

A Study of Motivation for Playing Computer Games at Tertiary Education Level in China

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ABSTRACT

Within the past decade, a number of studies have analysed and investigated the aspects and potential applications of games-based learning. Educationalists and industrialists continue to explore it as it is perceived as a potentially beneficial supplementary learning mechanism, teaching and training approach and perfectly matches the determinants of intrinsic motivation. Previous studies indicate that games can promote learning and engage learning experiences compared with traditional methods, while one of the primary arguments against games-based learning focuses on a dearth of empirical evidence in particular a lack of Randomised Controlled Trials (RCTs) and longitudinal studies. The lack of empirical evidence in supporting the efficacy of games-based learning can be challenged as unsubstantiated optimism. This paper provides empirical evidence by reporting the results of a survey conducted at tertiary education institutions in China. The survey is conducted on the basis of a number of previous studies on the motivation of games-based learning. The survey reports on the evidence from the Chinese institutions where 346 undergraduate and postgraduate students completed the survey in March 2017 over a three-week period. Participants had positive attitude towards playing computer games for learning.

The top motivations of playing computer game were: enjoyment, competition and relationships whereas the top motivation of playing games in education were: relaxation, leisure and pleasure. Respondents perceived that computer games could potentially provide the following skills: collaboration, problem-solving and analysis. The paper contributes to empirical evidence in games-based learning through a comprehensive quantitative analysis of data including gender, education, game platform and play types of game comparisons. The results were compared to similar studies conducted at different levels of education in different countries and provide a synthesis.

Keywords: Motivations, computer games, games-based learning, empirical research, survey.

1. Introduction

Games-based Learning (GBL), appears to be a recent phenomenon (Alvarez et al., 2010) and as has been used in a number of curriculum-based subjects including: business and policy analysis (Gredler, 2004), financial decision-making (Jercic et al., 2012), medicine (Lennon, 2006; Roubidoux, 2005), military training (Gudmundsen, 2006), science (Squire et al., 2004), mathematics (Baker et al., 2007), biology (Dede et al., 2005), language (Rankin et al., 2006), computer science (Connolly et al., 2007) and strategic communication objectives (Zyda, 2005). The motivation is the key aspect of learning effectiveness in term of using computer games for education (Tsai et al., 2012), attitudes towards computer games (Riedel et al., 2014). These aspects were considered in a detailed design and evaluation framework in a literature review study (Connolly et al., 2009) and require empirical evidence in different educational contexts to verify the effectiveness of computer games for educational purposes. Previous studies have been performed in different levels of education and countries. This paper aims to identify students' attitudes and motivations of using GBL at tertiary education level in China.

2. Previous Works on Motivation

Motivations have been proposed to explain the subjective feelings experienced while playing games (Boyle, Connolly, and Hainey, 2011). Falstein (2004) proposes three overlapping categories of fun: physical,

mental, and social. Furthermore, Hunicke et al.'s (2004) MDA framework identifies eight kinds of fun which are proposed as types of aesthetics: (1) sensory pleasure, (2) make-believe or fantasy, (3) drama or narrative, (4) challenges to be overcome, (5) fellowship with others, (6) exploration and discovery, (7) self-discovery and expression, and (8) submission or a way to pass the time. There are a number of questionnaire/survey studies in the literature performed to investigate the attitudes and motivations for playing computer games. Yee (2006) identified ten motivations based on a survey from players of MMORPGs, grouped into achievements (advancements, mechanics, competition), social (socialising, relationships, teamwork) and immersion (discovery, role-playing, customisation, escapism). Grinberg et al. (2014) found that the realism of virtual interaction (social engagement) was more important for heightening sense of immersion than the realism of the virtual environment (fidelity aspect). In addition, Defazio et al. (2013) found that majority of the players were interested in playing games and thought that games were challenging and fun. According to the Nielsen Games report (2008), the main motivations for playing video games are fun (80%), relax/de-stress (55%), boredom (41%) and challenge (36%) in 15 European countries. Grinberg et al. (2012) performed a survey of 324 college students to explore motivations for playing games on social networks where escapism and entertainment were rated as the highest ranking motivation.

Studies have also measured motivations for playing computer games at different levels of education. Sobkin and Evstigneeva (2004) surveyed 796 Russian school children for playing computer games where the main motivations for playing video games were boredom, entertainment, emotional release and the desire to beat the opponent. Bekebrede et al. (2011) carried out a survey about the use of games in Higher Education using 1,432 students in the Netherlands where the respondents preferred games as a valuable teaching method. Ranchhod et al. (2014) performed a study where pleasure was rated as the top reasons for playing computer games in education. The motivations for playing computer games in education are significantly affected by gender and game types. Previous studies performed using Malone and Lepper's (1987) framework of intrinsic motivation had some of the main findings:

- Rossiou and Hainey (2011) performed a study involving 120 Secondary Education (SE) students in Greece where cooperation was rated as the highest ranking motivation for playing computer games in a SE context. Males rated challenge to be significantly more important for playing computer games in SE. Females believed that control and recognition are significantly more important. There were no significant differences in relation to gender with cooperation, fantasy, curiosity, pleasure and relaxation.
- Hainey et al. (2011) performed a study to investigate the differences in motivations of online game players and offline game players. The study was a combined analysis of three surveys at Higher Education (HE) level and involved 2226 participants from 2005, 2007 and 2009. Challenge was the top ranking motivation in HE. Multiplayer gamers and online gamers rated competition, cooperation and recognition to be significantly more important for playing computer games in HE than single players and offline gamers.
- Hainey et al. (2013) conducted a study in HE comparing students' attitudes and motivations for playing computer games in Scotland and the Netherlands where participants from the Netherlands rated the following motivations for using computer games in a HE context significantly higher: cooperation, fantasy, pleasure and relaxation. There were no significant differences in relation to gender with the following motivations: challenge, competition, recognition, control and curiosity. Participants from the Netherlands emphasize more relaxed and social motivations than participants from Scotland.
- Hainey et al. (2011) performed a study involving 131 HE computing students and 111 Further Education (FE) computing students. The top motivations for playing computer games in a FE context were challenge and cooperation. There were no significant differences between FE and HE student motivations for playing games in an educational context with the exception of curiosity. HE students rated curiosity significantly more important for playing games in an educational context than FE students.
- Fu et al. (2016b) performed a survey of 832 students regarding motivations for playing computer games at SE institutions in Turkey. The top ranking motivations for playing computer games in education were control, fantasy, recognition and challenge and the lowest ranking motivations were pleasure, relaxation and leisure. Females rated the following motivations for playing computer games in an educational context as significantly higher than males: challenge, competition, cooperation, recognition, control, fantasy, leisure, pleasure and relaxation. There was no significant difference in relation to gender with regards to curiosity.
- Fu et al. (2016a) carried out a survey of 524 respondents to investigate the motivation for playing computer games in FE in China. The top three motivations for playing computer games in a training

context were relaxation, leisure and pleasure and the lowest ranking motivations were curiosity and fantasy. There were significant differences in motivations for using computer games in relation to gender and education with the exception of relaxation. Moreover, occupation group variables significantly affected fantasy and pleasure dimensions for using computer games in business training.

3. Methods Used to Collect Data in the Study

3.1 Participants

346 participants who were from Chinese tertiary education institutions completed an online questionnaire about the motivations for playing computer games in March 2017. 140 (40.5%) participants were males and 206 (59.5%) participants were females. 204 (59.0%) participants were studying business and management, 89 (25.7%) were studying engineering, 45 (13.0%) were studying social sciences, 4 participants were studying medicine and 4 participants were studying design and art.

3.2 Materials

The questionnaire contains demographic variables, game playing habits, motivations for playing computer games and using computer games for education, attitudes to playing computer games and skill gain. Yee's (2006) motivations for playing online game, Wu et al.'s (2010) gratifications perspectives and Malone and Lepper's (1987) framework of intrinsic motivation were used to examine the reasons for playing computer games. Computer game attitude scale (Liu et al., 2013), perceived satisfaction (Liaw, 2008) and student acceptance of playing computer games in education scales (Saleh et al., 2014) were used to examine the general attitudes toward playing computer games. Participants were asked to state what types of skills can be obtained from computer games. Therefore, it contains the following categories: problem solving, reflection, analyzing/classifying, collaboration/teamwork, leading/motivating, and critical thinking, and emotion/attitude. The five-point Likert scale was utilised and the questionnaire was translated into Chinese.

3.3 Procedure

The online survey was made available to a number of Chinese institutions, for a three-week period in March 2017. Participation was voluntary and participants completed the questionnaire at their convenience. The notice was published on the Wei Chat (Mobile App), QQ, and the relevant forums.

4. Results and Analysis

4.1 Game Playing Habits

137 (97.8%) of males and 193 (93.7%) of females played computer games, and 16 participants did not play computer games. 116 (33.5%) of participants had played computer games for less than 1 year, followed by 89 (25.7%) of participants had played computer games for 1-3 years, 70 (20.2%) of them had played for 4-8 years and 55 (15.9%) of them had played for more than 8 years. A Mann-Whitney U test indicated that males played computer games significantly longer years of gameplay time than females ($Z=-5.419$; $p=0.000$). 109 (33.0%) of participants stated that they played games for 1-5 hours per week, followed by 89 (27.0%) of them played for less than 1 hour per week.

134 (38.7%) of participants preferred single-player games and 196 (56.6%) of participants liked to play multi-player games. A Mann-Whitney U test showed that there were significant differences in participation in frequency of gameplay per week ($Z=-7.642$; $p=0.000$) and years of gameplay time ($Z=-6.723$; $p=0.000$) in relation to the form of gameplay.

330 of the participants responded to which types of games and game platforms they prefer to play. 212 (64.2%) of participants preferred mobile games, followed by 84 (25.5%) of participants played computer games and 29 (8.8%) participants liked Xbox, PlayStation games. The classification of game genre was based on Grace (2005) and MobyGame (2016) systems. Table 1 shows the percentage of males and females who played each type of game. MMORPGs (20.9%) and Action/Adventure/Fighting (17.9%) games were

rated as the most popular games to play in general. Males preferred MMORPGs (22.6%) and Action/Adventure/Fighting (20.4%), whereas females were interested in MMORPGs (19.7%), puzzle/board games (16.6%) and rhythm (16.6%). A Mann-Whitney U test showed that there were significant differences in the form of gameplay in relation to the game genres ($Z = -4.085$; $p = 0.000$) and game platforms ($Z = -4.900$; $p = 0.000$), and gender significantly influenced on a choice of game genres ($Z = -3.971$; $p = 0.000$) and game platforms ($Z = -6.777$; $p = 0.000$).

Table 1: Popularity of types of computer games played (genre) split by gender

	Rank	N	%	Male			Female		
				Rank	N	%	Rank	N	%
MMORPGs	1 st	69	20.9%	1 st	31	22.6%	1 st	38	19.7
Action/ Adventure / Fighting	2 nd	59	17.9%	2 nd	28	20.4%	4 th	31	16.1%
Board game/ Puzzle	3 rd	39	11.8%	7 th	7	5.1%	2 nd	32	16.6
Rhythm	4 th	37	11.2%	9 th	5	3.6%	2 nd	32	16.6
Strategy	5 th	29	8.8%	4 th	16	11.7%	7 th	13	6.7%
Role playing	6 th	27	8.2%	6 th	11	8.0%	6 th	16	8.3
Others	7 th	23	7.0%	8 th	6	4.4%	5 th	17	8.8
Racing game/ Sports	8 th	22	6.7%	3 rd	17	12.4%	8 th	5	2.6%
Frist Person shooter	9 th	17	5.2%	5 th	13	9.5%	10 th	4	2.1%
Simulation	10 th	8	2.4%	10 th	3	2.2%	8 th	5	2.6%

4.2 Motivations for Playing Computer Games

There were 330 respondents who answered the motivation for playing computer games question and using computer games in education and responded to attitudes toward playing computer games. Table 2 shows the meaning rating for each reason for playing computer games. Competition (Mean=3.75; SD=0.76), relationship (Mean=3.56; SD=0.73) and teamwork (Mean=3.54; SD=0.75) were rated the three most important reasons for playing computer games. A Mann-Whitney *U* test indicated that males rated the following motivations as significantly higher than females: competition ($Z = -4.010$; $p = 0.000$), relationship ($Z = -3.085$; $p = 0.002$), customization ($Z = -3.406$; $p = 0.004$), mechanics ($Z = -3.774$; $p = 0.000$), discovery ($Z = -3.243$; $p = 0.001$), role-playing ($Z = -3.406$; $p = 0.001$), advancement ($Z = -3.854$; $p = 0.000$), enjoyment ($Z = -2.165$; $p = 0.030$), and recognition ($Z = -3.790$; $p = 0.000$). Multi-player gamers rated the motivations as significantly higher than single-player gamers (Table 2). A Kruskal-Wallis test indicated that participants who used computer game platforms rated the following motivations as significantly higher than other game platforms: enjoyment (Chi=14.393; $p = 0.002$), customization (Chi=6.482; $p = 0.009$), advancement (Chi=8.762; $p = 0.033$), mechanics (Chi=11.814; $p = 0.008$), competition (Chi=10.266; $p = 0.016$), relationship (Chi=13.598; $p = 0.004$), discovery (Chi=13.979; $p = 0.003$), role-play (Chi=9.452; $p = 0.024$), and customization (Chi=11.476; $p = 0.009$).

Table 2: Motivations for Playing Computer Games

Reasons	Rank	Mean	SD	Male			Female			Multi/Single	
				Rank	Mean	SD	Rank	Mean	SD	Z	P
Competition	1 st	3.75	0.76	2 nd	3.70	0.76	4 th	3.41	0.65	-5.006	0.000
Relationship	2 nd	3.56	0.73	3 rd	3.68	0.81	2 nd	3.47	0.66	-3.876	0.000
Teamwork	3 rd	3.54	0.75	4 th	3.62	0.83	1 st	3.48	0.69	-5.167	0.000
Socializing	4 th	3.49	0.73	9 th	3.53	0.74	3 rd	3.46	0.73	-4.351	0.000
Customization	5 th	3.46	0.75	6 th	3.57	0.79	5 th	3.37	0.72	-2.943	0.003
Enjoyment	6 th	3.44	0.70	9 th	3.53	0.71	5 th	3.37	0.69	-4.856	0.000
Mechanics	7 th	3.44	0.75	5 th	3.61	0.76	8 th	3.31	0.71	-3.593	0.000
Discovery	8 th	3.42	0.81	7 th	3.56	0.89	7 th	3.33	0.73	-3.201	0.001
Role-playing	9 th	3.39	0.78	8 th	3.54	0.80	9 th	3.29	0.75	-3.398	0.001
Advancement	10 th	3.28	0.77	11 th	3.48	0.79	10 th	3.15	0.74	-4.397	0.000
Recognition	11 th	3.14	0.93	1 st	3.73	0.87	12 th	2.97	0.93	-3.160	0.002
Escapism	12 th	3.11	0.76	12 th	3.15	0.78	11 th	3.09	0.75	-2.943	0.003

4.3 Motivations for Playing Computer Games in Education

Table 3 displays the mean ratings of the motivations for playing computer games in an educational context. Cooperation (Mean=3.57; SD=0.84), relaxation (Mean=3.51; SD=0.83) and leisure (Mean=3.49; SD=0.78) were rated the top three motivations for playing computer games in an educational context. The lowest ranking motivations were control (Mean=3.31; SD=0.80), recognition (Mean=3.26; SD=0.83) and fantasy (Mean=3.10; SD=0.91). A Mann-Whitney *U* test indicated that males rated the following motivations for playing computer games in education as significantly higher than females: competition ($Z=-2.089$; $p=0.037$), recognition ($Z=-3.279$; $p=0.001$), control ($Z=-2.922$; $p=0.003$), relaxation ($Z=-2.012$; $p=0.044$) and pleasure ($Z=-2.056$; $p=0.040$). Multi-player gamers rated the motivations as significantly higher than single-player gamers with the exception of curiosity (Table 3). According to results of Kruskal-Wallis Test, there was a significant difference in relation to game platforms with regards to relaxation ($\chi^2=9.871$; $p=0.020$).

Table 3: Motivations for Using Computer Games in an Educational Context

Reasons	Rank	Mean	SD	Male			Female			Multi/Single	
				Rank	Mean	SD	Rank	Mean	SD	Z	P
Cooperation	1 st	3.57	0.84	1 st	3.66	0.87	1 st	3.50	0.81	-3.581	0.000
Relaxation	2 nd	3.51	0.83	2 nd	3.62	0.86	3 rd	3.43	0.80	-4.024	0.000
Leisure	3 rd	3.49	0.78	4 th	3.54	0.81	2 nd	3.46	0.76	-3.042	0.002
Pleasure	4 th	3.44	0.82	3 rd	3.55	0.84	4 th	3.37	0.79	-2.955	0.003
Competition	5 th	3.44	0.78	5 th	3.53	0.87	4 th	3.37	0.71	-2.454	0.014
Challenge	6 th	3.40	0.76	6 th	3.47	0.78	6 th	3.34	0.76	-3.061	0.002
Curiosity	7 th	3.33	0.85	9 th	3.32	0.90	6 th	3.34	0.81	-1.507	0.132
Control	8 th	3.31	0.80	6 th	3.47	0.79	8 th	3.19	0.80	-2.563	0.004
Recognition	9 th	3.26	0.83	8 th	3.44	0.96	9 th	3.14	0.70	-4.447	0.000
Fantasy	10 th	3.10	0.91	10 th	3.11	0.97	10 th	3.09	0.88	-2.563	0.010

4.4 Attitudes to Playing Computer Games

Table 4 displays the mean rating of general attitudes to playing computer game with 330 participants. Linking (Mean=3.37; SD=0.75) was rated as the most important factors, followed by perceived usefulness (Mean=3.35; SD=0.71), and perceived ease of use (Mean=3.32; SD=0.71). Confidence (Mean=2.94; SD=0.63) was rated as the lowest important factor to influence attitudes and acceptance to playing computer

games. A Mann-Whitney *U* test indicated that there were significant differences in general attitudes to playing computer games in relation to the form of gameplay with the exception of perceived usefulness (Table 4). Moreover, males rated playing computer games as significantly more positive than females, however, there was no significant difference in relation to gender with regards to relaxation perceived effectiveness ($Z=-0.946$; $p=0.344$) and usefulness ($Z=-1.527$; $p=0.127$).

Table 4: General Attitudes and Acceptance to Playing Computer Games

Reasons	Rank	Mean	SD	Gameplay		Male/Female	
				Z	P	Z	P
Linking	1 st	3.37	0.75	-4.249	0.000	-2.283	0.022
Perceived usefulness	2 nd	3.35	0.71	1.673	0.094	-1.527	0.127
Perceived ease of use	3 rd	3.32	0.71	-3.262	0.001	-2.154	0.031
Leisure	4 th	3.25	0.68	-4.057	0.000	-3.005	0.003
Participation	5 th	3.13	0.82	-3.302	0.001	-3.822	0.000
Perceived effectiveness	6 th	2.96	0.85	-2.395	0.017	-0.946	0.344
Confidence	7 th	2.94	0.63	-3.814	0.000	-2.969	0.003

4.5 Skills from Playing Computer Games

Table 5 shows the skills that participants believed they could obtain from playing computer games in an educational setting split by gender. The highest ranking skills that participants could obtain from playing computer games were collaboration (Mean=3.69; SD=0.84), analysing (Mean=3.60; SD=0.80) and leading (Mean=3.48; SD=0.86). Males rated collaboration (Mean=3.81; SD=0.81), analyzing (Mean=3.74; SD=0.81) and reflection (Mean=3.69; SD=0.82) as the three top ranking skills that could be obtained from playing computer games and emotion (Mean=3.48; SD=0.93), critical thinking (Mean=3.56; SD=0.91) and leading (Mean=3.62; SD=0.87) were rated as the three lowest skills. Females rated collaboration (Mean=3.60; SD=0.86), analysing (Mean=3.50; SD=0.79) and leading (Mean=3.39; SD=0.84) as the three highest ranking skills and reflection (Mean=3.27; SD=0.84), critical thinking (Mean=3.25; SD=0.87) and emotion (Mean=3.24; SD=0.87) as the lowest ranking skills. A Mann-Whitney *U* test indicated that males considered skills from playing computer games as significantly higher than females (Table 5).

Table 5: Types of Skills Split by Gender

Reasons	Rank	Mean	SD	Male			Female			Male/Female	
				Rank	Mean	SD	Rank	Mean	SD	Z	P
Collaboration	1 st	3.69	0.84	1 st	3.81	0.81	1 st	3.60	0.86	-2.566	0.010
Analysing	2 nd	3.60	0.80	2 nd	3.74	0.81	2 nd	3.50	0.79	-2.825	0.005
Leading	3 rd	3.48	0.86	5 th	3.62	0.87	3 rd	3.39	0.84	-2.634	0.008
Problem solving	4 th	3.46	0.85	4 th	3.64	0.85	4 th	3.33	0.83	-3.773	0.000
Reflection	5 th	3.45	0.85	3 rd	3.69	0.82	5 th	3.27	0.84	-4.546	0.000
Critical thinking	6 th	3.38	0.90	6 th	3.56	0.91	6 th	3.25	0.87	-3.195	0.001
Emotion	7 th	3.34	0.90	7 th	3.48	0.93	7 th	3.24	0.87	-2.348	0.019

5. Discussion and Future Research Directions

346 participants completed the online questionnaire from Chinese tertiary education institutions with 45% of males and 65% of females. 137 (97.8%) of males and 193 (93.7%) of females played computer games. More than half of the participants played computer games for a period of less than 3 years and for less than 5 hours per week. Males played computer games for longer than females, which has been a consistent finding in the literature (Lucas and Sherry, 2004; Johnson *et al.*, 2016).

196 (56.6%) of participants preferred multi-player games. Multi-player gamers had played for a significantly longer number of years of gameplay time and higher frequency of gameplay per week than single-player gamers. The most popular games were MMORPGs and Action/Adventure/Fighting in general. 212 (64.2%) of participants preferred mobile games, followed by 84 (25.5%) of participants played computer games.

The top ranking motivations for playing computer games were competition, relationship and team work. Males rated the following motivations as significantly higher than females: competition, relationship, customization, mechanics, discovery, role-playing, advancement, and recognition. Multi-player gamers rated the motivations as significantly higher than single-player gamers. Participants who used computer game platforms rated the following motivations as significantly higher than other game platforms: competition, relationship, customization, mechanics, discovery, role-playing, advancement, enjoyment and recognition.

Cooperation, relaxation and leisure were rated the top three motivations for playing computer games in a Higher Education (HE) context. The lowest ranking motivations were control, recognition and fantasy. The highest ranking motivations in the HE study in the Netherlands were cooperation, fantasy, pleasure and relaxation where the top motivations at HE in Scotland were: challenge, curiosity, cooperation and competition (Hainey *et al.*, 2013). The results possibly indicate that all HE sets of participants perceive computer games to promote cooperation. In Further Education (FE) in China the following motivations were rated as the most important for playing computer games in a FE context: relaxation, leisure and pleasure (Fu *et al.*, 2016a) where in Scotland challenge, relaxation and prevention of boredom were considered as the top motivation for playing computer games in a FE context (Hainey *et al.*, 2011). In Secondary Education (SE) in Turkey the top motivations for playing computer games in a SE context were control, fantasy, recognition and challenge (Fu *et al.*, 2016b). The highest ranking motivations in the SE study in Greece were cooperation, pleasure and competition (Roussiou and Hainey, 2011). To take all information into account it seems that across all levels of education, computer games are perceived as quite leisurely. Whereas there is a difference of how they are perceived in relation to educational level and country.

Males rated the following motivations for playing computer games in education as significantly higher than females: competition, recognition, control, relaxation and pleasure. Participants who preferred multi-player games rated the motivations as significantly higher than single-player gamers with the exception of curiosity. There was significant difference in relation to game platforms with regards to relaxation.

The highest ranking skills that participants could obtain from playing computer games were collaboration, analyzing and leading. Males rated collaboration, analyzing and reflection as the three top ranking skills that could be obtained from playing computer games and females rated collaboration, analysing and leading as the three highest ranking skills. Males considered skills from playing computer games as significantly higher than females. In the Netherland study problem solving and creativity were the two highest rated skills and in two studies in Scotland, problem solving and critical thinking were highest rated skills (Hainey *et al.*, 2013; Hainey *et al.*, 2011). In a SE context in Greece collaboration and problem solving were rated as the two top skills (Roussiou and Hainey, 2011) and in Turkey creativity, leading and analyzing were the highest ranking skills (Fu *et al.*, 2016b). The previous studies suggest that problem solving is an important skill, however, this study has revealed that it may not be as important. The cultural and educational level may influence perceived skill development. In terms of attitudes, multi-player gamers every attitudinal statement as significantly higher score than single-player gamers with the exception of perceived of usefulness. Males rated playing computer games as significantly more positive than females. Consistently in the FE study in China males rated playing computer games more positive than females (Fu *et al.*, 2016a).

This paper presents the empirical evidence in motivations and attitudes for using computer games at tertiary education level in China and provides a comparison with a number of studies in terms of educational levels and nationality. Further study suggests that it is necessary to narrow down the topic, for instance, where games should be used, how to design games associated with motivations in different countries and different educational levels.

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