Digital Native Students: Gender Differences in Mathematics and Gaming

Su-Ting Yong, The University of Nottingham, Selangor, Malaysia

ABSTRACT

The purpose of this study was to explore gender differences among digital native students in mathematics learning and gaming. A quantitative dominant mixed methods approach was employed in which quantitative surveys [174 students] and qualitative interviews [eight students, eight parents and six teachers] were administered concurrently. Data collected has revealed that students are characterized as digital natives and do not portray a significant gender gap in technology usage. Nevertheless, males and females tend to demonstrate their digital native characteristics differently. Males are more likely to play computer games and acknowledge the many benefits of gaming. Moreover, boys have better spatial skills and they are more confident in mathematics. While females still lag behind males in spatial abilities and mathematics confidence in the past, digital native females are not helping to close the gender gap. Essentially, girls could play more computer games to strengthen their spatial abilities.

KEYWORDS

Computer Games, Digital Native, Gaming, Gender, Mathematics, Multitasking, Spatial

INTRODUCTION

Studies of gender differences in mathematics learning have been reported in the literature across many decades (Guay & McDaniel, 1977; McLeod, 1992; PISA, 2012; Yaratan & Kasapoglu, 2012). Despite many controversial arguments, female students are generally reported as having weaker spatial and mathematics abilities than males (McLeod, 1992; PISA, 2012). The findings may not be generalized but they are rather indicative and convincing. In spite of that, today’s students have changed radically. They are the millennials or digital natives. They live much of their lives online and connected - playing computer games, surfing the Internet, watching YouTube, and engaging in the social media conversation. According to Prensky (2001b), the young generation has received a considerable amount of digital input since young, thus the functioning of their brains has changed - they think and process information differently. For instance, playing computer games is helpful for children’s cognitive development, e.g. spatial perception, visual tracking, mental math, math concepts, reasoning, matching shapes, problem-solving, planning, visual motor integration, counting and quantity, visual motor speed, selective attention, episodic memory, theory of mind and math numerosities (Martinovic et al., 2014, p. 142). Although the young generation of students were born into and raised in the digital world, males and females are biologically and psychologically different.

DOI: 10.4018/IJVPLE.2017070102

Copyright © 2017, IGI Global. Copying or distributing in print or electronic forms without written permission of IGI Global is prohibited.
Both genders may have different interests and capabilities in computer technologies, and certainly, they may have different attitudes towards learning.

In this study, the author intended to explore gender differences among digital native students in mathematics learning and gaming. The research question addressed was: How gender differences in mathematics learning had changed as the result of the exposure to computer games? The scope of this study was confined to spatial skills. However, spatial skills in games were associated with multitasking skills (Mäntylä, 2013), so both skills were administered in this study. At the preliminary stage of the study, it was crucial to identify whether students were characterized as digital natives. Helsper and Eynon (2010) have shown in their research that age alone does not define adequately whether or not someone is a digital native because there is a difference between being the digital natives based on their age and doing the digital native activities in everyday practices. In this study, digital natives were defined based on the two dimensions, i.e. being the digital natives and doing the digital native activities. Five research objectives were used to govern the research process. The purpose of this study was to explore gender differences in:

1. Digital natives’ characteristics.
2. Gaming behavior.
4. Spatial/multitasking skills learned in gaming.
5. How spatial/multitasking skills (gaming) affect mathematics learning attitude?

LITERATURE REVIEW

Digital Native

The term digital native was introduced by Prensky (2001a) and it refers to those who were born after 1980. Digital natives have grown up surrounded by digital technologies and always think of graphics first, thrive on instant gratification, multitasking and prefer video games to serious work (Prensky, 2001a, 2001b). The work of Yong and Gates (2014) has revealed that students (i.e. born after 1980) are digital natives, and females are characterized to be more digitally native than males. The term digital native is a loosely defined construct that covers a wide range of definition and interpretation. According to Helsper and Eynon (2010), a digital native should not be defined by age. Instead, digital native is defined as “someone who comes from a media rich household, who uses the Internet as a first port of call for information, multi-tasks using information communication technologies and uses the Internet to carry out a range of activities” (Helsper & Eynon, 2010, p. 516). Essentially, a more comprehensive definition of digital natives is (1) being the digital natives based on their age (i.e. born after 1980) and (2) doing the digital native activities in everyday practices, e.g. multitasking and thrive on instant gratification.

Gender Differences in Gaming

Digital natives love to play computer games, and it has become a major part of their lives (Prensky, 2001a). Males are reported to spend more time playing computer games than females (Bonanno & Kommers, 2005; Phan, Jardina, Hoyle, & Chaparro, 2012; Yong, Harrison, & Gates, 2016). Males love to play sports (Bonanno & Kommers, 2005; Yong et al., 2016), fighting (Phan et al., 2012), role play (Bonanno & Kommers, 2005; Phan et al., 2012; Yong et al., 2016), action-adventure (Phan et al., 2012; Yong et al., 2016), strategy (Bonanno & Kommers, 2005; Phan et al., 2012; Yong et al., 2016), shooter (Bonanno & Kommers, 2005; Yong et al., 2016) and racing (Phan et al., 2012) games. Whereas females love to play puzzle (Bonanno & Kommers, 2005; Phan et al., 2012; Yong et al., 2016) and simulation (Phan et al., 2012) games. Females do not like to play three-dimensional games (Lucas & Sherry, 2004), and this could be a reason why females have weaker spatial skills.
The Charles Darwin University vHospital®: Creating an Authentic Virtual Learning Environment for Undergraduate Nursing Students
www.igi-global.com/chapter/charles-darwin-university-vhospital/56052?camid=4v1a

Building Student Engagement Through Collaborative Practice in Business Management Education
www.igi-global.com/article/building-student-engagement-through-collaborative-practice-in-business-management-education/207331?camid=4v1a