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EXPECTATIONS AND REALITY: VIDEO GAMES IN EDUCATION FROM TEACHERS' PERSPECTIVE

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Abstract

Games integration could be a catalyst for changing pedagogical practices. however, the effectiveness of using video games in education depend on teacher's acceptance to use video games in their classroom. The purpose of this quantitative study was to investigate Saudi teachers' perspective toward video game integration in education at elementary, middle, and high schools' levels in Saudi Arabia; and found differences in teachers' attitudes between gender and teachers experiences and level of teaching. It also investigated relationships between teachers' philosophy based on three main learning theories (behaviorism, cognitivism, and constructivism) and their perspectives toward video game use in the classroom. There were 930 male and female teachers who participated in the study. Overall, the results of this study showed Saudi teachers' attitudes toward video games were fairly positive. Analysis found a relationship between teachers' philosophy of teaching and their perspectives toward using video games in their classroom for learning. A moderate negative correlation was found between behaviorist philosophy and

teachers' attitudes. On the other hand, there was a moderate positive correlation between cognitivism and constructivism philosophies Saudi teachers' attitudes toward using video games in classrooms.

Keywords

Teacher Perspective; Game Integration; Teaching Methods; and Pedagogy

1. Introduction

Applying video games in learning is considered a one of the important topic in educational technology. Moreover, there has been growing published research since 2000 about the use of gaming in education (Ritzhaupt, Poling, Frey, & Johnson, 2014). The sharp growth in video game development has encouraged researchers and educators to integrate video games into different pedagogical areas. The video game environment impacts the current generation of learners and researchers have noted how it is changing the ways in which students think and learn (Howard, Morgan, & Ellis, 2006).

2. Teacher Perspective

Recently, Sobhani and Bagheri (2014) conducted a study to investigate the attitudes of teachers and learners toward the effectiveness of games and fun activities in learning English. They observed that traditional teaching was not enough to motivate students. Sobhani and Bagheri advised teachers to add educational games to their teaching as a method to make learning engaging.

Jones et al. (2007) did study about pre-service teachers' attitudes toward computer games. They found that more than 92% of pre-service teachers played their first computer games in elementary school or high school. Hsu and Chiou (2011) studied pre-service teachers' attitudes toward digital games. The researchers found that most of 125 pre-service teachers played digital games and agreed that games could be a useful tool for learning. While 66.4% of participants believed games affected their academic performance, 97.6% felt games could bring people a lot of enjoyment.

Hayes and Ohrnberger (2013) conducted a survey study with 223 pre-service teachers about their attitude toward technology and using games in education. They mentioned that 93 pre-service teachers were currently played games and 51.6% of them played games before first grade. Also, the results showed that 72% of pre-service teachers were playing three hours or less per week

while only 5.4% of pre-service teachers were playing games for eight hours or more per week. Then the researchers compared the non-gamer, casual gamer, and committed gamer to the four groups of questions related to their interest in using specific technologies for learning, their beliefs about how technology affected their learning, their orientation toward using new technologies, and their beliefs about the role of technology in their future profession. They found many of participants did not consider technology as a valuable tool to utilize in their future career. The researchers mentioned some pre-service teachers tended to be consumers more than creators of game-related content. Thus, the researchers believed it would be hard for those teachers to support applying games in education (Hayes & Ohrnberger, 2013).

Noraddin and Kian (2014) conducted a study that investigated teachers' positive and negative attitudes toward digital games in the classroom in higher education in Malaysia. The sample was 273 teachers,139 males and 134 females, from five universities in Malaysia. The results showed teachers' attitudes tended to be positive regarding the benefits and importance of digital games. The teachers did not agree with negative attitudes toward digital games. The results showed a positive attitude was not impacted by gender or age except in the experience with digital games (Noraddin & Kian, 2014).

Alqurashi and Williams (2017) conducted a survey study with Saudi teachers about their current situation of playing video game and their favourite games types and their reasons to play video games. They found that the teachers in Saudi Arabia played 84 minutes per week as average. Also, the result showed that 53.3% of Saudi teachers did not play video games. 46.7% of teachers spent three hours a week playing video games. Also, they found that the enjoyment was the most popular reason for playing video games. For the favourite video games, the results showed that the male teachers preferred sports games while the female teachers preferred puzzles games. Finally, they mentioned that the teachers who had less years of teaching experience spent more hours playing video games (Alqurashi & Williams, 2017).

Al-Zoyoodi (2015) conducted a survey study about the educational implications of electronic games on primary school students in Saudi Arabia as perceived by teachers and parents. The study sample was about 336 teachers and 500 parents. It was conducted at one site in Saudi Arabia. The study survey contained 40 questions about teachers' and parents' viewpoints about the negative impacts of electronic games and their perspectives toward preventing these negative effects. The survey results indicated the teachers believed there were negative effects and risks of

the games. They thought the games did not have any benefit for improving students' cognitive, learning, and physical skills (Al-Zoyoodi, 2015).

Klemetti, Taimisto, and Karppinen (2009) asked 400 teachers about their experiences and attitudes toward educational digital games. They found most of teachers (92%) agreed to use educational games in their classroom. About 99% of the teachers believed educational games motivated students in learning. In general, they found teachers in Finland had highly positive attitudes toward educational games (Klemetti et al., 2009).

Wu (2015) did a survey study with 116 teachers to investigate teachers attitudes, experience, self- efficacy, and perceived challenges and barriers to applying video game in the classroom. He indicated that most teachers played video games lightly by using their mobile devices. They provided positive attitudes toward integrating games in their teaching. Most teachers indicated they could use digital game-based learning in their teaching (Wu, 2015).

Although male and female play video games, there is a difference in their enjoyment. Also, there is a difference in the preferable video games between the genders (Miller, 2008). There are many studies showed there are differences between genders in learning, thinking, and playing (Miller, 2008). Also, researchers have conducted studies on gender differences on attitudes of using technology. These studies found a significant difference between male and female attitudes toward technology. Reasons for these differences between gender attitudes are based on cultural and social constructs (Alrasheedi, 2009). In contrast, Hsu and Chiou (2011) did not find significant differences between genders on participants' attitudes toward digital gaming. Also, Noraddin and Kian (2014) mentioned there was no significant difference in negative and positive attitudes toward using digital games between males and females. Alqurashi and Williams (2017) found that the male teachers playing video games more than female teachers in Saudi Arabia (Alqurashi & Williams, 2017).

3. Learning Theories

There are many learning theories. The three main learning theories are behaviorism, cognitivism, and constructivism (Reiser & Dempsey, 2006). Behaviorism is a learning theory that concentrates on observable behaviors and ignores mental activities (Schunk, 1991). In contrast to behaviorism is cognitive theory; learning is based on changes between states of knowledge and not on changes in the probability of behavior as in behaviorism (Shuell, 1986). On the other hand,

Constructivism theory sees learners as the center of the learning process. The learning process is seen as a meaningful creation formed from experience (Bednar, Cunningham, Duffy, & Perry, 1991).

Alqurashi (2018) conducted a quantitative study to explore Saudi teachers' philosophy in teaching based on three main theories of learning (behaviorism, cognitivism, and constructivism). The results showed that the teachers preferred using cognitivism theory more than constructivism and behaviorism theories in the teaching. Also, the results demonstrated that the male teacher preferred using behaviorism philosophy in the teaching more than female teachers and the female teachers preferred using cognitivism and constructivism philosophies in the teaching more than male teachers. Finally for teacher's experiences, the results showed that the teachers who had more experience preferred using cognitivism and constructivism philosophies in teaching more than behaviorism philosophy.

4. Research Questions

The following research questions guided this study:

Q1 What are the attitudes of Saudi Arabian teachers toward video games in education utilizing the Games in the Classroom Attitudes Survey (GCAS)?

Q2 Is there a significant mean difference between teachers' gender in their perspective toward video game use in the classroom?

Q3 Is there a significant mean difference among teachers' grade level (elementary school, middle school, and high school) in their perspectives toward video game use in the classroom?

Q4 Is there a significant mean difference among teachers' years of experience (1-5, 6-10, 11-15, 16-20, more than 20 years) in their perspectives toward video game use in the classroom?

Q5 Based on three main theories of learning (behaviorism, cognitivism, and constructivism), is there a significant relationship between teachers' philosophy and their perspectives toward video game use in the classroom?

5. Methodology

This study was conducted in Saudi Arabian. All the teachers who Participated in this study taught in public or private schools; taught in elementary, middle, and high schools; and taught different subjects (Ministry of Education in Saudi Arabia, 2014). According to the Ministry of Education in Saudi Arabia report in 2014, there were 441,529 teachers. It is about 45.6% male teachers and about 54.4% female teachers. There were 930 Saudi Arabian teachers participated in the study.

The data was collected by questionnaire. The questions were based on a 5-point Likert scale. The questionnaire consisted of three sections: The first section asked about demographic information and the teacher's background. The second section is about the teacher's philosophy. It contains three questions; each question relates to a specific learning theory (behaviorism, cognitivism, or constructivism). The third section contains 26 questions about the teacher's perceptions of educational games. These 26 questions are in four groups. The first 13 questions are about learning attitudes. The second five questions are about the games' impact on the teacher's attitude. Enjoyment attitudes came next with four questions. The last four questions are social interaction attitudes. The purpose of this section is to investigate Saudi teachers' attitudes toward educational games.

6. The Results

There were 930 Saudi teachers who participated in the study (see Table 1). Male teachers were 447 and represented 48.1% of the participants while female teachers were 483 and represented 51.9% of the participants.

Table 1: *Frequencies and Percentages of Participant Characteristic Variables*

Variables	**Variables**	**Frequency**	**Percent**
Gender	Male	447	48.1
	Female	483	51.9
Level of teaching	Elementary school	385	41.4
	Middle school	239	25.7
	High school	306	32.9
Teachers' experience in teaching	1-5	201	21.6
	6-10	225	24.2
	11-15	138	14.8
	16-20	165	17.8

	More than 20 years	201	21.6

The reliability of the instrument was calculated with study data. As we can see in Table 2, the results showed a high level of internal consistency for the scales.

Table 2: *Overall Internal Consistency of the Instrument*

Questionnaire		**Cronbach's Alpha**	**Items**
1. The Games in the Classroom Attitudes Survey (GCAS)		.978	26
Learning and engagement		.979	13
The Impact on Teachers		.928	5
Enjoyment		.912	4
Social Interaction		.924	4
2. Teachers' Philosophy	Behaviorism	.918	3
	Cognitivism	.912	3
	Constructivism	.931	3

To answer the first question, descriptive methods such as mean and standard deviation were used. To answer the rest, a one-way ANOVA test was used to determine significant mean differences in teachers' attitudes among genders, levels taught, and teachers' years of experience. When the homogeneity assumption was violated, the researcher could not interpret the standard one-way ANOVA so the Welch ANOVA was used. In addition, to compare all possible combinations of group differences, the Games-Howell post hoc test was used instead of the Tukey post hoc test because it is a proper test when the assumption of homogeneity of variances is violated (Laerd Statistics, 2015a; Tabachnick & Fidell, 2007).

The Games in the Classroom Attitudes Survey (GCAS) consisting of 26 statements about using video games came in four sections: 13 statements for learning attitudes, five statements for teacher impact attitudes, four statements for enjoyment attitudes, and four statements for social interaction attitudes. Table 3 shows the means and standard deviations for 26 statements combined ($M = 3.6$, $SD = 0.9$).

Table 3: *Means and Standard Deviation for 26 Statements Regarding Teachers' Attitudes*

	N	**Mean**	**SD**	**S. Error Mean**
Teachers' attitudes	930	3.6	0.9	0.03

Results of the Welch ANOVA can be seen in Table 4, which showed there was a statistically significant mean difference among the four sections of attitudes (learning teacher impact, enjoyment, and social interaction), Welch's $F(3,2059.73) = 82.44$; ($p < 0.0001$).

Table 4: *Descriptive Statistics for Welch Analysis: Teachers' Attitudes for Four Constructs*

	Statistic	**df 1**	**df 2**	**Sig.**
Welch	82.44	3	2059.73	0.0001

*Significant difference at .05 level.

The Games-Howell post hoc analysis showed a significant difference among all four sections of attitudes. An inspection indicated higher mean scores for enjoyment attitudes (N = 4, M = 3.99, SD = 0.9) than for teacher impact attitudes (N = 5, M = 3.32, SD = 1.0), learning attitudes (N = 13, M = 3.5, SD = 1.1), and social interaction attitudes (N = 4, M = 3.7, SD = 1.0).

Table 5 shows the means and standard deviations for perceptions regarding learning attitudes of educational games ranged from 3.29 to 3.67 and from 1.14 to 1.22, respectively. The fifth statement had the highest mean value among all statements at 3.67 and the lowest standard deviation value at 1.14. In contrast, the eighth statement earned the lowest mean value of 3.29 and the highest standard deviation value at 1.22.

Table 5: *Likert Scale Responses for Learning Attitudes*

Statements	**Mean**	**SD**
Games are very important for teaching and learning.	3.49	1.17
Games improve students' content knowledge.	3.50	1.17
Games increase students' skills.	3.63	1.16
Games improve individual learning.	3.65	1.15
Games help students develop thinking skills.	3.67	1.14
Games increase the students' classroom performance.	3.40	1.22
Games help students to solve complex tasks.	3.42	1.17
Games help students to achieve better grades.	3.29	1.22
Games enhance students learning productivity	3.37	1.21
Games motivate students' engagement.	3.58	1.21
Games motivate students learning.	3.60	1.22
Games encourage deeper students learning.	3.57	1.21
Games encourage effective students learning.	3.46	1.22

N = 13

As seen in Table 6, the means and standard deviations for perceptions of teacher impact attitudes regarding educational games showed the means for the five variables were confined between 3.20 and 3.48. The third statement had the highest mean value among all statements at 3.48 and the lowest standard deviation value at 1.10. In contrast, the fourth statement earned the lowest mean value at 3.20 with the highest standard deviation value of 1.21 among all statements.

Table 6: *Likert Scale Responses for Teacher Impact Attitudes*

Statements	**Mean**	**SD**
Games improve teachers' performance.	3.26	1.14
Games help towards reaching instructional objectives.	3.38	1.12
Games help teachers teach students.	3.48	1.10
Games support traditional teaching strategies.	3.20	1.21
Games guide teachers' instructional planning.	3.26	1.14

N = 5

Table 7 shows the means and standard deviations for the enjoyment construct, which had the highest mean among all four attitudes. The means ranged between 3.88 and 4.12 and the standard deviations ranged from 0.94 to 1.08.

Table 7: *Likert Scale Responses for Enjoyment Attitudes*

Statements	**Mean**	**SD**
Students need to enjoy in the classroom.	4.12	0.94
Games more exciting	4.03	0.94
Games make learning fun.	3.88	1.07
Games entertainments classroom.	3.91	1.08

N = 4

Table 8 shows the means and standard deviations for the social interaction construct. As can be seen, the third statement had the highest mean at 3.80 and lowest standard deviation at 1.10. On the other hand, the first statement had the lowest mean at 3.52 and highest standard deviation at 1.17.

Table 8: *Likert Scale Responses for Social Interaction Attitudes*

Statements	**Mean**	**SD**
Games enhance social interaction.	3.52	1.17
Games help students to interact with each other.	3.73	1.14
Games make active classroom.	3.80	1.10
Games make participation classroom.	3.74	1.11

N = 4

To answer the second research question, a one-way ANOVA was used to find if there was a significant mean difference between teachers' gender in their perspectives toward video game use in the classroom. The resulting analysis is presented in Table 9.

As can be seen in Table 9, the results of the Welch ANOVA showed there was a statistically significant mean difference between male and female teachers in their attitudes toward video game, Welch's $F(1, 894.601) = 4.522$; ($p < 0.034$). An inspection of the mean scores indicated female teachers had more positive attitudes ($M = 3.7$, $SD = 0.86$) than did male teachers ($M = 3.5$, $SD = 0.93$).

Table 9: *Welch Analysis of Variance: Teachers' Gender*

	Statistic	**df1**	**df2**	**Sig.**
Welch	4.522	1	894.601	0.034*

*Significant difference at 0.05 level.

For Each Section separately, the results showed there was no statically significant mean difference in learning attitudes between males ($M = 3.72$, $SD = 0.84$) and females ($M = 3.77$, $SD = 0.74$), $F(1,839) = 1.709$, $p = (0.191)$. However, regarding teacher impact, there was a statically significant mean difference between genders in teachers' attitudes, $F(1,868) = 5.820$, $p = (0.016)$. The female teachers had slightly higher means ($M = 3.5$, $SD = 0.79$) than did male teachers ($M = 3.4$, $SD = 0.88$). In the social interaction section, the results showed there was a significant mean difference between genders in teachers' attitudes, $F(1,927) = 8.902$, $p = (0.003)$. Also, female teachers had slightly higher mean scores ($M = 3.8$, $SD = 0.93$) than did male teachers ($M = 3.6$, $SD = 1.1$). Finally, the results for enjoyment attitudes showed there was no statically significant mean difference between males ($M = 3.97$, $SD = 0.95$) and females ($M = 4.0$, $SD = 0.85$), $F(1,927) = 0.298$, $p = (0.586)$.

For the third question, a one-way ANOVA was used to find if there was a significant mean difference among teachers' level of teaching (elementary school, middle school, and high school) in their perspectives toward video game use in the classroom. The resulting analysis is presented

in Table 10. The results indicated that there was no statically significant mean difference in teachers' attitudes among elementary school teachers (M = 3.55, SD = 0.94), middle school teachers (M = 3.64, SD = 0.88), and high school teachers (M = 3.61, SD = 0.85), F(2,919) = 0.947, p = 0.388).

Table 10: *Teachers' Attitudes toward Video Games Based on Level of Teaching*

	S.S	**df**	**Mean Square**	**F**	**Sig.**
Between Groups	1.523	2	0.762	0.947	0.388
Within Groups	739.257	919	0.804		
Total	740.781	921			

For Each Section separately, there was no statically significant mean difference in learning attitudes among elementary school teachers (M = 3.74, SD = 0.79), middle school teachers (M = 3.78, SD = 0.81), and high school teachers (M = 3.74, SD = 0.77), F(2,838) = 0.189, p = 0.828). Also, regarding the teacher impact construct, there was no significant mean difference among elementary school teachers (M = 3.51, SD = 0.83), middle school teachers (M = 3.48, SD = 0.86), and high school teachers (M = 3.43, SD = 0.82), F(2,867) = 0.858, p = 0.424) in teachers' attitudes. Moreover, regarding the enjoyment section, the results showed there was no significant mean difference among elementary school teachers (M = 3.98, SD = 0.93), middle school teachers (M = 3.99, SD = 0.87), and high school teachers (M = 3.97, SD = 0.89), F(2,926) = 0.032, p = 0.968). Finally, the result for social interaction attitudes showed there was no statistically significant mean difference in teachers' attitudes among elementary school teachers (M = 3.64, SD = 1.06), middle school teachers (M = 3.72, SD = 1.03), and high school teachers (M = 3.74, SD = 0.94), F(2,926) = 0.939, p = 0.391).

For the third question, a one-way ANOVA was used to discover if there was a significant mean difference among teachers' years of experience (1-5, 6-10, 11-15, 16-20, more than 20 years) in their perspectives toward video game use in the classroom. The resulting analysis is presented in Table 11.

Table 11: *Teachers' Attitudes toward Games Based on Teachers' Years of Experience*

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4.068	4	1.017	1.266	0.282
Within Groups	736.713	917	0.803		
Total	740.781	921			

The results showed no statistically significant mean difference in teachers' attitudes among teachers who had 1-5 years of experience (M = 3.64, SD = 0.84), teachers who had 6-10 years of experience (M = 3.67, SD = 0.87), teachers who had 11-15 years of experience (M = 3.48, SD = 0.96), teachers who had 16-20 years of experience (M = 3.58, SD = 0.89), and teachers who had more than 20 years of experience (M = 3.55, SD = 0.84), F(4,917) = 1.266, p = 0.282).

For each section separately, the results showed no statistically significant mean differences in the learning attitude section among teachers who had 1-5 years of experience (M = 3.73, SD = 0.8), teachers who had 6-10 years of experience (M = 3.79, SD = 0.79), teachers who had 11-15 years of experience (M = 3.86, SD = 0.80), teachers who had 16-20 years of experience (M = 3.80, SD = 0.74), and teachers who had more than 20 years of experience (M = 3.75, SD = 0.79), F(4,836) = 0.520, p = 0.721).

Also, in the teacher impact section, there was no significant mean difference among teachers who had 1-5 years of experience (M = 3.51, SD = 0.83), teachers who had 6-10 years of experience (M = 3.51, SD = 0.81), teachers who had 11-15 years of experience (M = 3.39, SD = 0.86), teachers who had 16-20 years of experience (M = 3.43, SD = 0.80), and teachers who had more than 20 years of experience (M = 3.50, SD = 0.87), F(4,865) = 0.685, p = 0.602) regarding teachers' attitudes.

Moreover, in the enjoyment section, the results showed no significant mean difference among teachers who had 1-5 years of experience (M = 3.99, SD = 0.89), teachers who had 6-10 years of experience (M = 4.07, SD = 0.90), teachers who had 11-15 years of experience (M = 3.96, SD = 0.91), teachers who had 16-20 years of experience (M = 3.96, SD = 0.89), and teachers who had more than 20 years of experience (M = 3.93, SD = 0.92), F(4,924) = 0.768, p = 0.546).

Finally, the results for social interaction attitudes showed there was no statistically significant mean difference in teachers' attitudes among teachers who had 1-5 years of experience (M = 3.75, SD = 0.97), teachers who had 6-10 years of experience (M = 3.81, SD = 1.02), teachers who had 11-15 years of experience (M = 3.62, SD = 1.06), teachers who had 16-20 years of

experience (M = 3.63, SD = 1.04), and teachers who had more than 20 years of experience (M = 3.63, SD = 1.02), F(4,924) = 1.42, p = 0.224).

The last research question was about the relationship between Saudi teachers' philosophy in teaching and their attitudes toward video games in education. Saudi teachers' attitudes toward video games in education was compared with three teaching philosophies (behaviorism, cognitivism, and constructivism).

First of all, descriptive methods such as means and standard deviations were calculated for three teaching philosophies: behaviorism, cognitivism, and constructivism. Cognitivism philosophy had a slightly higher mean (M = 3.84, SD = 0.86) than constructivism philosophy (M = 3.76, SD = 1.04) and behaviorism philosophy (M = 3.26, SD = 1.10).

To answer this research question and find whether there was a correlation between the teachers' philosophies and their perspectives toward video game use in the classroom, a correlation coefficient test was performed for all teachers' philosophies regarding teachers' perspectives toward video games. Since the assumption of linearity seemed to be violated, a Spearman rank-order correlation was used instead of a Pearson correlation coefficient (r) test (Laerd Statistics, 2015b). The Spearman correlation evaluated the monotonic relationship (Laerd Statistics, 2015b; Tabachnick & Fidell, 2007). Table 12 demonstrates the results.

Table 12: *Spearman Correlation between Teachers' Philosophies and their Attitudes*

Philosophy	**Correlation**	**R2**	**Sig.**
Behaviorism	-0.30	0.09	0.0001*
Cognitivism	0.331	0.11	0.0001*
Constructivism	0.490	0.24	0.0001*

* Correlation is significant at the 0.05 level (2-tailed).

For the behaviorism philosophy, the results showed the Spearman correlation was significant (p < 0.0001); there was also a moderate negative correlation between the behaviorism philosophy and teachers' perspectives toward video game use in the classroom, (r = - 0.3). The behaviorism philosophy explained only 9% of the variance in Saudi teachers' attitudes toward using video games in their classroom (R2 = 0.09). In other words, teachers who applied a behaviorism philosophy showed negative attitudes toward using video games in their classrooms.

For the cognitivism philosophy, the results showed the Spearman correlation was statistically significant (p < 0.0001); there was a moderate positive correlation between a

cognitivism philosophy and teachers' perspectives toward video game use in the classroom (r = 0.331). The cognitivism philosophy explained only 11% of the variance in Saudi teachers' attitudes toward using video games in the class room (R2 = .11), i.e., teachers who followed a cognitivism philosophy had positive attitudes toward using video games in their classrooms.

Finally, for the constructivism philosophy, the results showed the Spearman correlation was statistically significant ($p < 0.0001$); there was a high positive correlation between the constructivism philosophy and teachers' perspectives toward video game use in the classroom (r = 0.49). The constructivism philosophy statistically explained only 24% of the variability in Saudi teachers' attitudes toward using video games in the classroom (R2 = .24), i.e., teachers who applied constructivism philosophy in their teaching demonstrated high positive attitudes toward using video games in their classrooms.

7. Conclusion

The GCAS was comprised of four sections. The first section determined a learning construct that had a mean of 3.51. This indicated Saudi teachers had positive attitudes toward games in teaching and learning for content knowledge, thinking skills, classroom performance, increased achievement, motivation and engagement, and effective learning. These results agreed with the pilot study, which had a 3.6 mean for this section.

The second section of the GCAS was the teacher impact construct, which had a mean of 3.32. This section had the lowest mean among all sections; thus, this researcher could not assert that most teachers in Saudi Arabia believe games could improve teachers' performance, help teachers instruct students, support traditional teaching strategies, and guide teachers' instructional planning. Similarly, the mean for this section of the pilot study was 3.3.

The third section of GCAS formed the enjoyment construct and had a mean of 3.99. The enjoyment construct had the highest mean among all sections, indicating most Saudi teachers agreed that games could create enjoyment in the classroom and make learning fun and exciting. This mean was slightly lower compared to the pilot study's mean of 4.2.

The last construct was social interaction with a mean of 3.7. This indicated teachers thought games could enhance social interaction, help students interact with each others, and make a collaborative classroom. These results matched the pilot study's mean of 3.7 for this section.

All of these results agreed with many previous research studies about teachers' attitudes (Alrasheedi, 2009; Hsu &Chiou, 2011; Jones et al., 2007; Noraddin & Kian, 2014; Sobhani & Bagheri, 2014; Wu, 2015). Alrasheedi (2009) found the teachers in Kuwait had positive attitudes toward information and communication technology (ICT) since the mean score for overall teachers' attitudes was 3.35. Also, Noraddin and Kian (2014) noted the means for the perception of digital games ranged from 3.62 to 3.73. Sobhani and Bagheri (2014) mentioned the teachers had positive attitudes toward games and fun activities and the teachers were motivated in using games and fun activities in the classroom. Wu (2015) asked teachers about enjoying playing video games; the result showed a generally positive answer with 57.8% of teachers either strongly agreeing or agreeing compared to only 13.8% teachers disagreeing or strongly disagreeing.

The overall results showed there was a significant difference between teachers' attitudes according to gender. Results showed that female teachers had more positive attitude than male teachers. This result conflicts with the common thought that stated males have more positive attitudes toward computers than females (Alrasheedi, 2009; Liao, 1999; Sharp, 2005; Young, 1999). On the other hand, Noraddin and Kian (2014) and the pilot study did not find any significant difference between teachers' attitudes according to gender.

Enjoyable, challenge, cooperate with other, and develop useful skills and knowledge were the main reasons to playing video games for both group of gender. Clark and Ernst (2009) indicated in their study that 74% of participants agreed gaming was a valuable resource and learning tool for students. In contrast, female felt video games filled their leisure time more than male while male believed playing games was more exciting than female. The findings of this study align with existing literature, but also raise questions about potential connections among gender, game play, and implementation of gaming as a teaching and learning tool.

There was no statistically significant mean difference in teachers' attitudes among levels of teaching (elementary, middle, and high) schools and teachers' years of experience (1-5, 6-10, 11-15, 16-20, more than 20 years). This was not surprising as many studies showed the same results. Noraddin and Kian (2014) noted no statistically significant mean differences in teachers' attitudes among the length of teaching experience, teachers' age group, and teachers' majors. This shows that years of teaching experience or grade level does not have significant influence on Saudi teachers' attitudes about video games as a teaching and learning too. This could mean that opportunities to introduce gaming strategies or gamification practices within Saudi educational

environments could be successful as a means of teaching and learning, regardless of education instruction level or teacher experience.

The results showed there was a moderate negative correlation between behaviorism philosophy and teachers' attitudes (r = -0.3), a moderate positive correlation between cognitivism philosophy and teachers' attitudes (r = .331), and a high positive correlation between constructivism philosophy and teachers' attitudes toward video game use in the classroom (r = .49). These results aligned and supported a previous study that discovered a relationship between teaching philosophies and some kinds of educational games (Wu, 2015). Wu (2015) found a negative correlation between behaviorism and educational games design (r = - 0.30); a positive correlation between cognitivism and educational games design (r = 0.25); and a positive correlation between constructivism and educational game design tools (r = 0.23). Teachers who apply behaviorism theory are the opposite of applying learning objectives such as creativity and artifact creation. The findings of this study were congruent with what was previously stated since the teachers who applied behaviorism had a negative attitude toward using video games in classrooms. This could be due to the definition of this theory where the input and output of knowledge is in the form of observable behaviors and not based on cognitive learning offered by educational video games. In contrast, the teachers who apply cognitivism and constructivism learning theories presented positive attitudes toward applying games in their classroom. This was considered relevant to the definition of these theories since educational video games develop a cognitive construct learning styles in the form of multitasked learning that includes exploration and discovery activities.

In general, the results showed positive attitudes toward video games. This was a good indicator about Saudi teachers' readiness of employing educational video games in their classroom once it gets approved by the Minister of Educational in Saudi Arabia. Saudi teachers need to adopt cognitivism and constructivism theories in their teaching, which will help them when applying video games in their classroom as was shown in the results. Game integration could be a catalyst for changing pedagogical practices. With positive attitudes should through the findings of this study, and a large portion of the population unknowing about gaming as it might relate to teaching and learning, introducing video games as a teaching and learning tool could have significant impact.

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