

Chapter 26

Exploring the Gender Differences between Student Teachers when Using an Educational Game to Learn Programming Concepts

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ABSTRACT

The gender differences have long been an issue in computer games, but there is very little empirical research on the behavior and performance of females and males when playing computer games. This chapter discusses an exploratory study that aimed to examine the gender differences between female and male student teachers who played an educational game to learn programming concepts. This study we adopted a self-made educational game called “Game”. Fifteen males and eighteen females finished playing a level of the Game. Female participants spent more time in the Game but their scores were lower. Female and male students also employed different strategies when playing the Game. The findings call for larger and longer research studies and perhaps a re-design of the Game to make it more appealing to females, in order to have a thorough examination on the gender differences when using an educational game to learn.

INTRODUCTION

Computer games are very popular for the young generation due to its interactivity and multimedia

features. Gee (2003) elaborates video games as a semiotic domain and he believes that when people learn to play games, they are learning a new literacy. Malone (1981) suggests challenge, fantasy, and curiosity are the three main elements that “make video games fun”. Apart from playing

DOI: 10.4018/978-1-60960-495-0.ch026

games for fun, games are useful for improving learning skills in practical reasoning (Wood & Stewart, 1987), making inferences and engaging in inductive reasoning (Mayer & Sims, 1994), solving complex problem (Hayes, 1981), enhance spatial skills performances (Baenninger & Newcomber, 1989) and cognitive process (Pillay, Brown, & Wilss, 1999; Quinn, 1996).

The gender differences have long been a problem in the area of computing. There are a number of studies on gender differences in computer experiences, skills and adoptions. Females were likely to be computer phobic than males (Igarria & Chakrabarti, 1990; Rosen & Maguire, 1990). Morahan-Martin, Olinsky & Schmacher (1992) found that there were a significant gender differences between male and females where the former had greater experience skills with computers. Females were slower to adopt Internet than males (Weil & Rosen, 1995, 1997), and females reported higher levels of discomfort and incompetence of using computers (Schumacher & Morahan-Martin, 2001). More recently, Schumacher & Morahan-Martin (2001) conducted a survey to university students and found that females reported higher levels of discomfort and incompetence in using computers. Males were also more experienced and possessed higher levels of skills in using Internet. Moreover, Wilson (2002) found that there was no difference between female and male undergraduate computer science students in terms of comfort level, mathematics background and attribution to luck but there was a significant gender difference in game playing as males had much more experiences.

The usefulness of using games to enhance learning and the lack of gender difference empirical research in this area instill the author to investigate whether there is any difference between female and male students when using an educational game to learn programming. The following section described the pertinent literature review related to using computer games for learning. The review will be followed by a discussion of the

research methodology and findings. Finally, the conclusion of the research and future directions in research and game design will also be discussed.

BACKGROUND

Computer games are broadly divided into two categories, namely action games and strategy games. Action games mainly require better eye-hand coordination to win whilst strategy games require better planning and critical thinking skills. Examples of action games include Super Mario and Half Life whilst strategy games include Sim-City and Age of Empire. When playing games, players interact with the objects in the game and sometimes other players and to manipulate variables to solve specific problems. Educational games are one form of serious games as they are designed to address specific learning outcomes such as reinforcing some concepts or recalling of some facts. Sometimes, educational games are called edutainment.

Garris, Ahlers & Driskell (2002) reviewed a number of articles on the characteristics of computer games and suggested that games could be grouped into the following dimensions: (1) fantasy, (2) rules/goals, (3) sensory/stimuli, (4) challenge, (5) mystery and (6) control. The factors that affect players are: (1) interest, (2) enjoyment, (3) task involvement and (4) confidence. Moreover, the learning outcomes could be grouped into skilled, cognitive and affective based. Under the cognitive learning outcomes, it includes declarative, procedural, strategy knowledge. Soukup (2007) reviewed a number of video games and found that most popular video games embrace mastery and dominations via violence and aggressive competition which should be challenged by feminist.

Boys and girls are equally interested in playing games at the young age but girls tend to have reduced interests in game playing as they grow (Agosto, 2004). Beasley & Collins Standley (2002) found that most popular video games are primar-

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