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The Effects of Games Between Gender for the Acquisition of Factual knowledge

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"This study tried to close this research gap by asking the question if there is a significant difference between males and females, playing educational games, when it comes to factual knowledge."

Computer games are evolving rapidly. Faster computers, better video cards, and refined operating systems have allowed game designers to produce better games. Because of the advent of modern computer technology, video games are becoming more complex and are starting to be seen in a wide variety of platforms, e.g., websites and mobile phones (Nielsen & Smith, 2003).

Games are, with little doubt, an element of culture in the 21st century United States. Games were once an activity of adults (Hooker, 2007), however, it is now a widespread phenomenon. Millions of people are avid gamers (ESA, 2004). In fact, most managers aged 34 or older play games (Carsten & Beck, 2005), and purchase more games than movies. (Carsten & Beck, 2005).

Research in games has increased in the last few years due to the introduction of the game studies and DIGRA journals. Ethnographical work, studies of meaning, role and function of games, and studies in comparative literature and social psychology have been conducted by social science scholars throughout the world. (Nielsen & Smith, 2003) It is perhaps for this reason that the number of game study journals nearly doubled in the last few years.

The interest in game research hasn't been only exclusive to academics. Studies of active user and media perspectives have attracted the interest of the public and have made major headlines (Nielsen & Smith, 2003). Research studies related to interface, violence and societal effects have been documented extensively (Prensky, 2003; Gentile & Anderson, 2003; Gee, 2006). The Scandinavians have provided theoretical inspiration, especially in terms of qualitative methods, e.g., ethnography and phenomenonlogy. Experimental design studies and games have been limited to date, especially in terms of gender game research.

In fact, the question of gender and game research has attracted considerable attention lately. According to Melnick (2011), girls and boys play different games, even though they spend an equal amount of game playing, when accompanied by a parent. When not accompanied by an adult, boys played more games than girls (Funk, 2000). Girls tend to be more affected by violent computer games than boys (Durkin & barber, 2002). The former studies are examples of how games have been investigated by scholars. Rarely, research is conducted to investigate the effects of games in student achievement.

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Games and Learning

Educators have started to dedicate a large portion of their time to computer games, as a way to improve student achievement (Gee, 2005; Oblinger, 2006). However, there seems to be a lack of consensus on the effects of computer games in education. Some scholars argue that computer games have an impact on student achievement (Annetta et al. 2009; Vogel et al. 2006). Other scholars have found just the opposite (Ke, 2008).

Researchers have also been interested in investigating the effects of computer games on gender specifically. Although a multitude of studies have reported gender difference results (Agosto & Joseph, 2008), very few studies have provided results beyond the reasonable doubt in favor of one gender over the other (Vogel et al., 2006). There is little doubt among social science scholars that research on gender is inconclusive. There is a lack of empirical studies investigating the differences in gender, when it comes to video games. This study tried to close this research gap by asking the

question if there is a significant difference between males and females, playing educational games, when it comes to factual knowledge.

Research Design

Forty-eight Indiana University of Pennsylvania undergraduate students majoring in education were conveniently sampled by the researcher from two introductory computer technology classes to participate in this research study. Throughout the semester, the subjects took a series of factual knowledge quizzes about computer technology. Both males and female students had to play the game followed by a test. The games was titled, "The Almeida Wheel" and served to assist students with mastering classroom factual content regarding computer technology. Both males and females took the quizzes and played the game. The game was produced with Adobe Flash and looked like the famous TV show 'wheel of fortune'. Twenty-eight females and twenty males participated in the research study. The unequal variance was present because the number of males was smaller than the number of females, which is often typical within the college of education. The independent variable was gender. The dependent variable was the achievement of factual knowledge. The alpha level was set to p=.05.

A post-test only design was used to reduce the threats to external validity. The quasi-experiment took place in a computer lab/intelligent classroom at Indiana University of Pennsylvania, main campus. Prior to taking each test, subjects had to go to a content management system with their school password. Subjects were instructed to start the test at

their own time. Each test had 20 questions; therefore, both males and females answered 60 factual knowledge questions. The weekly questions were identical for males and females. There was a thirty-minute limit to finish each weekly test. There were minimal disturbances during the experiment. There was one null hypothesis in this research study. *H0: There will be insignificance between males and females in test scores.*

The researcher designed the game questions using the *Bravo* Spin off Game Engine. The graphics and program functionalities were developed by C3Softworks Incorporated. Each question answered correctly resulted in subjects "winning" the money. When a question was answered incorrectly, subjects "lost" money.

Results

The researcher ran a t-test in order to compare the mean scores of males and females subjects. The alpha level was set to 0.5 (p=.05). Table 1 presents descriptive statistical results for males versus females. Means and standard deviations are presented. The researcher predicted that males would outperform the female group. In fact, females outperformed males by a letter grade, as stated below. Please refer to Table 1.

	Group	Mean	Standard Deviation	N
Factual Knowledge	Males	77.4	0.122	20
	Females	82.6	0.092	28

Table 2. Descriptive Statistics showing the means of factual knowledge of both males and females.

The male group overall mean test score was 77.4. The female group overall mean score was 82.6. Females scored higher than males with minimal standard deviations. Another interesting result from this research study was that Females had a larger

number of "A" grades than Males. There were 66% more" A" grades among female students than males when both gender played the Almeida Wheel. Please refer to Table 2.

	Group	Number Frequency
Factual Knowledge	Males	12
	Females	18

Table 1. Descriptive Statistics showing the number of "A" grades between males and females.

Females also had the higher number of "A or B" grades combined. Females had 49 "A or B" grades versus 29 for Males. There were 60% more females scoring either an A or B grade using games than males. Perhaps, the significant differences in test scores between males and females is what Carr-Chellman (2011) consider to be the impacts of the feminization of the classroom and its effects on male learning. Please refer to Table 3.

	Group	Number Frequency
Factual Knowledge	Males	29
	Females	49

Table 3. Descriptive Statistics showing the number of "A" and "B" grades between males and females.

In order to provide a more robust research results and because the number of subjects was unequal, further statistical analysis was conducted accounting for unequal variances. A t-test with a two sample unequal variances was ran in order to provide inferential statistics results for this research study.

The results of the t-test are summarized in Table 4. The t-test indicates that there is a significant difference between males and females in factual

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knowledge when using games at the p=.05 level. Although there was a discrepancy of eighteen observations between the male and female groups, both had a sample of over twenty students on average per test or higher, which should be statistically sufficient for addressing issues of generalization. The t-test accounted for all male subjects and a sample of the female population.

	Males	Females
Mean	77.4	82.6
Variance	0.122	0.092
Observations	55	73
Hypothesized Mean Difference	0	
Df	97	
t Stat	-2.62267	
P(T<=t) one-tail	0.05	
t Critical one-tail	1.6607	
P(T<=t) two-tail	0.0101	
t Critical two-tail	1.984723	

Table 4. Two-Sample (Assuming Unequal Variances) t-Test.

Discussion and Conclusions

This research found that there were significant differences between males and females in factual knowledge, with games as a treatment. This study found that females outperformed males in the achievement of factual knowledge. This study opposed the results found in the articles *Computer Games for the Math Achievement of Diverse Students* (Kim & Chang, 2010*) and Bridging Reality to Virtual Reality* (Annetta et al., 2009) indicating that males outperform females and/or gender is not a significant factor when it comes to achievement of factual knowledge acquisition with the use of educational games. It concurs with the research currently being conducted by Carr-Chellman (2011) indicating that boys are being left behind. Based on the results of this research study, females scored

higher on factual knowledge test using games than males.

Limitations / Further Research

Although this study statistically confirmed that female subjects scored higher on tests than males, there were several reasons to believe that the results of this research study could be inconclusive. Both males and female subjects took the tests throughout the semester. Fatigue and class time could have influenced the results of this study. The difference in sample size between males and females could have had an impact in the results of this study. Perhaps, if more male students participated in the study, the results could have been different. Subjects were not randomly selected among the total population, which could have had an impact in the results of this study. Further studies are strongly recommended to address these limitations.

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