College Students and Nintendo:

Factors that Influence College Students' Engagement in Video Gaming

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I Abstract

This research aims to provide Nintendo with strategic insights to enhance video game consumption among college students. The research question is: What influences college students' video game playing?

The study paper will start by giving an overview of Nintendo and its position in the competitive video game industry, comparing it to key rivals like Microsoft's Xbox, Activision Blizzard and Sony's PlayStation. This background will help understand Nintendo's place in the market. Following this, the study will review existing literature to identify factors influencing college students' engagement of video games. Lastly, this study will measure the proposed predictors through a survey methodology.

II Introduction

The Client

Nintendo Corporation was established in Kyoto, Japan, initially focusing on the creation of video games and toys(Zhang, 2022).

This company was the pioneer in mass-producing gaming consoles and remains a leading force in the gaming industry today (Li, 2023). In 1980, Nintendo introduced the Game & Watch series, followed by the launch of the Game Boy Advance SP, , the Nintendo DS in 2004, and the Nintendo Wii in 2006 (Vrtana et al., 2019). In 2011, the Nintendo 3DS™ system was released, offering users the ability to experience and play 3D content without the need for special glasses. Later on in 2017, the Nintendo Switch™ system was introduced(Nintendo, 2024).

In 2023 Nintendo continued to captivate audiences with its top-selling titles in 2023. Leading the way is Mario Kart 8 Deluxe, with sales reaching 60.58 million units; Next is Animal Crossing: New Horizons, capturing players with its engaging gameplay, selling 44.79 million units; Super Smash Bros. Ultimate follows with 33.67 million units sold, and The Legend of Zelda: Breath of the Wild rounds out the top sellers with 31.61 million units sold (Nintendo, Dedicated Video Game Sales Units, 2023).

The Competition

Sony PlayStation

Sony's PlayStation was then launched in 1994 in Japan. Alvisi et al. (2003) noted that Sony achieved a remarkable feat by selling over 80 million PlayStation units worldwide within a span of seven years, establishing it as "the most successful digital games console ever." Subsequently, Sony achieved another milestone by selling 5,000,000 PlayStation 2 units in the

U.S. during the first year (Elkin, 2001). The PlayStation 2's significant success, attributed to its powerful graphics processor and impactful gameplay enhancements, led Sony to hold more than half of the market share in 2003, other companies sharing the remaining portion(Grantham & Readman, 2006).

Activision Blizzard

Activision Blizzard has a history spanning over 40 years, resulting from the merger of two renowned gaming brands, Activision and Blizzard Entertainment(Activision Blizzard, 2024). The Company has launched professional gaming properties such as the Overwatch League™, the Call of Duty League™, Hearthstone® Masters, and the World of Warcraft® Arena World Championship, among other notable ventures (Activision Blizzard, 2024). World of Warcraft boasts more than 11 million global players and subscribers, generating annual revenues exceeding $1 billion (Grant, 2010).

Microsoft's Xbox

Microsoft made its entry into the video game industry in 2001 with the release of the Xbox in North America, Japan, Australia, and Europe (source: Wikipedia). According to Grant (2010), Microsoft's Xbox Live gaming platform has garnered 20 million subscribers, connecting to 39 million gaming systems and an additional 10 million accounts not used for gaming.

The Industry

In the recent decades, online gaming has rapidly ascended as one of the most swiftly growing segments within the online entertainment industry (Lee & Tsai, 2010). In 2013, the revenue of the global video game industry, accounting for around one-fifth of the total global software industry revenue, increased to $93 billion from $79 billion in 2012 (Gartner, 2013).

Nolan Bushnell, renowned as the founder of Atari, is widely acknowledged as a key figure in shaping the global video game industry. Bushnell's contributions span multiple generations of gaming hardware and software. Among his notable achievements is the creation of the seminal game, Pong (Grantham & Readman, 2006).

Sega, Electronic Arts (EA), Sony's PlayStation, and Microsoft with the Xbox were key players in the evolution of the video game industry. Sega and Nintendo engaged in a duopoly during the late 1980s to mid-1990s, with Sega's introduction of the 16-bit Genesis system prompting competition from Nintendo's Super NES(Grantham & Readman, 2006). Sony's PlayStation was then launched in 1994 and Microsoft entered into the market with the Xbox in 2001.

Ⅲ Literature Review

The purpose of this literature review is to explore and identify the potential determinants influencing individuals' intentions to play or purchase video games.

3.1 Factors under Theory of Planned Behavior (TPB)

The Theory of Planned Behavior (TPB), an extension of the Theory of Reasoned Action (Fishbein and Ajzen, 1975) developed by Ajzen (1991, p.182), serves as a comprehensive framework for understanding and predicting human behavior. At the core of the TPB lies the concept that an individual's intention is the most reliable predictor of their actual behavior. The intention is determined by three key factors: attitude towards the behavior, subjective norms, and perceived behavioral control.

3.1.1 Attitudes

In the TPB, attitude, reflecting an individual's positive or negative view about a behavior, significantly influences their intention to perform that behavior (Ajzen, 1991, p.182). This concept is strongly validated in online gaming, where attitudes significantly influences the intention to play, evidenced by a path coefficient of 0.99 ($P<0.001$) (Hsu & Lu, 2004). Moreover, several studies (Lee, 2009; Kaburuan et al., 2011; Park et al., 2014; Alzahrani et al., 2017) have illustrated that individuals who have favorable attitudes towards online gaming are inclined to exhibit a heightened interest in participating in such activities.

3.1.2 Subjective Norms

Subjective norm is the perception of social pressure from important others to perform or avoid a behavior, influencing an individual's drive to adhere to these expectations (Ajzen & Fishbein, 1980). Previous studies (Hsu & Lu, 2004; Lee & Tsai, 2010, p.603) conclude that

seeing or learning about close individuals who have positive experiences with online games motivates others to join in and play these games themselves.

3.1.3 Perceived Behavioral Control

Perceived behavioral control involves individuals' subjective assessments of their capability to carry out a behavior (Ajzen, 1991). This concept plays a critical role($\beta = 0.29$, $p < 0.001$) in shaping players' attitudes towards gaming(Lee & Tsai, 2010, p.603). Additionally, it positively influences actual game usage, demonstrated by a beta value of 0.235 and a p-value less than 0.01 (Alzahrani et al., 2017).

3.2 Flow Experience

Flow experience, defined by Csikszentmihalyi (1977) as a state of total involvement, significantly affects online gaming intentions. When people achieve a state of flow, they become so absorbed in their activity that they lose awareness of any changes in their surroundings (Csikszentmihalyi and LeFevre, 1989). Focusing specifically on the domain of video games, previous research has established a clear association between the phenomenon of flow and gaming intention. For instance, Choi and Kim (2004) have shown that achieving a state of flow while engaging in online video games significantly boosts a player's loyalty to those games. Similarly, Lee (2009) and Lee and Tsai (2010, p.604) confirmed that flow experience is a significant indicator of attitude toward game playing. Building on this foundation, Alzahrani et al. (2017) further argue that the flow experience not only enhances attitudes towards online gaming but also actively increases engagement in playing these games, aligning with the findings of earlier studies.

3.3 Interaction

Interaction happens when two or more entities engage in communication and influence each other (Laurel, 1993). Within video games, interaction can manifest as a player employing defensive strategies to safeguard themselves, especially during online confrontations (Lee & Tsai, 2010). Lewinski (2000) highlights that interaction plays a crucial role in enhancing the gaming experience in computer games, a sentiment echoed by Choi and Kim (2004), who note its significant effect on the popularity of online games. Acknowledging the intricate interaction patterns in online games as outlined by Ducheneaut and Moore (2004), this paper narrows its focus to two primary dimensions: human-computer interaction and social interaction. This approach is informed by prior research, including studies by Lee & Tsai (2010) and Alzahrani et al. (2017), which have emphasized the critical role these types of interactions play in analysis, thereby highlighting their importance.

Human-computer interaction

Sheppard and Rouff (1994) described the interaction with the human-computer interface as the point of interaction where the end user and the application (including systems, apps, and games) engage in communication, allowing for a mutual exchange between the computer and the user. Alzahrani et al. (2017) and Lee & Tsai (2010) both suggest that there is a positive correlation between human-computer interaction and the flow experience encountered in online games.

Social Interaction

Crawford (1997), Kerlinger (1973), and Richard (2001) have identified that one of the primary motivations for users playing video games is to engage in a social experience with friends or family. Players establish social bonds with their in-game virtual personas (Liu and

Chang, 2016). Additionally, Koivisto and Hamari (2014) note that social games enhance an individual's network visibility, foster a sense of playfulness, and boost recognition within the gaming community. Furthermore, the introduction of another computer or player into the game elevates the level of competition, thereby intensifying social competition, as observed by Alzahrani et al. (2017).

After an extensive examination of the scholarly work, the Theory of Planned Behavior (TPB) is set to be amalgamated into a consolidated framework, augmented by the notions of flow experience and interaction. Thus, we formulated the following hypotheses:

H1: Attitude is positively related to the behavioral intention of playing video games.

H2: Perceived behavioral control is positively related to the behavioral intention of playing video games.

H3: The subjective norm is positively related to the behavioral intention of playing video games.

H4: Flow experience in gaming is positively related to the behavioral intention of playing video games.

H5: Human-computer interaction positively influences the flow experience in video gaming.

H6: Social Interaction positively influences the flow experience in video gaming.

Ⅳ **Method**

Study Overview

The primary aim of this research was to provide Nintendo with strategic insights to enhance video game consumption among college students in China. The study investigated the factors influencing college students' engagement with and purchases of video games, using a literature review to identify relevant variables. The online survey method was utilized because of its efficiency in reaching a large number of respondents within the target demographic and its effectiveness in collecting a diverse range of data quickly and cost-effectively.

Sampling procedure

Data was collected using an online survey, initially composed in English and subsequently translated into Chinese. The survey was developed using the Qualtrics platform. To distribute the survey effectively, QR codes were generated and shared. The survey was approximately 10 minutes long. It started with general questions about video game playing, and ended with questions about individual behaviors and demographic details.

The population targeted by the survey consisted of active video game players within the age range of 15-35 years in China, focusing on those who are currently enrolled in college or university. This demographic was selected as it represents a significant portion of the gaming market and is likely to provide insights into current and emerging gaming trends. The sampling strategy employed was convenience sampling. Participants were recruited through a strategic outreach on online platforms that are frequented by video gamers. This included gaming forums, social media groups dedicated to gaming, and other gaming community networks.

The study initially aimed to collect responses from 100 participants. However, to account for potential incomplete surveys and dropout rates, an over-sampling strategy was implemented.

This led to the collection of 127 responses, out of which 123 were valid and used in the final analysis. The discrepancy in the expected versus actual valid responses was mainly due to incomplete survey submissions and outlier responses related to the time spent on completing the survey.

Measures

Each of the 6 independent variables in the survey was measured using a 5-point Likert scale, ranging from Strongly Disagree (1) to Strongly Agree (5). The reliability of the scale was assessed using Cronbach's Alpha. The type of scale used, its source, the reliability of the variable, and sample items are listed below.

1. **Flow Experience**

Definition: the holistic sensation that people feel when they play video games with total involvement (Csikszentmihalyi, 1977 p. 39).

Cronbach's alpha: 0.67

Previous Study	After Adjustment	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I feel time passes quickly while playing X on this website (Lee & Tsai, 2010).	I feel time passes quickly while playing video games.					
I felt curious while playing X on this website (Lee & Tsai, 2010).	I am deeply engaged and eager to explore every aspect of the video game.					
While playing X on this website, I was entirely absorbed (Lee & Tsai, 2010).	While playing video games, I become unaware of my physical surroundings.					

2. **Interaction**

Construct: Human-Computer Interaction

Definition:the junction of contact between the application (system, apps, and games) and the end user, which enables the user and the computer to communicate with each other (Alzahrani et al., 2017).

Cronbach's alpha:0.71

Previous Study	After Adjustment	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
X on the website gives me of necessary information how to play, such as media controls, basic controls, media selection and online help (Lee & Tsai, 2010).	Video games give me the instructions I need for managing sounds.					
	Video games include accessible online help when I need it.					
The instructions in X on the website can be read comfortably (Lee & Tsai, 2010).	The instructions within video games are easy to read and understand.					
The instructions in X on the website advise me properly in each situation (Lee & Tsai, 2010).	The instructions in video games guide me appropriately in each situation.					

3. Interaction

Construct: Social Interaction

Definition: a process in which people communicate and work or play together in society (Chen & Lin, 2018).

Cronbach's alpha:0.75

Previous Study	After Adjustment	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Playing X game on this website enables me to make friends (Lee & Tsai, 2010).	Playing video games allows me to make friends.					
I enjoy meeting the friends I make while playing X on this website (Lee & Tsai, 2010).	I enjoy meeting the friends I make while playing video games.					
Communicating with others makes X on this website more enjoyable (Lee & Tsai, 2010).	Communicating with others makes playing video games more enjoyable.					

Communicating with others is useful for playing online games (Lee, 2009).	Communicating with others is useful for playing video games.					

4. Perceived Behavioral Control

Definition:an individual's feelings about the ability to play video games (Alzahrani et al., 2017).

Cronbach's alpha:0.75

Previous Study	After Adjustment	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Playing online games was entirely within my control (Lee, 2009).	I can do what I want when I play video games.					
I have the knowledge to play X on this website (Lee & Tsai, 2010).	I have the knowledge to play video games.					
I have the resources to play X on this website (Lee & Tsai, 2010).	I have the resources to play video games.					

5. Attitude

Construct: Attitude toward Playing Video Games

Definition:the perceived degree of positive and negative feelings about playing video games(Ajzen, 1991).

Cronbach's alpha:0.87

Previous Study	After Adjustment	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I feel good about playing an on-line game (Hsu & Lu, 2004).	I feel good about playing video games.					
I like playing an on-line game (Hsu & Lu, 2004).	I like playing video games.					
I think playing X on this website is good for me (Lee & Tsai, 2010).	I think playing video games is good for me.					
I have a positive opinion of playing X on this website (Lee & Tsai, 2010).	I have a positive opinion of playing video games.					

6. Subjective Norm

Construct: Family Attitude toward Video Games.

Definition: the perception of social pressure from family to perform or avoid playing video games, influencing an individual's drive to adhere to these expectations (Ajzen & Fishbein, 1980).

Cronbach's alpha:0.85

Previous Study	After Adjustment	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
My friends think that I should play an on-line game (Hsu & Lu, 2004).	My family thinks that I should play an on-line game.					
People important to me supported my playing online games on this website (Lee & Tsai, 2010).	My family supports me playing video games.					
People who influence my behavior wanted me to play online games on this website instead of any alternative activities (Lee & Tsai, 2010).	My family prefers I play video games instead of engaging in alternative activities.					
Most people who are important to me would think that playing online games on this website is a wise idea (Lee & Tsai, 2010).	Most of my family members think that playing video games is a wise idea.					

V Results

Sample Profile

Participants were predominantly female (59.3%, n = 73), with males making up 34.1% (n = 42) of the sample, and smaller percentages identifying as non-binary/third gender (1.6%, n = 2) or preferring not to say (4.9%, n = 6). The average age of participants was 23 years (SD = 3.637). The majority of participants were enrolled in a Master's program (57.7%, n = 71), followed by juniors (15.4%, n = 19), seniors (14.6%, n = 18), freshmen (8.9%, n = 11), PhD students (2.4%, n = 3), and sophomores (0.8%, n = 1).

Preliminary Analysis

Descriptive analysis as presented in Table 1 showed that respondents on average reported a high level of their Perceived Behavioral Control (M = 3.80, SD = 0.74) and their Attitude (M = 3.76, SD = 0.76). Respondents also reported on an average medium level of the effect of Social Interaction (M = 3.64, SD = 0.74) and Human-Computer Interaction (M = 3.62, SD = 0.67). Respondents also reported on average a slightly low level of their perceptions of Flow Experience (M = 3.50, SD = 0.80) and Social Influence (M = 2.48, SD = 0.87).

A series of ANOVA analyses examined the effects of demographic variables on the focal variables in the preliminary analysis. The analysis revealed no statistically significant difference in behavioral intention of playing video games among the four gender groups ($F(3, 119) = 2.167$, $p > .05$). The results also indicated that there was no statistically significant effect of education level on behavioral intention of playing video games ($F(5, 117) = 1.121$, $p > .05$).

A series of correlation analyses on the correlation among different variables to test the significance of correlations between all the focal variables in this study. The analysis in Table 2 showed a range of correlations among the variables. The strongest correlation was observed

between Attitude and Perceived Behavioral Control, which was significant and very strong, r (123) = .715, $p < .001$. This was closely followed by the correlation between Human-Computer Interaction and Social Interaction, also significant and strong, r (123) = .621, $p < .001$. A moderate and significant correlation was found between Flow Experience and Human-Computer Interaction, r (123) = .581, $p < .001$. Likewise, Attitude and Subjective Norms showed a significant, moderate correlation, r (123) = .562, $p < .001$. At the lower end of the spectrum, the positive correlation between Flow and Subjective Norms was significant but weak, r (123) = .246, $p = .006$, suggesting a less pronounced relationship.

Regression analysis

H1 to H4 sought to understand if various factors positively impact one's intention to play video games, a multiple regression analysis was conducted (Table 3). Specifically, we regressed the behavioral intention of playing video games on four proposed predictors: Subjective Norm, Flow Experience, Perceived Behavioral Control, and Attitude. The ANOVA results indicated that, combined, these predictors explained 34.9% of the variance in the behavioral intention to play video games ($F(4, 118) = 15.798$, $p < .001$).

To assess the impact of Human-Computer Interaction (HCI) and Social Interaction (SI) on the flow experience in video gaming, we conducted a multiple regression analysis (Table 4). The regression was executed with flow experience as the dependent variable, regressed on the two predictors, HCI and SI. The results of the ANOVA demonstrated that combined, the two predictors explained 36.8% of the variance in flow experience, $F(2, 120) = 34.871$, $p < .001$, indicating a significant model.

H1: Attitude is positively related to the behavioral intention of playing video games. According to the result, Attitude (b = .521, t(118) = 3.048, p = .003) was a significant and positive predictor of the behavioral intention to play video games. Thus, H1 was supported.

H2: Perceived behavioral control is positively related to the behavioral intention of playing video games. The result supported H2. Perceived Behavioral Control (b = .155, t(118) = .938, p = .350) did not significantly predict the behavioral intention.

H3: The subjective norm is positively related to the behavioral intention of playing video games. H3 was not supported by the results. Subjective Norm also showed a significant positive effect (b = .270, t(118) = 2.484, p = .014).

H4: Flow experience in gaming is positively related to the behavioral intention of playing video games. Flow Experience (b = .043, t(118) = .342, p = .733) did not significantly predict the behavioral intention. Thus, H4 was not supported by the result.

H5: Human-computer interaction positively influences the flow experience in video gaming. Human-Computer Interaction showed a significant and strong positive influence on flow experience (b = .525, t(120) = 4.771, p < .001), thus supporting H5.

H6: Social Interaction positively influences the flow experience in video gaming. Social Interaction also positively influenced flow experience, though to a lesser extent (b = .240, t(120) = 2.407, p = .018), providing support for H6.

VII Discussion

The investigation into the factors influencing college students' engagement with video games provided notable insights that advance our understanding of behavioral intentions within the gaming context. Predominantly, the research reiterates and expands upon foundational models like the Theory of Planned Behavior (TPB) and integrates flow experience and interaction.

Consistent with previous research, Hypotheses H1 (Attitude) and H3 (Subjective Norm) were supported, reaffirming the robust influence of favorable attitudes and the perceived social pressure from significant others as pivotal factors in fostering a higher intention to play video games (Lee & Tsai, 2010). This alignment with the Theory of Planned Behavior underscores the prevailing importance of psychological and social dimensions in predicting behavioral intentions within diverse contexts, including gaming. However, the study presents a departure from conventional expectations regarding Hypotheses two (Perceived Behavioral Control) and Hypotheses four (Flow Experience). Contrary to what has been previously reported in the literature, where perceived behavioral control and flow are seen as significant contributors to engaging in specific behaviors (Alzahrani et al., 2017), these factors did not significantly predict gaming intentions in the current sample. These findings prompt a modification of the traditional models in the context of gaming, suggesting that factors influencing gaming behavior may vary significantly with demographic and cultural contexts, particularly among college students who may prioritize social interaction or experience gaming differently due to academic and personal life balances.

The current findings extend the understanding of how human-computer interaction (HCI) and social interaction (SI) contribute to the flow experience in gaming. While previous research

has hinted at the importance of these interactions (Choi & Kim, 2004; Lee & Tsai, 2010), this study quantitatively confirms their significant positive impacts.

Given the insights derived from the study and the unique findings regarding the influences on gaming intentions, several recommendations can be formulated for game developers like Nintendo:

Influencer Collaborations to Shape Attitudes: Collaborating with influencers who are viewed positively by college students can effectively enhance attitudes towards gaming. By prominently featuring these influencers in gaming activities and promotions, students are more likely to perceive gaming as a positive and desirable activity. This strategy taps into the aspirational aspects of influencer marketing, leveraging the trust and admiration that students have for these personalities to foster a more positive view of gaming.

Promoting Family-Inclusive Gaming for Subjective Norms: Launching games that encourage family participation can significantly influence subjective norms surrounding gaming. When games are designed to be family-friendly, allowing for multiple participants across different age groups, they naturally encourage collective engagement. Such initiatives can help shift the perception of gaming from being a solitary activity to being a valuable family bonding activity. This not only boosts engagement among students but also fosters a positive gaming culture at home, making gaming a shared interest rather than a point of contention.

The current study provides valuable insights into the factors that influence college students' engagement with video games, yet several limitations are apparent and should be addressed in future research. First, the exploration of subjective norms was confined primarily to family influences, neglecting the potential impact of peers, educators, and broader societal influences that might also play significant roles. Additionally, the study's small sample size and

its concentration on students predominantly from Beijing may limit the generalizability of the findings to other regions or demographic groups. This geographical limitation calls for a more diverse sampling strategy to capture a wider array of cultural and educational contexts. Moreover, the absence of attention checks and the reliance solely on self-reported measures could introduce response biases, affecting the validity of the data. Incorporating methods to verify the attention of respondents and triangulating self-reported data with behavioral or observational measures could enhance the reliability of future studies. Addressing these limitations would provide a more comprehensive understanding of the dynamics at play and bolster the applicability of the findings across varied contexts.

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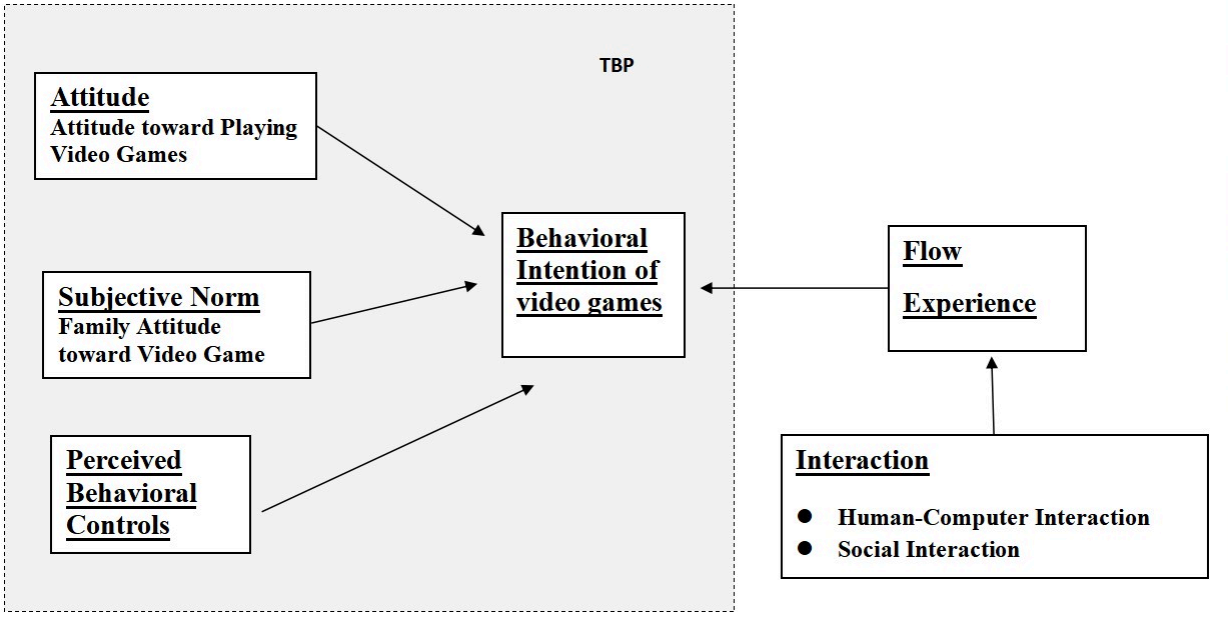
Appendix

Appendix A: Visual Model: Proposed Model for this Research



Appendix B: Participate Demographics

Table 1

Participate Demographics

Profiles	Frequency	Valid % of Sample
Gender		
Female	73	59.30%
Male	42	34.10%
Non-binary/third gender	2	1.60%
Prefer not to say	6	4.90%
Academic Level		
Freshman	11	8.90%
Sophomore	1	0.80%
Junior	19	15.40%
Senior	18	14.60%
Master’s program	71	57.70%
PhD	3	2.40%

Appendix C: Descriptive Statistics of Independent Variables
(Means, Standard Deviation, and Correlation)

Table 2

Variable	Mean	SD	N	1	2	3	4	5	6
1.Flow Experience	3.4986	0.79659	123	1					
2.Human-Computer Interaction	3.624	0.67019	123	.581**	1				
3.Social Interaction	3.6423	0.73974	123	.498**	.621**	1			
4.Perceived Behavioral Control	3.7995	0.73767	123	.550**	.501**	.501**	1		
5.Attitude	3.7561	0.76116	123	.537**	.491**	.341**	.715**	1	
6.Subjective Norm	2.4817	0.86553	123	.246*	.313**	.365**	.341**	.492**	1

** Correlation is significant at $p < .01$ (2-tailed).

Appendix D: The Result of the Multiple Regression Analysis

Table 3

	B	***SE B***	***β***	***t***	***p***
Model2				$F(4, 118) = 15.798$, $p < .001$	$R^2 = .349$
Flow Experience	.043	.127	.031	-.342	.733
Perceived Behavioral Control	.155	.165	.104	.938	.350
Attitude	.521	.171	.360	3.048	.003
Subjective Norm	.270	.109	.212	2.484	.014

Table 4

	B	***SE B***	***β***	***t***	***p***
Model 2				$F(2, 120) = 34.871$, $p < .001$	$R^2 = .368$
Human-Computer Interaction	.525	.110	.442	4.771	<.001
Social Interaction	.240	.100	.223	2.407	.018