Perceived Effects of Videogames: Chinese Case Study

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Abstract- This research investigates the current situation of videogames in China by analyzing the effects of playing computer games on academic achievement and social skills, as well as attitudes toward playing games from the perspective of both parents and children.Paper and online questionnaires were used to collect data, and Chi-Squaredand Logistic Regression analyseswere done to evaluate the significance of findings using R and Excel.

The main findings concern the prevalence and circumstance of people playing videogames, utilization of computers, perceived necessary learning skills for people, and the effects of playing computer games on students' studying and social lives. It is clearly revealed that youths are prone to play games with violence and excitement so that they can release their pressure from the heavy workload in school. However, adults prefer to play games that can improve their intelligence and working skills, all of which are useful for their careers. When asked about the effects of playing videogames, most participants think there is slight reduction in both studying and socialization.

In addition, this research discusses the effects of playing videogames more deeply and provides students, teachers, and parents with suggestion about the current situation of games addiction. With the suggestions, students and teachers or parents could neutralize their opinions on playing videogames.

Index Terms-videogames, effects of playing, academic achievement, social skills, learning skills, game preference, logistic regression, chi-squared

I. INTRODUCTION

As society develops promptly and dramatically, people have more opportunities and access to use technological devices, and this has led to the development of videogames. Computer games have been evolving through several decades, adapting so that players can experience different kinds of games in different ways. The more prevalent games become, the more problems are raised by people who consider video games as a "drug" to players. For example, it is controversial whether the technology should be widely utilized in the education.

While thinking about this contradiction, some people have the conservative opinion that if people get addicted to video games, thismay cause negative effects on students' study and damage people's physical health. On the contrary, others suggest that video games promote many social and learning skills for people to improve themselves by properly playing games which utilize their intellects to solve problems.

This article will first examine the literature that supports these points of view, and then introduce original research into the perceptions of individuals to see how they match the empirical results of the research.

II. LITERATURE REVIEW

One of the most contentious debates concerning video games is their effect on learning skills. Although not universally agreed upon, there are some essential and necessary factors of promoting academic achievements. Creativity, motivation, critical thinking, communication ability, and adaptability all effectively influence students' capability of absorbing knowledge and making achievements(Saavedra&Opfer, 2012). Time management skill, self-assessment, and self-diagnosis are also significant to learning, especially before assessments (Nordell, 2009).Playing games can enhance these skills and promote achievements using technology, because increased access to technology improves students' technology proficiency, engagement, and academic achievement (Sharpley, Sheehan, Maloney, & Walker, 2011).

In reality, parents are worried about the negative effects of using technologies and therefore strictly supervise students' playing time (Salceanu, 2014). However, using technology such as videogames playing is one way to promote students' learning skills and achievements. Creativity is promoted by games that require cognitive demands to be creative, and games connected with a large breadth of visual attention throughout, including both central and peripheral visual processing (Yeh, 2015).Additionally, while playing violent video games, children can not only fulfill their basic impulses that cannot be met in the real world, but also avoid conflicts and transfer violence into their learning settings to promote themselves (Salceanu, 2014; Agina& Tennyson, 2012).

In addition to creativity and expression, video games can also help kids learn social skills. When students were encouraged to play video games from childhood, it was shown to be the best time for them to learn to understand rules and express themselves(Annetta, 2008). Furthermore, while playing video games, children can be encouraged to actively explore and learn things such as rules and social skills (Agina, 2012).

Different types of video games can have even more direct benefits. Keeping students motivated is one of the most essential factors of learning, which could provide enjoyable learning experiences by playing AVGs (Active Video Games) (Sun & Gao, 2016). AVGs can benefit them by promoting physical activity and facilitating children to put in a high volume of body movement, improve their cardiorespiratory fitness (ie. capability of hearts and lungs), and enhance academic achievement in school (Sun &Gao, 2016).

Technology in learning has different effects on various students. Kim and Chang's research (2010) concludes that minor language-learning students who played computer games in math every day demonstrated higher math performance scores than those male English-speaking majority students who never played. In addition, it also shows that playing games promotes the participation of linguistic minorities in class and students of both genders have better academic achievement than those not playing

games (Kim & Chang, 2010). Another experiment reveals that male students show greater confidence, derive more enjoyment, and are more likely to participate in the playing of computer games playing so that they could improve more (Liu, Lee, & Chen, 2013).

Technology is not only beneficial to students' achievements, but helps teachers to better educate and guide students. The systems of process monitoring such as CBA (Curriculum-Based Assessment) and CBM (Curriculum-Based Measurement) are used to help teachers pay attention to the performance and progress students achieve, enable them to change instruction when experiencing difficulties, and enhance the level of information that can be modified by educators (Ysseldyke& Bolt, 2007). Those games' features such as clear goals, learner control, challenging tasks, and repetition may help teachers to create individualized learning methods to take control and improve students' achievements (Shin, Sutherland, Norris, &Soloway, 2012). For example, motivation, one of the teachers' chief concerns, could be solved by encouraging students with interesting activities found in technological devices (Granito&Chernobilsky, 2012).

Academic promotion, especially mathematics achievement, is obviously improved by the application of technology. Playing videogames is an efficient method to improve attentional capacities that are significant for creating an academic basis, which has been seen to promote students' mathematics performance (Novak &Tassell, 2015). So when education technology is put into practice appropriately, the incorporation of technology into instruction has positive effects on students' achievement and significant gains in students' math achievement (International Society for Technology in Education). A telling example is that students in AM (Accelerated Math)—a computer program that allows students to progress at their own pace—classrooms have significantly higher scores than those in common classrooms (Ysseldyke& Bolt, 2007).Similarly, playing AVGs could also assist students in facilitating good special abilities which positively relate to high mathematics achievement, successful geometry studying and normalized test performance (Novak &Tassell, 2015), since this method interests the students in the class so that they are attracted to the studying content (Lari, 2014). If the knowledge is presented by visual tools, students are more attracted to and motivated by the contents (Lari, 2014).

Based on the research listed above, it can be seen that applying technology can positively affect students' motivation to study and help promote their academic achievements, development of social skills, and other stimulation in thinking. Thus, if technology is so advantageous to students, it must be examined how universal technology utilization is in schools.

The research by Stearns (2012) implies that teachers and schools must incorporate technology into the classroom and the education process. However, factors including the cost of computer technology, necessary training for staff and students to use the equipment and materials, and accessibility of computers should be considered and solved so that students could improve their reading comprehension skills with technology (Stearns, 2012).Nowadays, most schools have started to implement computer technology into classrooms, but actual usage is not that optimistic since "school leaders do not have a clear sense of how to evaluate effective use of technology" (Lim, Zhao, Tondeur, Chai, & Tsai, 2013). Therefore, though technology is positively influential to students' achievement, schools practically do not take action to strengthen them, because they do not know how to attain this positive influence.

In addition, it is the gap between the technology tendency and use of technology in school that influences the complete implementation of technology in students' classrooms. No matter how many necessary conditions are applied, it is still complicated to judge the success of technology implementation because there are not enough specific goals and models to imitate (Lim, Zhao, Tondeur, Chai, & Tsai, 2013). Although researchers have repeatedly stated that successful policy completion requires clearly decided goals directly related to student learning (Fullan, 2001), in all specific educational goals,only concreteconciliatory goals such as "amount of hardware, student-computer ratios, and connectivity rates"are defined in educational technology policy documents (Lim, Zhao, Tondeur, Chai, & Tsai, 2013).

Thus, to ensure that introduced technology is truly helpful to students' education, we should pay more attention to how to improve their enthusiasm for using technology in order to promote their achievement in not only academic ways but also positive social aspects. The reason we achieve this is that student-motivating activitiesare elements of "high novelty, high attention demand, intensive exploration opportunity, instant enjoyment, and moderate physical challenge", which are all related with learning (Sun &Gao, 2016). Then, challenging tasks and repetition in videogames motivate students to complete exercises, influencing greater achievement and strengthening learning skills, positive motivation, persistence, and curiosity for learning, which leads to better academic performance (Shin, Sutherland, Norris, &Soloway, 2012).To some extent, students themselves are interested in learning by playing video games, since they increase their practice efforts and are assisted to facilitate higher order learning goals, though there are still violence and aggression features in them (Barko& Sadler, 2013).

Once the government finishes this goal and the mechanism of gaming education is completely established, students can improve by providing learning environments which give them active control over their learning experiences (Barko& Sadler, 2013). The pedagogical use of technology in the classroom and amalgamated learning, the desire to bring together broad issues concerning the effects of teachers and learners' use of technologies currently in service of success, and attitude outcomes must all considered in the future construction of technology in schools (Schmid, Bernard, Borokhovski, Tamim, Abrami, et al, 2014).

Although there have been many researches about the effects of playing video games on students, most of them focus on the

physical influences and mental illnesses possibly caused by playing computer games in the long term. Moreover, most of the research does not directly explore the relationship between playing games and learning skills, which is comparatively significant to consider about while investigating whether the effects on the students are positive or negative, and most of them do not include the supervision of parents on children's playing games.

Therefore, this survey's purpose is not only to pay attention to these aspects but also to provide opinions to game-designing corporations by discussing people's preferences and their worries about video games.

III. METHODOLOGY

This section outlines the participants and their basic information as well as the instruments, procedure, data collection method, processing and analysis.

A. Participants and their Basic Information

There were 343 participants from over 20 provinces across China and 8 international residents who filled out the questionnaire while collecting data, including 158 students and 185 adults.

B. Instruments

The main purpose of designing this survey is to research people, especially students, on their beliefs about the impact of playing games on academic achievement.Both paper and online questionnaires were utilized.

Twenty-three questions are included in the survey.The first two questions are about gender and age. The next two questions investigate people's situation of playing games. Then, there are four questions related to the connection between playing games and scores or personal ability. The ninth question is designed to divide the subjects into two parts, one of which is students and the other is parents so as to research various attitudes toward videogame playing. After that, questions 10-16 ask students about whether and how their parents supervise them while using the computer, the influence of playing games on scores and social ability, and their preferred type of games. Questions 17-23 ask the same of parents. There are fourteen single-answer multiple-choice questions, four open-ended questions, and five questions where more than one choice can be checked.

C. Changes made on questionnaires

The questionnaire was meticulously translated into Chinese when done in China so that the translation would have minimal influence on the results. There were also some changes made to the questionnaire to make the result more clear and the following will explain the changes and the reasons why they were made.

In question 7, the ranking of students' scores in the Chinese edition was changed into the percentage of every student in their class, because in China, some students are ranked in the order of scores, while others are ranked in the percentage of students' scores in the entire class, not the exact number.

While analyzing the data, the choice of "others" in question 8, 11 and 18 was omitted since there were only 7-10 participants out of 358 who chose this option, and most of them didn't fill in the blank space with detailed information. Then, the "-3"s in the data of a few questions was changed into "NA", since the survey program automatically codesomitted question as "-3". However, this number would actually affect the result when analyzing the data mathematically, so the recode was necessary.

D. Procedures

The questionnaire was done in both paper format and online format to get a larger sample and more diverse participants.

The paper questionnaires were handed out mainly in Liaoning Province Shiyan High School. The total sample of the paper questionnaires was 15.

The online questionnaires were distributed in Wechat moments, QQ chat groups, and Qzone, three of the most popular social media platforms in China. Sojump, an online survey tool, was used to upload the questionnaire to the Internet and transform it into an online format. The total sample of online questionnaires was 343. Statistical analysis done in the data analysis program named R.

E. Data processing

During the data analysis period, totally 358 responses were used for analysis. There are slightly more students than adults and comparatively more difference in male and female participants. About age, every divided age group has roughly same people with a few more people below 14 and above 30.

IV. FINDINGS AND DISCUSSIONS

In the tables, * indicates significance at 10% level; ** indicates significance at 5% level; *** indicates significance at 1% level.

A. Findings about people playing videogames

This section talks about the findings of people playing games. By analyzing game preferences, perceived effects of playing games on students, and other factors or results, differences of sex and age can also be seen in the following discussions.

a. Findings and discussions about game type

Table1: Number of survey participants by each category

Students		**Gender**		**Age group**					
Yes	No	Male	Female	0-14	15-17	18-22	23-30	31-40	41+
183	175	166	192	75	55	43	42	80	63

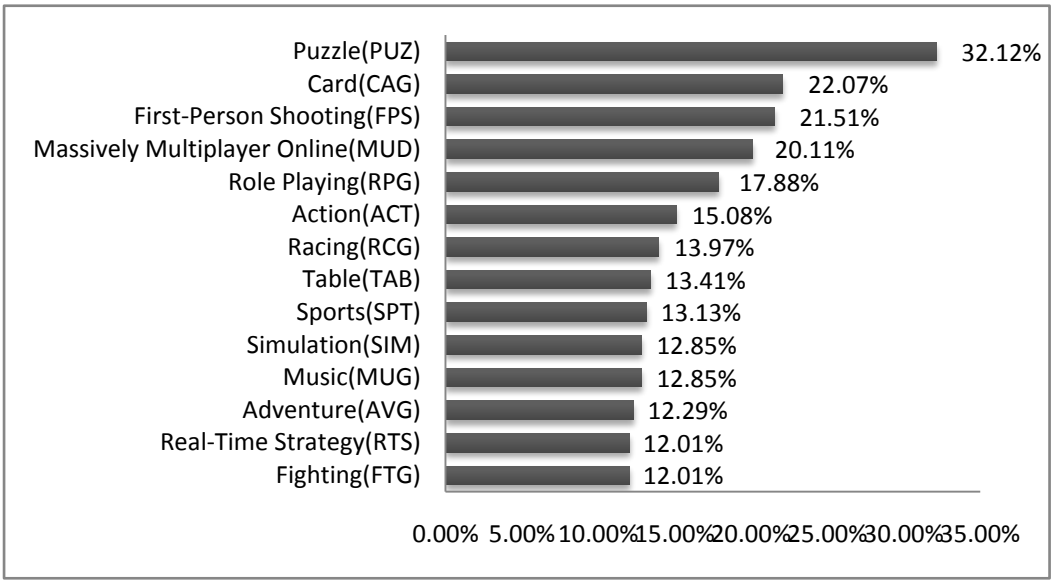

Figure 1.Games preferences of people

As seen in Figure 1, the three most popular videogames for people are Puzzle Games, Card Games, and First-Person Shooting (FPS) Games. However, the least preferred three games are Adventure, Real-Time Strategy (RTS), and Fighting games, which is noticeable because these are full of violent plots, which research has shown is a serious concern for critics of video games. However, the probable reason why FPS Gamesare so popular even though they are violent should be attributed to people's outlet and relaxation from heavy working and studying loads(Salceanu, 2014; Agina& Tennyson, 2012). FPS is more effective than this than the other violent games because it gives the perspective of an actor rather than an observer.

Table 2 shows the distribution of people who like the top three kinds of games and discusses the differences between youths and adults (any participantabove 22 years old is classified as an adult, since this is the common age at which people complete their education in China).

Table 2.

Favorite games preferred by adults and youths

Age Category	Puzzle	Card	FPS
Youths	23.6%	25.8%	31.9%
Adults	44.2%	19.6%	11.7%
Difference	-10.6%***	6.2%***	20.2%***
(X-squared)	(26.47)	(12.04)	(30.39)

Note: N=183 for youths, 175 for adults.

From the difference in game preference between adults and youths seen in Table 2, it is clear that these top three kinds of games are more liked by different groups of people. The percentage of adults who like Puzzle Gamesfarexceeds the percentage of youths, while the percentage of youths who like Card Games is more than the percentage of adults. In addition,the number of youths who like First-Person Shooting Games largely outweighsthat of adults. Because of youths' stress from work and study, they prefer violent video games to release their anger and lessen their pressure. Furthermore, Card Games are recently more prevalentamong youths largely because of the incredibly popular game *Hearthstone*, which respondents report playing on mobile devices as well as computers. However, Puzzle Games play a comparatively important role in adults because they want to maintain the ability of reasoning and logistic thinking.

The differences in preference for Adventure, Real-Time Strategy, and Fighting Games may be concluded by Table 3.

Table 3.

Disliked game types by different groups of people

Age Category	Adventure	RTS	Fighting
Youths	17.6%	17.0%	17.6%
Adults	7.4%	7.4%	6.7%
Difference	10.2%***	9.6%***	10.9%***
(X-squared)	(18.23)	(17.53)	(19.41)

Note: N=183 for youths, 175 for adults.

Though these three games are the more disliked than the other kind of games, youths show the tendency that they have more appreciation for these games, and these data are all statistically significant. The reason why adults don't like them may be that: firstly, they suppose they are too boring to play. Adventure Games have the characteristics that it needs people to spend much time on exploring and colonizing the new areas to promote their power and living style.In addition, Fighting and Real-Time Strategy Games take players time not only to play, but also require complex knowledge and strategy just to be able to play at a basic level, which wastesmuch more time than Puzzle Games which can be picked up quickly.Secondly, some of them cannot classify the Adventure and Fighting Games, since they are both like Action Games. For instance, *Minecraft* involves not only the construction of players' homes but also attack and defense from other online

players, so participants in this research showed some confusion in distinguishing these two types of games.

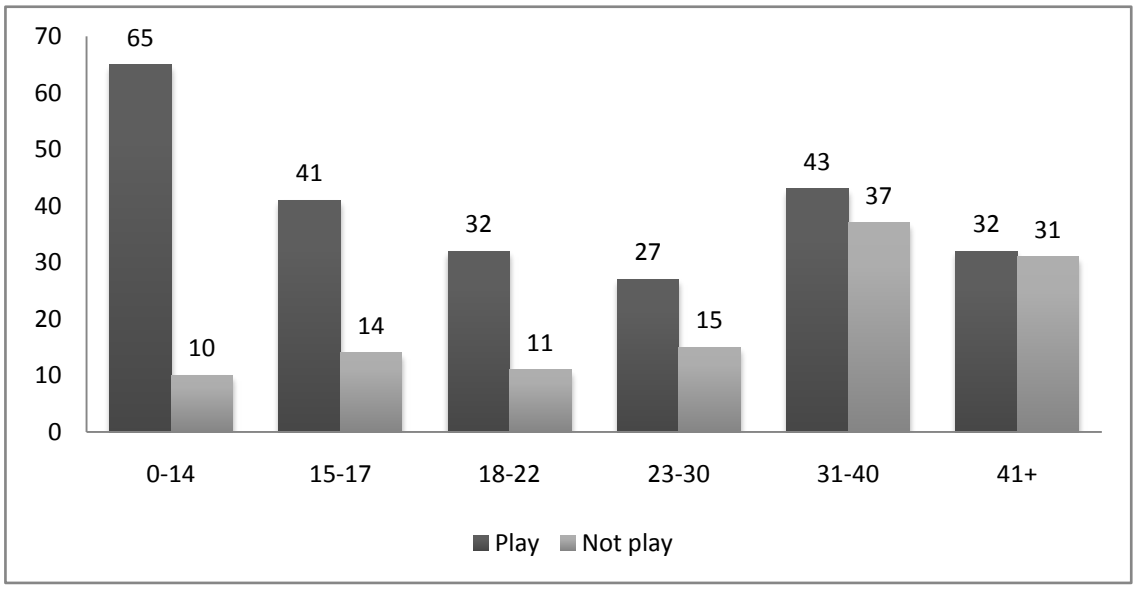

Figure 2.The situation of playing videogames for different age groups

b. Findings and discussions about relation between ages and games

The comparison between whether people play videogames and their ages is shown in the Figure 2.From the graph, it is clear that as people get older, they are prone to not play video games. When observing the data depicted above, the participants aged from 0 to 30 have many more individuals who play videogames than not. Nevertheless, the subjects aged 31 and above show comparatively little difference between playing and not playing games. This reaffirms the findings about adults and students, but allows for further disambiguation of the trend. More specific analysis can be done through binomiallogistic regression, shown in Table 4.

From the analysis shown in Table 4-1, it is possible to see the impact of different variables influencing whether people play videogames. Model (0) tests the effect of the two basic demographic factors, "Student/Adult" and "Sex", showing they are both significant predictive variables related to people's playing computer games. Furthermore, the R-squared (McFadden's) shown reveals that these two factors explain 11% percent of the variance in the game-playing variable, which shows that many other factors must affect individuals' propensity for playing.

It is surprising that when "Age" is added in Model (1), "Student/Adult" remains significant—albeit less so than before—but age does not appear to be significant. The correlation between these factors was only around 0.66.This suggests that the reason students play more video games is not simply that they are younger.

Perhaps even more surprising is that once "Achievement" (participants' attitudes toward their own academic or work-related achievement) is considered in the Model (2), "Age" and "Achievement" show predictive influence, while the significance of "Student/Adult" disappears. This could perhaps suggest that younger individuals with lower achievement are more likely to play games, regardless of whether they are students or not. This could support some typical concerns of parents that playing video games decreases motivation. At the same time, the R-squared of Model (2) is approximately 20 percent higher than that of Model (0), which means that achievement and age do add to the reliability of the model beyond the basic identifications, even though the raw predictive ability is still low at 13%.

In Model (3), a list of variables related to learning skills is added in the regression, and the data indicates that the significance of "Age" in the Model (2) disappears, but "Achievement" shows more significance in the new model. The disappearance of significance for age and identity of a student when the mental factors are added into the model indicates that the playing of games is not a generational phenomenon, but is more connected to individual outlooks and achievements.The mental outlooks are responses to the questions of what leads to success and it is very notable that professional knowledge and creativity are closely associated with a proclivity to play video games.Individuals who value creativity most are much more likely to play video games, as the odds that a person associating creativity with success will play video games is nearly 2.5 times higher than an average individual. On the contrary, the odds that a person favoring professional knowledge will play video games are only half those of an average respondent. This is in line with the fact that people promoting video games in education usually point to individual benefits, and creativity values individual perspectives.

Finally, the R-squared in the Model (3) is almost 40 percent more than that in the Model (0), and 20 percent higher than Model

(2), indicating these mental outlooks have a conspicuous impact on whether an individual chooses to play video games, even when the increased number of variables in taken into consideration.

Table 4-2 explains the significance and dependence of these variables which indicates the relation between playing videogames and themselves controlling for the other variables. These odds explain the comparative groups of people who play and those who do not. More specifically, having two people of identical characteristics but of different sexes, the odds of the female playing video games would be the odds of the male playing video games multiplied by 0.25. For example, suppose that the ratio of males who play video games and those not is 1 to 1, and then the same ratio of females is approximately 0.25 to 1 (1 to 4). Both ratios means that 50 percent of males play video games and 20 percent of females play video games. Thus, it is apparent that the male is more likely to play than the female because when the populations of males and females are the same, there are more females not playing than males.

Table 4-1.Regression of playing videogames, logistic binomial

	Model(0)	Model(1)	Model(2)	Model(3)
Intercept	4.19*** (0.56)	4.04*** (0.56)	4.19*** (0.57)	4.65*** (0.67)
Student/Adult	-0.92*** (0.25)	-0.55* (0.33)	-0.35 (0.35)	-0.35 (0.36)
Sex	-1.29*** (0.26)	-1.30*** (0.26)	-1.31*** (0.26)	-1.37*** (0.28)
Achievement			-0.16* (0.08)	-0.20** (0.29)
Age		-0.58 (0.37)	-0.61* (0.37)	-0.59 (0.38)
Motivation				-0.05 (0.27)
Confidence				-0.15 (0.27)
Concentration				-0.12 (0.29)
Reading comprehension				0.07 (0.28)
Professional knowledge				-0.68** (0.29)
Productive practice				-0.21 (0.32)
Time administration				-0.22 (0.29)
Creativity				0.85*** (0.31)
R-squared	0.11	0.12	0.13	0.15

Note: For dependent variable: 0=don't play video games, 1=play video games.

Table4-2.Coefficients converted into odds factors, Model (3)

Intercept	Student/Adult	Sex	Achievement	Age
104.42***	0.71	0.25***	0.82**	0.55
Motivation	Confidence	Concentration	Reading comprehension	Professional knowledge
0.95	0.86	0.89	1.07	0.51**
Productive practice	Time administration	Creativity		

0.81	0.80	2.33***		

Note: Numbers displayed are odds factors or multiples, not coefficients. The coefficients (log odds) of the logistic regression were exponentiated in order to produce the odds increase in playing video games for a unit change in the independent variable.

Table 5-1.Regression of playing time, logistic binomial

	Model(0)	Model(1)	Model(2)	Model(3)
Intercept	2.01***	2.02***	2.29***	2.41***
	(0.47)	(0.48)	(0.50)	(0.57)
Student/Adult	-0.79***	-0.82**	-0.50	-0.55
	(0.25)	(0.32)	(0.34)	(0.34)
Sex	-1.02***	-1.02***	-1.03***	-1.13***
	(0.24)	(0.24)	(0.25)	(0.26)
Achievement			-0.29***	-0.28***
			(0.09)	(0.10)
Age		0.04	-0.02	-0.02
		(0.07)	(0.32)	(0.33)
Motivation				-0.22
				(0.27)
Confidence				0.24
				(0.26)
Concentration				0.15
				(0.28)
Reading comprehension				0.11
				(0.27)
Professional knowledge				-0.34
				(0.28)
Productive practice				0
				(0.31)
Time administration				0.25
				(0.29)
Creativity				-0.22
				(0.28)
R-squared	0.08	0.08	0.10	0.12

Note: For dependent variable: 0=don't play video games, 1=play video games.

Table5-2.Coefficients converted into odds factors

Intercept	Student/Adult	Sex	Achievement	Age
11.15***	0.57	0.32***	0.75***	0.98
Motivation	Confidence	Concentration	Reading comprehension	Professional knowledge
0.80	1.27	1.17	1.11	0.71
Productive practice	Time administration	Creativity		
1.00	1.29	0.80		

Note: Numbers displayed are odds factors or multiples, not coefficients. The coefficients (log odds) of the logistic regression were exponentiated in order to produce the odds increase in playing video games for a unit change in the independent variable.

Table 5 looks more in depth at people's likelihood of playing video games by analyzing how much time they play instead of simply rather they play or not. It compares people who play more than one hour a day with those who play less and looks that the factors determining who chooses to spend more time playing. From Table 5-1, and aligning with traditional ideas and previous research, "Sex" and "Achievement" are the most significant variables because males and people with comparative low academic achievements are more likely to play videogames. In Model (0) and Model (1) with a few crucial variables, "Student/Adult" and "Sex" show apparently influence to the participants' playing time no matter whether "Age" does or does not exist in the model, but the significance of "Student/Adult" remains. Once "Achievement" is further considered in the Model (2) and Model (3), it shows strong significance and

"Student/Adult" totally loses its significance, mirroring what was observed in the previous analysis.However, different from the analysis of whether people play at all, the list of variables of learning skills has little correlation to the dependent value, which can be seen and concluded from Model (3). Though these learning skills in Model (3) do not show any significance to the people's playing time, this model still has almost 50 percent more R-squared than that of the Model (0) and Model (1), and 20 percent more than that of Model (2).

Comparing the two tables of "coefficients converted into odds factors" (Tables 4-2 and 5-2),there are some interesting points that should be discussed in those learning skills variables. For people who think confidence, concentration, and time administration are important factors of learning, they do not usually play video games—per Table 4-2— but when they do play games, they may spend more than an hour on playing computer games.

The reason may be that playing for longer amounts of time means people must have well scheduled plans to permit themselves sufficient time for playing, have enough confidence to keep playing even though they lose several times, and cannot be distracted by disturbances while playing games.

All the findings and analysis above were expected when the survey was being conducted, and the main reason for the finding should be that youths have more relaxation time and less self-control so that they play more videogames than adults do.

c. Findings and discussions about relation of gender and games

The ratio of males and females who play videogames are collected in the Figure 3.

Of all participants who play videogames, 57% of them are male, and 43% are female. It can be easily concluded that males are more likely to play videogames than females, which is also seen in the common life. No matter whether they are students or adults, men show more enthusiasm and receive more satisfaction while playing videogames than women do. Therefore, this result is in the expectation.

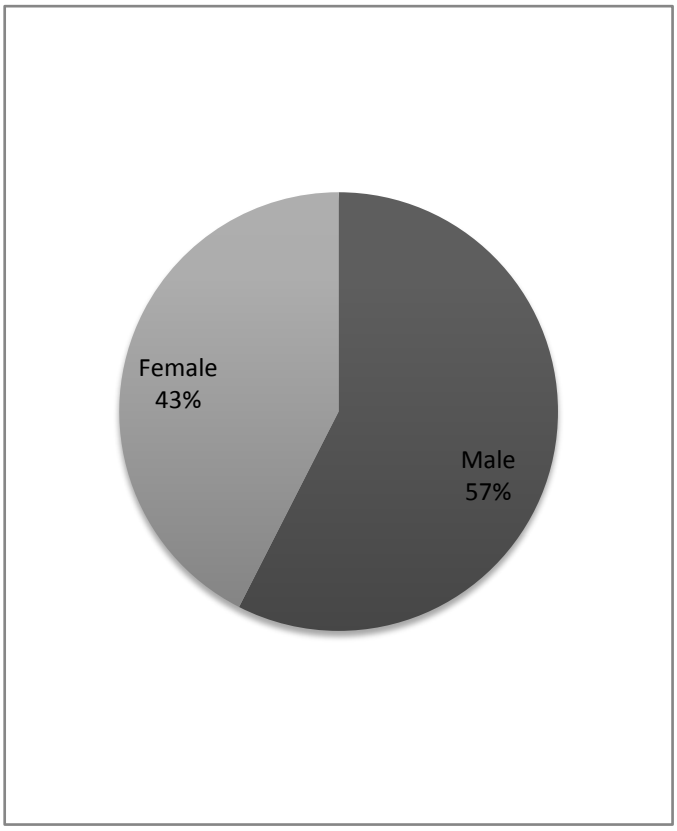

Figure 3.Gender and whether play or not

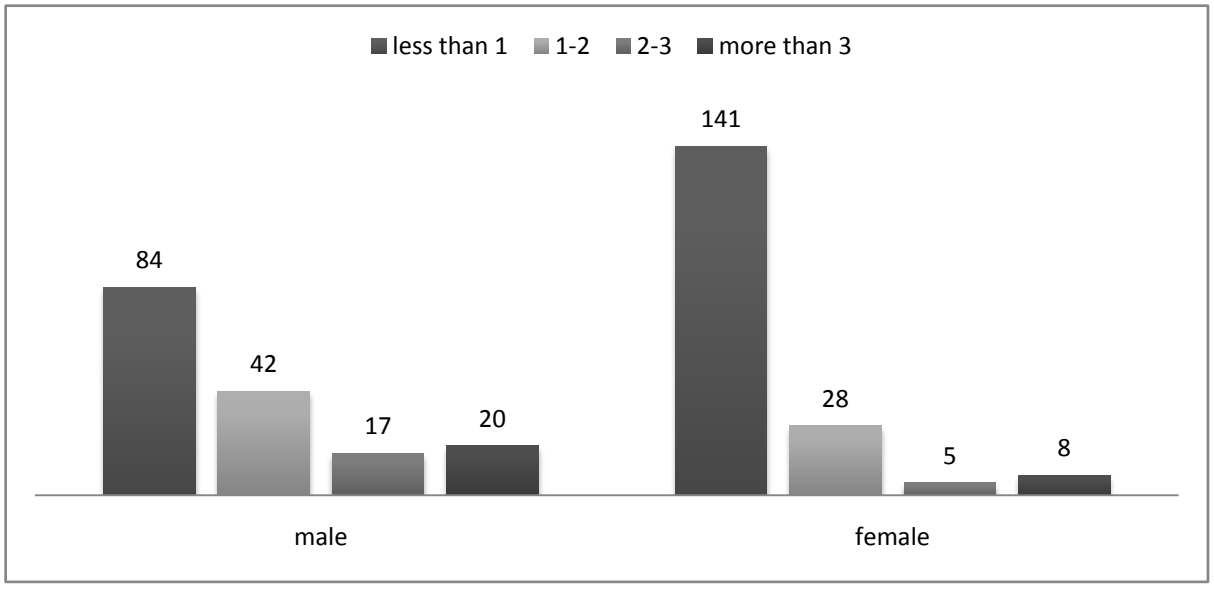

Figure 4.Comparison of gender in playing time

From the bar chart about relation of gender and playing time above, it also reveals that males tend to spend much more time playing videogames than females do. There are fewer male participants than female who play less than 1 hour, but males

exceed female in the other choices. It can be inferred that males are more likely to play and spend more time playing than females do, which can also be observed and concluded from the previous regression tables. A probable reason for this is that males like to release pressure by playing videogames. By playing games such as First-Person Shooting or Action games, people can do whatever they want, such as killing the enemy, beating anyone in the games, and doing other violent movements that cannot be achieved in the common life. Hence, they can transfer internal anger to action in the games in order to maintain a psychologic balance. On the contrary, females who play video games regard it as an activity for relaxation. They often play games with less competition and strategy because they just want to while away time of boredom.

B. Findings and discussion about learning and computer use

This part will analyze the research of learning skills that are important for students in learning, and tries to find people's computer uses in different age groups, especially the impact of parental supervision on the game-playing habits of students.

a. Findings and discussions about learning skills

The following tables and figures represent important learning skills and methods that people think they need and their uses of computer.

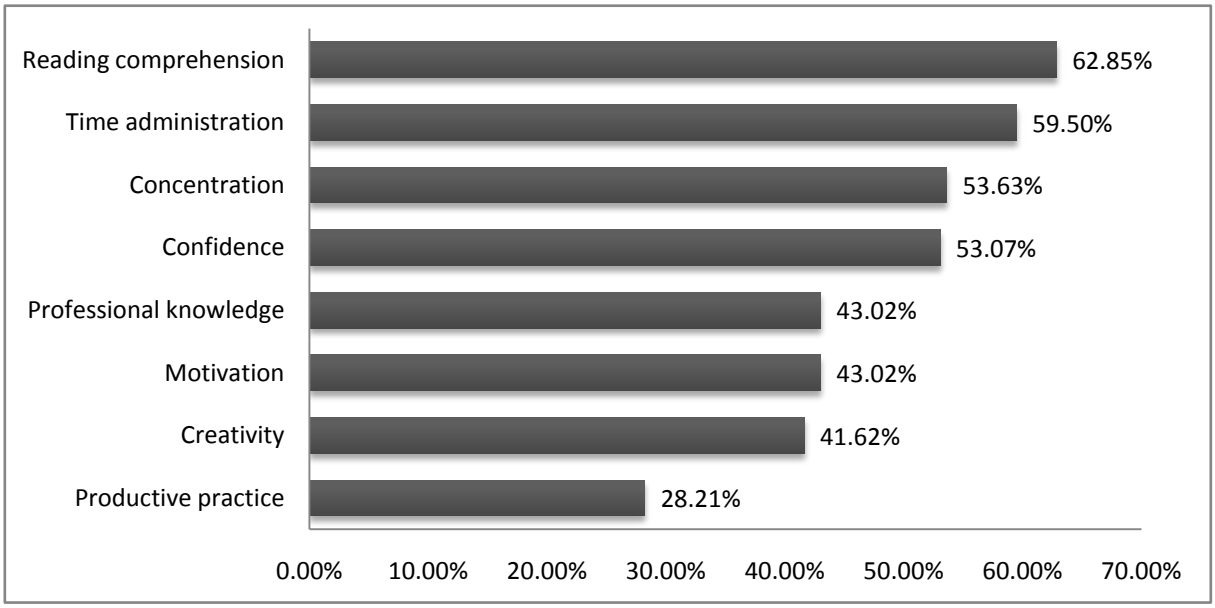

Figure 5.Learning skills that people think are important

From Figure 5, it can be seen that, comparatively, four learning skills are outstanding in all choices and above half of all participants: reading comprehension, time administration, concentration, and confidence. However, they think professional knowledge, motivation, creativity, and productive practice are four less favored learning skills, all of which are below 50 percent.

The next two tables reveal the relation of people's ages and their thinking about necessary learning skills.

Table 6.Relation of favorite learning skills preferred by various ages

Age Group	Reading comprehension	Time administration	Concentration	Confidence
Youths	59.0%	59.0%	57.4%	54.1%
Adults	66.9%	60%	49.7%	52%
Difference	-7.9%	-1%	7.7%	2.1%
(X-squared)	(2.03)	(0.01)	(1.82)	(0.09)

Note: N=183 for youths, 175 for adults.

From Table 6, we can see that for the four learning skills considered most important, there is no significant difference between youth perceptions and adult perceptions. Though all differences above have no statistical significance, fewer youths than adults consider reading comprehension important, but more youths regard concentration as crucial. Common believe would suggests that youth should have regarded reading comprehension as one of the most important factors of learning because it is frequently connected to formal education. However, the research above shows adults are more concerned with this skill but less with concentration. Thus, students think they have few problems in the understanding the knowledge in the class but are difficult to focus on studying, whereas adults are confident in their ability to focus, but feel challenged in understanding.

Table 7.Relation of least favorite learning skills preferred by various ages

Age Group	Professional knowledge	Motivation	Creativity	Productive practice
Youths	46.0%	47.5%	47.0%	33.3%
Adults	40%	38.3%	36%	22.9%
Difference	6%	9.2%*	11%**	10.4%**
(X-squared)	(1.04)	(2.76)	(4.00)	(4.34)

Note: N=183 for youths, 175 for adults.

While analyzing the learning skills least associated with success in Table 7, it can be seen that there aresignificant differences between youths and adults in "Motivation", "Creativity", and "Productive practice". To be exact, "Creativity" and "Productive practice" show more statistical significance than "Motivation". However, youths are prone to choose these three choices all approximately 10 percent more than adults. The probable reason for this is that as young people learn in schools, they regard productive practices in studying and creativityas more essential components of learning.

b. Findings and discussions about computer use

The following discussion is about people's computer usage, as well asthe impact of parental supervision on students playing videogames.

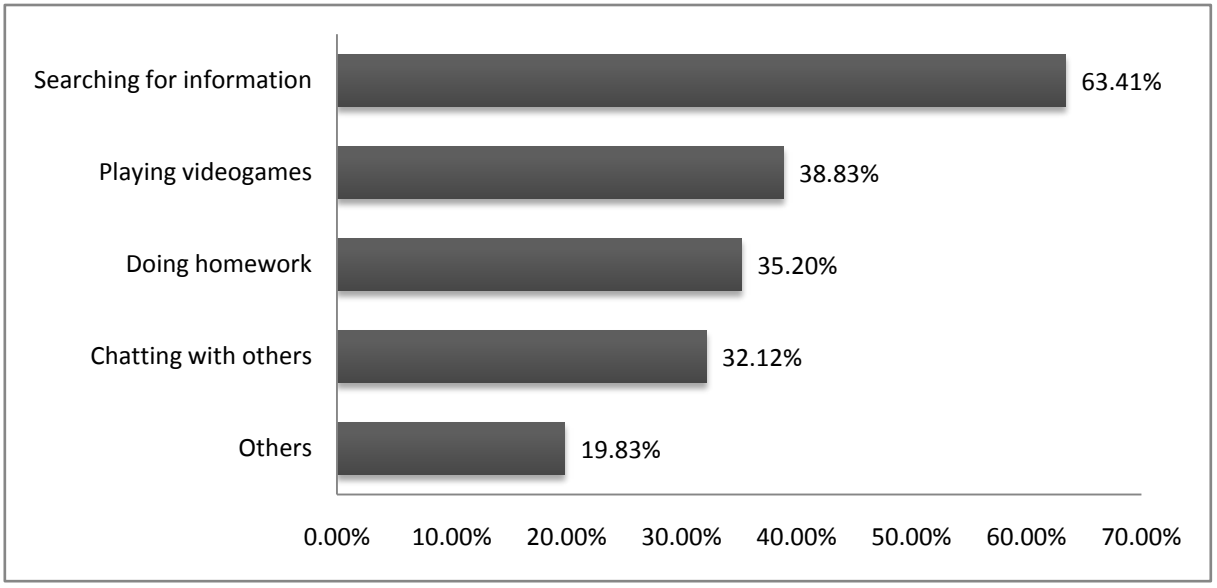

Figure 6.People's main computer uses

From the bar chart above, it can be observed that the most common use of computer is searching for information, followed byplaying games, doing homework, and chatting with others. Comparatively, half of all participants use computers to search for information, while around a third use them for videogames, work and chatting.

Table 8looks at whether there are differences between adults and youth in how they use computers.

Table 8.Various ages and their favorite computer uses

Whether is youth	Searching for information	Playing videogames	Doing homework	Chatting with others	Others
Youths	58.5%	53.6%	56.3%	38.3%	12.0%
Adults	68.6%	23.4%	13.1%	25.7%	28%
Difference from youths (X-squared)	-10.1%* (3.51)	30.2%*** (32.92)	43.2%*** (71.12)	12.6%** (5.89)	-16%*** (13.38)

Note: N=183 for youths, 175 for adults.

By calculating the difference between youths and adults, it is obviously found that adults are likely to use computers to search for information and do other things such as watching videos and working. Nevertheless, youths have more possibility to play videogames, do homework, and chat with friends on computersThe data above are all statistically significant showing that different generations certainly view and use computers differently.

c. Findings and discussions about supervision on computer use

This section will analyze the situation of students who are under supervision while playing videogames and adults' willingness to supervise their children in order to look at how students' opinions compare with adults'.

Table 9.Methods to supervise playing videogames

	Restrain	Limit	Set code	Don't

	time	Internet access	on computer	care
Students	60%	14%	6%	36%
Parents	82%	19%	23%	5%

Table 9 shows thatrestraining playing time is the most common method that parents use to supervise their children. Furthermore, while few students report having passwords to unlock electronic devices set by their parents, almost a quarter of parents reported locking their children's computers. While the participating parents may not be the parents of the students, such a large gap still suggests inconsistencies in purpose and practice. Similarly, about one third of all students consider that their parents do not care about whether they play video games, but only a few parents really do not care about this. Therefore, It seems that most parents want to supervise their children, but most students do not think it actually happens.

C. Findings and discussions about effects of playing games

Table 10 shows the perceived effects of playing videogames on students learning and sociability from their own and parents' perspectives.

Table 10.Effects of playing games on learning and sociality

	Scores	Social skills
Students	3.24	2.75
Parents	3.82	3.33

Note: 1 is the apparent promotion and 5 is the apparent reduction, a score of 3 suggests no perceived effect.

Comparing students' ideas with parents' ideas, it shows that parents think both scores and social skills will have slight reduction after playing videogames, whereas students believe games slightly reduce scores, but actually slightly promote social skills. The differing opinion of the social effects could be a product of the different views of what constitutes social interaction. Parents may not know students are playing with friends rather than alone, or they may not count this as building social skills.

The free responses in 358 questionnaires show mostly neutral opinions about the positive and negative effects of playing videogames. The most frequently cited positive effect was that people can get relaxed while and after playing computer games. A somewhat surprising amount of respondents also explained their ideas by claiming that playing videogames improves people's physical coordination and growth of intelligence. Specifically, Puzzle Games stimulate people to think about knowledge in different ways, and Massively Multiplayer Online Games motivate them to meet new friends with common interests and promote team working productivity.

On the other hand, the most cited negative effectis that playing videogames wastes too much time, and distracts them from focusing on studying and working on their own projects. In addition, they explain that playing computer games does harm to their eyesight and decreases their physical activities outdoors, thereby negatively impacting their health. Many participants noted that there is no positive or negative effect of playing videogames, but whether good or not depends on the time people spend playing games.

V. CONCLUSION

Although playing videogames has already been discussed for a long time by many researchers, most of them focus on the effects of playing games on study and socialization, the best kinds of games for students to improve themselves, and the situation of students playing games. This report contributes by analyzing the differences between perception among youths and adults aboutthe impact of demographic, achievement, and mental factors on participation, playing time, and game preference. More importantly, this report gives suggestions to students and parents so that they can better understand each other, while also informing future research on possible relationships to examine.

As mobile devices make game playing more and more accessible and external moderation by authority figures more difficult, it is important to consider perceptions and beliefs of students specifically. Thus, that is why it is important that they can regard this report as a reference to mitigate the addiction of students to games and inspire teachers and parents to come up with effective methods to solve the problem or combine the games with studying in effective ways.For stimulating the harmonious relationship between youths and adults, people can observe the situation of students playing games so as to discover the ways to deal with possible addiction.

This research also generates many useful findings for providers and researchers, including preferred game types, learning and social skills influenced by games, and effects of playing. About game types, youths like playing First-Person Shooting games with violent and enthusiastic plots with the goal of relaxation, while adults are prone to play Puzzle games with information to promote their intelligence. With this information, teachers and parents can know what and why their students or children are playing, and to judge whether their participation is harmful to their mental health. Simultaneously, the game design company can devise videogames for various age groups and increase their benefits.

About learning and social skills influenced by games and effects of playing, neither parents nor children think they can be apparently or even slightly promoted by playing games. On the contrary, most believe playing videogames negatively affects their study and social lives. However, when analyzing the free responses answered by participants, it shows that the effects of playing games depend on how long people spend on them. Thus, teachers and parents should negotiate about this situation that it takes their students or children too much time to play games, and they may figure out a way to solve the problem. Rather than trying to utterly ban games, schools and parents could consider implementing controlled play periods where students can use electronic devices for short periods. Also, game design companies may consider the information from this report deeply so that they can make or invent a type of game that can decrease players' time spent on them each day, and market these more to parents wanting to compromise with their kids.

The information mentioned above can be successfully accepted to fulfill their own purposes, especially when teachers and parents decide to better supervise their children or students while they play videogames, when students want to balance their study and relaxation time, and when game design companies want to satisfy both adults' and youths' appetites.

APPENDIX

1. What is your gender?

A. Male B. Female

2. What year were you born?_____

3. Do you ever play video games?

A. Yes B. No

4. How many hours, in average, do you spend on playing games every day?

A. Less than 1 hour
B. 1 - 2 hours
C. 2 - 3 hours
D. More than 3 hours

5. What kind of video games do you prefer? (Check all that apply)

☐FPS (First-Person Shooting)
☐FTG (Fighting)
☐SPT (Sports)
☐TAB (Table)
☐MUG (Music)
☐SIM (Simulation)
☐RCG (Racing)
☐RTS (Real-Time Strategy)
☐AVG (Adventure)
☐CAG (Card)
☐MUD (Massively Multiplayer Online)
☐PUZ (Puzzle)
☐RPG (Role Playing)
☐ACT (Action)

6. What is your main purpose of using computer?

A. Doing homework
B. Playing video games
C. Searching for information
D. Chatting with the others
E. Others _____

7. What is your rank in your class?

A. Top 20%
B. 20% - 40%
C. 40% - 60%
D. 60% - 80%
E. Lower than 80%

8. Which ones do you think are necessary skills for learning? (Check all that apply)

☐Motivation
☐Confidence
☐Concentration
☐Reading comprehension
☐Professional knowledge
☐Productive practice
☐Time administration
☐Creativity

(9-11 is only for teenagers. If you are adults, you can just skip these questions.)

9. Do your parents supervise when you are playing videogames?

A. Yes B. No

10. How do your parents supervise your playing time?

A. Restrain your playing time
B. Provide limited Internet access
C. Set code on your computer
D. Don't care about that
E. Other ways____

11. What are your parents' attitudes to your game playing?

A. Positively support
B. Slightly support
C. Never mind
D. Slightly disagree
E. Negatively disagree

12. What is the influence for you on the scores after playing video games?

A. Apparent promotion
B. A little promotion
C. No change
D. A little reduction
E. Apparent reduction

13. What is the effect on your social skills after playing games?

A. Make you get more friends
B. Improve interpersonal ability
C. Be more confident to show yourselves
D. Promote team spirit
E. Others_____

14. Do you think you are affected by playing games positively or negatively and how?

15. Suppose you are a game designer, what kind of video games would you prefer to produce for students?

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