.my, faizan@pahang.uitm.edu.my
[2,3,4,6] Faculty of Accountancy, Universiti Teknologi MARA Cawangan Pahang,
Kampus Jengka, 26400 Bandar Tun Razak Jengka, Pahang, Malaysia
junaidah_jamal@pahang.uitm.edu.my, norliey@pahang.uitm.edu.my, mohdazminias@pahang.uitm.edu.my,
nsyazwani@pahang.uitm.edu.my
[*]Corresponding Author

Abstract: Today digital games have become an important part of "digital generation" who have grown up playing computer and video games and increasingly an important part of our culture as a whole. Despite many criticisms, there is now increasing interest in asking whether digital games might be offering a powerful new medium to support student's learning in the information age. Researchers and educators have started researching on how to apply games into classroom activities to foster and support the learning process. The purpose of this paper is to discuss the effects of digital games on student's learning based on a review of literature. Many of the researchers focus their attention on the effects of the games on student's motivation, enjoyment, interest, skills, academic performance, competitiveness, efficacy, teamwork, attitude, psychology and health. In addition, this paper will also highlight some of the barriers and challenges in using digital games within our current education system and within our existing modes of learning.

Keywords: Barriers, Digital Games, Effects, Game-Based Learning

1. Introduction

Nowadays digital games have become an important part of young generation's lives and a growing part of our culture as a whole. Despite the fears that digital games might promote negative effects on students, there is an increasing interest among the researchers and educators in finding out whether digital games might be offering a powerful new medium to support students' learning in the information age. Recognising the potential of using digital games to facilitate the learning process, researchers and educators have started researching on how to apply games into classroom activities in different subjects and modules. Digital games could be used in many pedagogical aspects such as motivating students and providing attractive and effective learning tools.

The purpose of this paper is to provide a review of literature on the effects of digital games on student's learning. Many of the researchers focus their attention on the effects of the games on student's motivation, enjoyment, interest, skills, academic performance, competitiveness, efficacy, teamwork, attitude, psychology and health. In addition, this paper will also highlight some of the barriers and challenges in using digital games within our current education system and within our existing modes of learning.

2. What is a Digital Game?

The terminologies such as computer games, video games, online games and digital games are used interchangeably to describe the pedagocal technique associated with digital

game-based learning. Prensky (2001) never gives a concise or formal definition in his book *Digital Game-based Learning*. Nevertheless, he infers that all games in digital versions fall under the term digital game-based learning. Liu and Chen (2013) describes that digital games provide animated graphics and audio effects as well as immersive stimulation.

According to Noraddin and Kian (2014), all digital games could be classified into two broad categories. The first category is known as "edutainment games" that are created to serve certain learning objectives or outcomes with some features of entertainment. Noraddin and Kian (2014) said that the players in "edutainment games" learn by doing exercises presented in the game. Another term falls under the same category is known as "serious games" (Connolly at al., 2012) or instructional games (Guerrero, 2011). As asserted by Noraddin and Kian (2014), edutainment games are meant to be for preschool and young children and approach the learning and teaching through fact and memorization. On the other hand, serious games are intended for all young and adult learners and approach the learning through teaching, training and informing (Noraddin and Kian, 2014).

The second category is called "commercial-off-the shelf" (COTS) games and these games are created totally for intertainment purposes (Connolly at al., 2012). Their creation did not involve consideration of any educational outcomes. However, Ratan and Ritterfeld (2009) stated that any digital game has the potential of providing learning outcomes irrespective of whether it is considered a serious game or entertainment game. They added that the educators can make any of these digital games beneficial by guiding their students to gain the learning values in the game contents.

3.   Effects of Digital Games on Learning

According to the previous studies, impact of digital games vary in terms of different learning aspects focused by the researchers. Researchers have found that digital games are powerful learning tools as they are able to provide a learning environment that promotes students' interest and motivation in learning which could result in good learning achievement (Hung et al., 2014; Divjak & Tomic, 2011; Lin et al., 2010; Papastergiou, 2009). Several other studies have also reported that digital games have the potential of facilitating students' cognitive learning process (Chuang & Cheng, 2007) and promoting problem solving skill, critical thinking, creativity, collaboration and communication (Qian & Clark, 2016; Chuang & Cheng, 2007).

In evaluating the effectiveness of a mathematical game-based learning, Hung et al. (2014) has found that digital game-based learning group revealed significantly higher self-efficacy of learning mathematics than the traditional instruction group. According to Bandura (1988), cited by Hung et al. (2014), self-efficacy refers to one's belief or expectation in successfully completing some tasks or achieving some specific objectives.

In addition, it was found that using digital game-based learning influences formation of a positive attitude of students towards a difficult subject (Divjak & Tomic, 2011) and promotes higher students' learning performance (de-Marcos et al.,2016; Ashraf et al., 2014; Hung et al., 2014) when compared to teaching without digital game.

The previous studies conducted about digital games show not only the positive aspect, but negative aspect as well. Gunawardhana and Palaniappan (2015) have pointed out that playing digital games continuously causes physical pain such as epileptic seizures, joint, muscle and skin problems. Lieberman et al. (1988) have argued that students who used to play non-educational digital games usually performed badly in their school work as against those who used their computers for educational purposes. Besides, Andersen (2004) has mentioned that children who play violent digital games displayed a high level of aggressive cognition, emotions and behaviors.

4.   Barriers and Challenges in Using Digital Games

Several studies suggest that the current educational system is a huge barrier to the adoption of games in education (e.g. Koh et al., 2011; Rice, 2007; Baek, 2008). In Koh et al.'s (2011) study, the Singaporean teachers emphasised that although the Ministry of Education supported the use of games in education, it made no specific policies regarding game adoption, which led to lack of instructional game materials, inadequate training for teachers and inadequate administrative support for innovation. Other regularly mentioned barriers and challenges in relation to schools include lack of time, inflexible curriculum, weak alignment with curriculum, limited budgets, and lack of adequate hardware resources (Moncada & Moncada, 2014; Hassan dan Poopak, 2012; Koh et al., 2011; Rice, 2007; Baek, 2008).

Another challenges arising from using games include inaccurate or inappropriate game content, lack of supporting materials, negative effects of gaming, high cost, licensing and technical issues, limited affordances (Wastiau et al., 2009; Baek, 2008).

5.   Conclusion

The existing studies have pointed out the positive as well as negative effects of digital games of the learning process. Despite the fears that digital games might foster violence, aggression and other negative impact on students, digital games have been proven to be beneficial in students' learning experience in many ways when they are used in a proper manner. The existing literature has also suggested that digital games have to be appropriately designed in order to have a positive impact on the realization of educational goals. In order to achieve the full potential of digital games in fostering the learning process, government, researchers, educators and IT industry should collaborate to address the barriers to the adoption of games in our current education system and our existing styles of learning.

6.   References

Baek, Y. K. (2008). What hinders teachers in using computer and video games in the classroom? Exploring factors inhibiting the uptake of computer and video games. *Cyber Psychology and Behavior*, 6, 665-671.

Andersen, C. A. (2004). An update on the effects of playing violent video games. *Journal of Adolescence*, 27, 113-112.

Ashraf, H., Motlagh, F. G., & Salami, M. (2014). The impact of online games on learning English vocabulary by Iranian (low-intermediate) EFL learners. *Procedia – Social and Behavioral Sciences*, 98, 286-291.

Chuang, T. Y., & Chen, W. F. (2007). Effects of digital games on children's cognitive achievement. *Journal of Multimedia*, 2(5), 27-30.

Connolly, T. M., Boyle, E. A., MacArthur, E., Hainey, T., & Boyle, J. M. (2012). A systematic literature review of empirical evidence on computer games and serious games. *Computers & Education*, 59(2), 661-686.

De-Marcos, L., Garcia-Lopez, E., & Garcia-Cabot, A. (2016). On the effectiveness of game-like and social approaches in learning: Comparing educational gaming, gamification and social networking. *Computers & Education*, 95, 99-113.

Divjak , B., & Tomic, D. (2011). The impact of game-based learning on the achievement of learning goals and motivation for learning mathematics – Literature Review. *JIOS*, 35(1), 15-30.

Guerrero, H. A. G. (2011). Using video games-based instructions in an EFL program: understanding the power of video games in education. Colombian Applied Linguistics Journal, 13 (1), 54-70.

Gunawardhana, L. K. P. D., & Palaniappan, S. (2015). Psychology of digital games and its

effects to its users. *Creative Education*, 6, 1726-1732.

Hassan, R., & Poopak, M. (2012). The effect of card games and computer games on learning of chemistry concepts. *Procedia - Social and Behavioral Sciences*, 31, 597-601.

Hung, C. M., Huang, I., & Hwang, G. J. (2014). Effects of digital game-based learning on students' self-efficacy, motivation, anxiety, and achievements in learning mathematics. *Journal of Computers in Education*, 1(2), 151-166.

Koh, E., Kin. Y. G., Wadhwa, B., & Lim, J. (2011). Teacher perceptions of games in Singapore schools. *Simulation & Gaming*, 42(4), 1-16.

Lieberman, D. A., Chaffee, S. H., & Roberts, D. F. (1988). Computers, mass-media, and schooling: Functional equivalence in uses of new media. Social Science Computer Review, 224-241.

Lin, C. H., Liu, Z. F., & Shih, J. L. (2010). Analysis of seven important studies in research of joyful learning society. In G. Biswas, D. Carr, Y. S. Chee, & W-Y. Hwang (Eds.), *Proceedings of the IEEE International Conference on Digital Games and Intelligent Toy Enhanced Learning* (pp. 231-233).

Liu, E. Z. F., & Chen, P. K. (2013). The effect of game-based learning on students' learning performance in Science learning – A case of "conveyance go". *Procedia – Social and Behavioral Sciences*, 103, 1044-1051.

Moncada, S. M., & Moncada T. P. (2014). Gamification of learning in accounting education. *Journal of Higher Education Theory and Practice*, 14(3), 9-19.

Noraddin, E. M. & Kian, N. T. (2014). Academics' attitudes toward using digital games for learning & teaching in Malaysia. *Malaysian Online Journal of Educational Technology*, 2(4), 1-21.

Papastergiou, M. (2009). Digital game-based learning in high school computer science education: Impact on educational effectiveness and student motivation. Computers & Education, 52, 1-12.

Prensky, M. (2001). *Digital Game-based Learning*. New York: McGraw-Hill.

Qian, M., & Clark, K. R. (2016). Game-based learning and 21st century skills: A review of recent research. *Computers in Human Behavior*, 63, 50-58.

Ratan, R., & Ritterfeld, U. (2009). Classifying serious games. In U. Ritterfeld, M. Cody & P. Vorderer (Eds.), *Serious games: Mechanisms and effects* (pp. 10-24). New York. N.Y: Routledge.

Rice, J. W. (2007). New media resistance: barriers to implementation of computer video games in the classroom. *Journal of Educational Multimedia and Hypermedia*, 16(3), 249-261.

Wastiau, P., Kearney, C., & Den Berghe, W. V. (2009, May). How are digital games used in schools? Retrieved from http://games.eun.org/upload/gis-synthesis_report_en.pdf.