

Factors Affecting the Purchasing Behaviors of Virtual Commodities for Otome Game Players: Case of Light and Night

Xiangfei Wang^a, Nutteera Phakdeephrot^{b, *}

Rattanakosin International College of Creative Entrepreneurship, Rajamangala University of Technology Rattanakosin, Nakhon Pathom, 73170, Thailand

^awang.xiangfei@outlook.rmutr.ac.th, ^bnutteera.pha@rmutr.ac.th

Abstract: The objectives of this research were (1) To examine the impact of game story, character set, dubbing music, and art style on player satisfaction in the otome game “Light and Night”. (2) To examine the impact of the game story, character set, dubbing music, and art style on player flow experience. (3) To examine the relationship between player satisfaction and the flow experience, and their impact on in-game purchase intentions. Major Findings/Results: (1) In terms of the impact of game story, character set, dubbing music, and art style on player satisfaction, the results of the research show that all of these elements significantly increase player satisfaction with the game, thus indicating a direct correlation between game design elements and overall player satisfaction. (2) In terms of the impact of game story, character set, dubbing music, and art style on players' immersive experience, it was found that, in particular, the quality of character setting and dubbing music can significantly improve players' immersive experience and enhance their emotional and flow experience of the game. (3) Regarding the relationship between player satisfaction and flow experience and its impact on purchase intentions, the research shows that higher satisfaction and immersive experiences significantly increase the likelihood of players purchasing virtual goods, highlighting a positive feedback loop between these variables and purchase behavior.

Keywords: Otome game, Consumer purchase behavior, SOR theory, Flow experience, Satisfaction, Market strategies.

1. Introduction

With the rapid development of the mobile Internet and the popularization of smartphones, the Internet continues to penetrate all aspects of people's lives, work, entertainment, and so on, changing the traditional mode of interpersonal communication, as shown in the 53rd CNNIC Statistical Report on the Development of the Internet in China, Role-playing games occupy an important position in the field of video games due to their unique narrative depth, diverse aesthetic presentation and fine character construction. Children grow up playing different roles in play with their friends, and humans explore emotions and self through imitation and play in artistic activities such as music, literature, theater, and film. The earliest role-playing game in the form of a game was the tabletop role-playing game (TRPG), which gradually evolved into the present-day electronic role-playing game after intelligent computers were used as a gaming platform. (Sun Qishun, 2009) Role-playing games emphasize the characteristics of the characters and the content of the game's plot so that players feel that the characters in the game are played by themselves. (Hu, 2008) Against this background, Otome games, a genre developed specifically for female game consumers, have gradually become an important area of the game market and academic research. By deeply studying gamers' consumption behavior in Otome games, this study will help fill the current research gap of gamers' consumption factors in Otome games and provide new theoretical perspectives and empirical research bases for future generations. By digging deeper into the relationship between player satisfaction, heart flow experience, and consumer purchase intention, the research results are expected to provide game developers and

marketing practitioners with suggestions for practical marketing strategies and game design.

2. Literature Review

Since there are some differences in the definition of willingness to pay by different scholars, this paper will follow Dodds' definition of purchase intention: the likelihood that a consumer will purchase a product. (Doods & Krause, 1991) Ajzen (1980) considers willingness as the subjective likelihood that an individual or group will engage in a particular behavior. Based on this willingness to consume is considered an important indicator of consumer behavior, i.e. the probability that a consumer will consume a particular good. (Ajzen, 1980) Xu Mengxiao (2011) pointed out that the basis and prerequisite of consumption behavior is the willingness to consume, and thus divided the consumption behavior into five stages: knowledge, emotion, intention, behavior, and evaluation, i.e., perception of the goods, consumption emotion, consumption willingness, purchasing behavior, and evaluation after purchase. (Xu Mengxiao, 2011). Tian Xiaoxia's (2014) research points out that consumption willingness is an important indicator for predicting consumers to carry out consumption behavior, and it is also the basic prerequisite for consumers to carry out consumption behavior. (Tian Xiaoxia, 2014) Malone (1981) was the first to propose the theory of intrinsic motivation, attributing challenge, fantasy, and curiosity as the main components of potential motivation for play. (Malone, 1981) the concept of satisfaction was first introduced by Cardozo, whose case study examined the relationship between users' satisfaction with a product and their willingness to make repeat purchases. (Cardozo, 1965) Cardozo's explanation of satisfaction and its impact on repeat purchases was widely recognized by

academics. In subsequent studies on repeat purchases or continued use, scholars generally regard satisfaction as an important influencing factor. Li Bin (2016) argued that satisfaction can be defined as the relative relationship between users' expectations before using a product and their actual feelings after using it. When users' actual feelings after

using the product exceed their expectations, their satisfaction will be higher. The SOR (Stimulus-Individual Physiological, Psychological-Response) theory originated in environmental psychology, where Skinner (1935) proposed the correlation between environment and behavior through the study of stimulus and response (S-R). (Skinner, 1935)

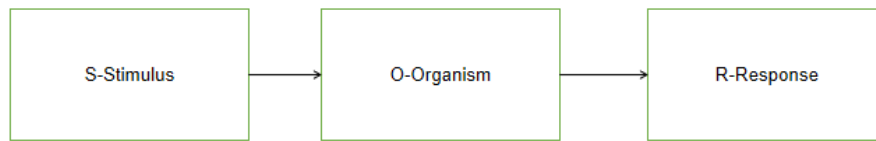


Figure 2-1. Theoretical model of SOR

Chia-Lin et al. (2012) explored and analyzed that information quality, system quality, and service quality stimulate consumers' professionalism and indulgence, and have an impact on consumers' satisfaction and purchase intention. (Chia-Lin et al., 2012)

According to the grounded theory hypothesis of the SOR theoretical model

H1: Game story setting is positively correlated with player satisfaction.

H2: Character setting is positively correlated with player satisfaction.

H3: Dubbing music is positively correlated with player satisfaction.

H4: Art Style is positively correlated with player satisfaction.

H5: Game story setting is positively correlated with player flow experience.

H6: Character setting is positively correlated with player flow experience.

H7: Dubbing music is positively correlated with player flow experience.

H8: Art Style is positively correlated with player flow experience.

H9: Player satisfaction is positively correlated with player purchase intentions.

H10: Player flow experience is positively correlated with player purchase intentions.

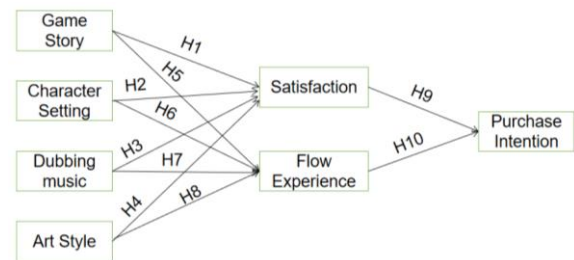


Figure 2-2. Research Hypothesis Model Diagram

2.1. Literature Research Method

This study uses computer software to analyze, descriptive statistics, reliability, validity, exploratory factor analysis, confirmatory factor analysis, and structural equation modeling.

2.2. Population and Sample Size

For the sample size, the margin of error was set to decimal ($e=0.05$), and the number of Light and Night's official microblogging followers was selected to be 2,618,000 followers, according to the sampling formula for the sample size of simple random sampling (Yamane, 1973):

3. The Results

3.1. Basic Information

Table 3-1. Statistical data of population in this research

Frequency analyzer				
Question	options	frequency	percentage	Cumulative percentage
1. Gender	Male	6	1.496%	1.496%
	Female	395	98.504%	100.000%
2. Age groups:	18-22 years old	15	3.741%	3.741%
	23-26 years old	178	44.389%	48.130%
	27-30 years old	112	27.930%	100.000%
	Above 30 years old	96	23.940%	72.070%
3. Monthly income	1000CNY and below	15	3.741%	3.741%
	1001 CNY-2500CNY	29	7.232%	10.973%
	2501 CNY-4000 CNY	146	36.409%	47.382%
	4001 CNY-8000 CNY	101	25.187%	72.569%
	8001CNY and above	110	27.431%	100.000%
4. Gaming Frequency	Less than or equal to 1 day a week	76	18.953%	18.953%
	2 days a week	104	25.935%	44.888%
	3 days a week	86	21.446%	66.334%
	4 days a week	76	18.953%	85.287%
	Greater than or equal to 5 days a week	59	14.713%	100.000%
5. Amount of in-game spending	1001 CNY - 5000 CNY	95	3.990%	92.768%
	5001 CNY-10000 CNY	170	33.916%	77.057%
	10001 CNY-20000 CNY	107	26.683%	37.656%
	20001CNY and above	29	7.232%	100.000%

Table 3-2. Descriptive statistics of indicators/items.

Descriptive statistics					
variable	sample volume	minimum value	maximum values	standard deviation	average value
A1. Otome games have a complete and clearly explained game story background.	401	1	5	1.188	3.805
A2. Otome games have a main storyline and a rich variety of sub-stories.	401	1	5	1.167	3.853
A3. otome games have a coherent main storyline.	401	1	5	1.142	3.840
B1. otome game has several male characters that can be cheated according to the player's preference.	401	1	5	1.132	3.853
B2. otome game has several male characters with distinctive personalities.	401	1	5	1.158	3.721
B3. Otome game has a variety of card faces for players to choose from.	401	1	5	1.124	3.813
C1. I feel comfortable with the character voices in otome games.	401	1	5	1.167	3.805
C2. The character voices in otome games fit the game story and the characters.	401	1	5	1.186	3.743
C3. I feel comfortable with the music and sound effects in otome games.	401	1	5	1.126	3.903
D1. The art style in the otome game is in line with the story background.	401	1	5	1.212	3.818
D2. The character modeling design of the otome game is in line with the story background.	401	1	5	1.227	3.713
D3. The overall visual effect of the otome game is in line with the story background.	401	1	5	1.147	3.823
E1. I am very satisfied with the otome game.	401	1	5	1.225	3.781
E2. I am very happy after playing an otome game	401	1	5	1.186	3.843
E3. After playing otome games I feel like otome games.	401	1	5	1.137	3.788
FF1. I really enjoy and immerse myself in the interaction with male characters in otome games.	401	1	5	1.145	3.808
FF2. When I play Otome game, I have a high level of mental concentration.	401	1	5	1.134	3.815
FF3. I feel back to the real world when I exit the Otome game story.	401	1	5	1.144	3.646
G1. I enjoy using Otome games and buying virtual goods from Otome games.	401	1	5	1.171	3.733
G2. I will continue to use Otome games and buy virtual goods in Otome games in the future.	401	1	5	1.183	3.776
G3. I will use Otome games as a common pastime.	401	1	5	1.178	3.813
Game Story	401	1	5	1.03	3.833
Character setting	401	1	5	1.001	3.796
Dubbing music	401	1	5	1.013	3.817
Art Style	401	1	5	1.047	3.785
Satisfaction	401	1	5	1.03	3.804
Flow Experience	401	1	5	0.979	3.756
Purchase intentions	401	1	5	1.027	3.774

From Table 3-1, it can be seen that 98.5% of the respondents are female players, 96.259% of the respondents are adults over 18 years old and 89.03% of the respondents have a monthly income of more than 2,500 CNY, which reflects the independence and independent spending power of the player group. d high-level consumer groups have a high level of performance in game profitability.

3.2. Reliability Analysis

Table 3-3. Reliability analysis variables

Cronbach Reliability analysis				0.921
Dimension	items	Sample Volume	Cronbach α	
Game story	3	401	0.860	
Character setting	3	401	0.853	
Dubbing music	3	401	0.844	
Art Style	3	401	0.848	
Satisfaction	3	401	0.840	
Flow Experience	3	401	0.821	
Purchase intentions	3	401	0.842	

As can be seen in Table 3-3, the Cronbach's alpha value for each dimensional variable is greater than 0.8, which indicates that the reliability of the scale is good, suggesting that the questionnaire data has a high degree of reliability and trustworthiness. Therefore, we can proceed to the next step of analysis.

3.3. Exploratory Factor Analysis

Table 3-4. KMO and Bartlett's Test

KMO and Bartlett's Test		
Bartlett Sphericity Test	KMO	0.904
	chi-square distribution	4454.466
	df	210
	P	0.000

The validity was verified using KMO and Bartlett's test, as can be seen from the table above: the KMO test value of the survey data is 0.904, which is greater than 0.7, indicating that the questionnaire is suitable for factor analysis.

Table 3-5. Table of the factor load coefficient after rotation

Table of the factor load coefficient after rotation							
Question item (The following otome games all refer to Light and Night)	Factor load coefficient						
	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7
A1. Otome games have a complete and clearly explained game story background.	0.071	0.85	0.112	0.105	0.185	0.103	0.176
A2. Otome games have a main storyline and a rich variety of sub-stories.	0.12	0.805	0.172	0.103	0.082	0.191	0.197
A3. Otome games have a coherent main storyline.	0.124	0.797	0.165	0.138	0.117	0.173	0.091
B1. Otome game has several male characters that can be cheated according to the player's preference.	0.758	0.137	0.047	0.177	0.188	0.214	0.178
B2. Otome game has several male characters with distinctive personalities.	0.829	0.047	0.181	0.155	0.096	0.12	0.182
B3. Otome game has a variety of card faces for players to choose from.	0.84	0.138	0.167	0.093	0.139	0.106	0.125
C1. I feel comfortable with the character voices in otome games.	0.168	0.169	0.161	0.148	0.153	0.775	0.164
C2. The character voices in otome games fit the game story and the characters.	0.142	0.191	0.163	0.124	0.146	0.787	0.141
C3. I feel comfortable with the music and sound effects in otome games.	0.128	0.124	0.118	0.148	0.173	0.806	0.166
D1. The art style in the otome game is in line with the story background.	0.136	0.163	0.095	0.104	0.815	0.136	0.137
D2. The character modeling design of the Otome game is in line with the story background.	0.15	0.151	0.192	0.21	0.781	0.159	0.149
D3. The overall visual effect of the otome game is in line with the story background.	0.129	0.08	0.175	0.08	0.815	0.165	0.131
E1. I am very satisfied with the Otome game.	0.116	0.203	0.119	0.178	0.176	0.108	0.801
E2. I am very happy after playing an otome game	0.175	0.152	0.1	0.151	0.136	0.176	0.773
E3. After playing otome games I feel like Otome games.	0.204	0.124	0.105	0.177	0.119	0.189	0.781
FF1. I really enjoy and immerse myself in the interaction with male characters in otome games.	0.174	0.112	0.771	0.174	0.177	0.183	0.09
FF2. When I play Otome game, I have a high level of mental concentration.	0.068	0.173	0.808	0.153	0.105	0.09	0.136
FF3. I feel back to the real world when I exit the otome game story.	0.153	0.151	0.792	0.092	0.162	0.149	0.08
G1. I enjoy using Otome games and buying virtual goods from Otome games.	0.109	0.124	0.131	0.774	0.078	0.145	0.298
G2. I will continue to use Otome games and buy virtual goods in Otome games in the future.	0.113	0.112	0.112	0.816	0.159	0.163	0.14
G3. I will use Otome games as a common pastime.	0.199	0.119	0.191	0.808	0.139	0.105	0.089

Note: Blue indicates that the absolute value of the load factor is greater than 0.5

3.4. Confirmatory Factor Analysis

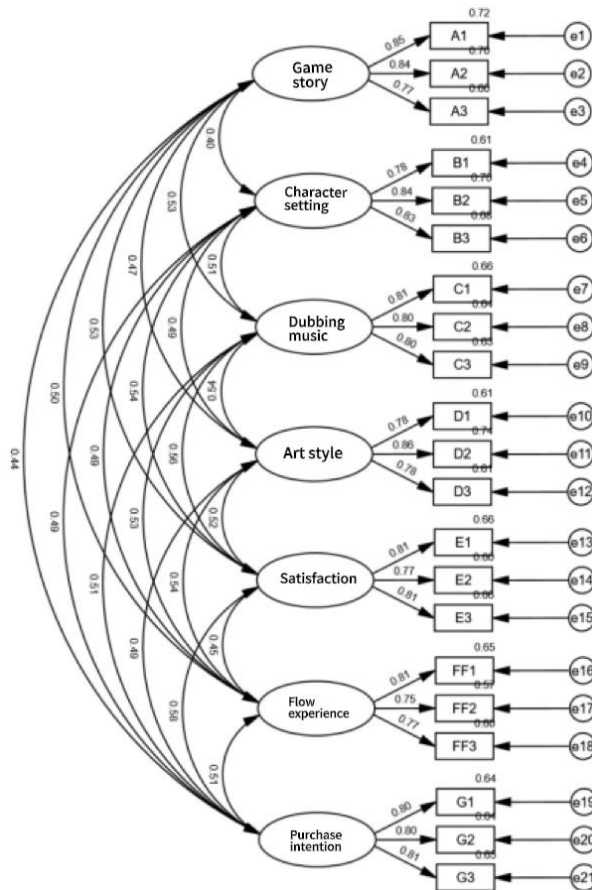


Figure 3-1. An exploratory factor path diagram

The chi-square degrees of freedom ratio χ^2/df value of this model is 1.165 less than 3, which results in an ideal fit; the values of the GFI, IFI, TLI, and CFI indexes are all greater

than 0.90, respectively; and the RMSEA index is 0.020, which is less than 0.08, which indicates that the model fit is better.

Table 3-6. Confirmatory factor fitting index

Commonly used indicators	χ^2/df	RMSEA	GFI	IFI	TLI	CFI
Criterion for judgment	<3	<0.08	>0.9	>0.9	>0.9	>0.9
Numerical value	1.165	0.020	0.957	0.994	0.992	0.994

Table 3-7. Gathering efficiency

Subjective variables	Item	Non-standardized factor loading	CR	AVE
Game Story	A1	0.851	0.861	0.674
	A2	0.836		
	A3	0.773		
Character setting	B1	0.778	0.855	0.663
	B2	0.836		
	B3	0.827		
Dubbing music	C1	0.810	0.844	0.644
	C2	0.800		
	C3	0.797		
Art Style	D1	0.778	0.848	0.651
	D2	0.858		
	D3	0.781		
Satisfaction	EE1	0.813	0.841	0.638
	EE2	0.773		
	EE3	0.809		
Flow Experience	FF1	0.806	0.821	0.605
	FF2	0.754		
	FF3	0.772		
Purchase intentions	G1	0.798	0.842	0.641
	G2	0.798		
	G3	0.805		

As can be seen from the 3-7 aggregation validity table, the standardized path coefficients of each question item on the

factor to which it belongs are all above 0.7.

Table 3-8. Discrimination validity

	Game story	Character setting	Dubbing music	Art Style	Satisfaction	Flow Experience	Purchase intentions
Game story	0.821						
Character setting	0.399	0.814					
Dubbing music	0.529	0.510	0.802				
Art Style	0.469	0.487	0.544	0.807			
Satisfaction	0.532	0.543	0.559	0.515	0.799		
Flow Experience	0.498	0.488	0.529	0.537	0.446	0.778	
Purchase intentions	0.436	0.494	0.512	0.490	0.577	0.512	0.800

From the discriminant validity table, it can be seen that the absolute value of the correlation coefficient between any two factors is less than the square root of the AVE of the corresponding factor, i.e., there is a certain degree of

differentiation between the factors, i.e., it shows that the discriminant validity of the scale is reliable.

3.5. Structural Equation Model Analysis

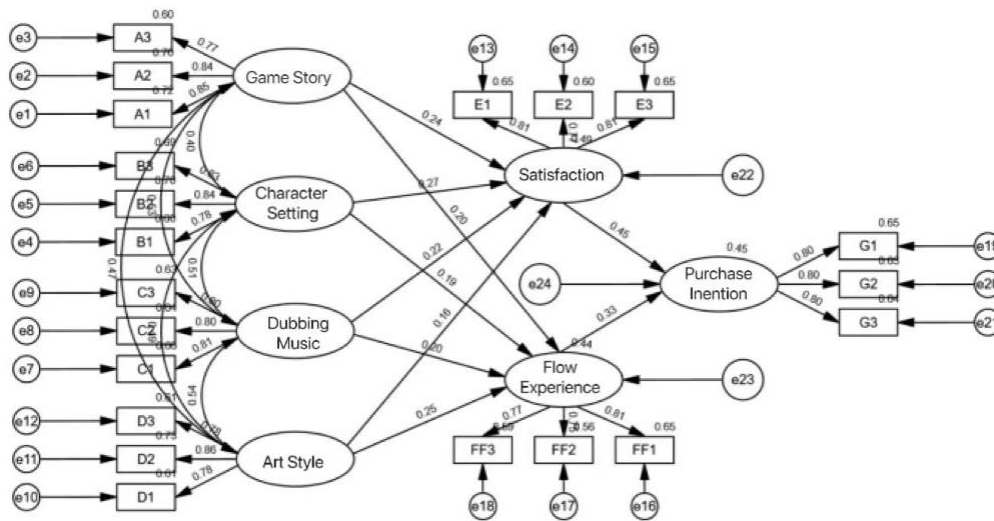


Figure 3-2. The AMOS pathway diagram

Table 3-9. Structural equation model fitting index

Commonly used indicators	χ^2/df	RMSEA	GFI	IFI	TLI	CFI	
Criterion for judgement	<3	<0.08	>0.9	>0.9	>0.9	>0.9	
Numerical value	1.203	0.023	0.954	0.992	0.990	0.992	
NO.	Path	Off-standard path coefficient	Standardization path coefficient	S.E.	C.R.	P	Hypothesis
H1	Game story-->Satisfaction	0.238	0.233	0.059	3.945	***	Accepted
H2	Character setting-->satisfaction	0.267	0.301	0.069	4.371	***	Accepted
H3	Dubbing music-->Satisfaction	0.218	0.229	0.072	3.192	0.001	Accepted
H4	Art Style-->Satisfaction	0.164	0.172	0.067	2.578	0.01	Accepted
H5	Game story-->Flow Experience	0.203	0.185	0.057	3.231	0.001	Accepted
H6	Character setting-->Flow Experience	0.195	0.205	0.066	3.086	0.002	Accepted
H7	Dubbing music-->Flow Experience	0.196	0.191	0.07	2.738	0.006	Accepted
H8	Art Style-->Flow Experience	0.248	0.242	0.066	3.682	***	Accepted
H9	Satisfaction-->Purchase intentions	0.451	0.428	0.059	7.284	***	Accepted
H10	Flow Experience-->Purchase intentions	0.328	0.335	0.062	5.433	***	Accepted

3.6. Research Conclusions

Therefore, the results of the research hypotheses in this paper are shown in Table 3-10, which presents five hypotheses, all of which are supported by empirical evidence.

Table 3-10. hypothesis results

NO.	Hypothetical content	Results
H1	Game story setting is positively correlated with player satisfaction;	Accepted
H2	Character set is positively correlated with player satisfaction	Accepted
H3	Dubbing music is positively correlated with player satisfaction;	Accepted
H4	Art Style is positively correlated with player satisfaction;	Accepted
H5	Game story setting is positively correlated with player flow experience;	Accepted
H6	Character setting is positively correlated with player flow experience;	Accepted
H7	Dubbing music is positively correlated with player flow experience;	Accepted
H8	Art Style is positively correlated with player flow experience;	Accepted
H9	Player satisfaction is positively correlated with player purchase intentions;	Accepted
H10	Player flow experience is positively correlated with player purchase intentions.	Accepted

4. Conclusion and Discussion

4.1. Discussion of Information Disclosure

4.1.1. Discussion about Satisfaction

According to the path analysis validation questionnaire data in structural equation modeling, it can be seen that the game story is positively correlated with player satisfaction ($\beta=0.238, p<0.05$); character setting is positively correlated with player satisfaction ($\beta=0.267, p<0.05$); dubbing music is positively correlated with player satisfaction ($\beta=0.218, p<0.05$); and art style is positively correlated with player satisfaction ($\beta=0.164, p<0.05$), and hypotheses H1, H2, H3, and H4 are valid. To summarize the four points mentioned above have a great impact on player satisfaction, the impact of the love story interpreted in the game on players' emotions is consistent with the conclusions of Huicong Jin and Huizhen Xu, and the emotional needs and the experience of using the game affect players' game participation and satisfaction.

4.1.2. Discussion with concern for flow experience

According to the path analysis validation questionnaire data in the structural equation modeling, it can be seen that the game story has a positive correlation with the player's heart flow experience ($\beta=0.203, p<0.05$); the character setting has a positive correlation with the player's heart flow experience ($\beta=0.195, p<0.05$); the dubbing music has a positive correlation with the player's heart flow experience ($\beta=0.196, p<0.05$); the art style has a positive correlation with the player's heart flow experience is positively correlated ($\beta = 0.248, p < 0.05$), and hypotheses H5, H6, H7, and H8 are valid. In summary, the four points mentioned above are positively correlated to players' mind-flow experience, and immersion experience is positively correlated to gamers' willingness to use, which is consistent with the findings of Wei Ting et al. In particular, visual and auditory sensations (i.e., art styles and dubbing music) enhanced players' mind-flow experience and promoted players' continued willingness to use, which is

consistent with the findings of Zhang yaqi et al. and Choi & Kim.

4.1.3. Discussion about willingness to buy

According to the path analysis in the structural equation model to validate the questionnaire data, it can be seen that player satisfaction is positively correlated with the willingness to buy ($\beta = 0.451, p < 0.05$); player's heart flow experience is positively correlated with the willingness to buy ($\beta = 0.328, p < 0.05$), and the hypotheses H9 and H10 are valid. To summarize, the stronger the player satisfaction and heart flow experience, the greater the impact on purchase intention, the players have an emotional attachment to the characters and purchased items in the game, mapping their own emotions to the game characters, which is consistent with the conclusions of Jack & Griffiths, He Yufei et al.

4.2. Conclusion

According to the above discussion, this paper verifies the consumer group of the Otome game Light and Night player consumer group's willingness to consume virtual goods in the game, and then elaborates on the research questions about this paper:

(1) This study uses questionnaire analysis, descriptive line statistical analysis, reliability and validity test, exploratory factor analysis, validation factor analysis, and structural equation modeling to test the valid data, and ultimately verifies that the game story, art style, character setting, and dubbing music have a positive correlation with the player's satisfaction with the game;

(2) This study uses questionnaire analysis, descriptive statistical analysis, reliability, and validity test, exploratory factor analysis, validation factor analysis, and structural equation modeling to test the valid data, and finally verifies that the game story, art style, character set, and dubbing music are positively correlated to players' flow experience;

(3) This study uses questionnaire analysis, descriptive statistical analysis, reliability and validity test, exploratory factor analysis, validation factor analysis, and structural equation modeling to test the valid data, and finally verifies that player satisfaction and flow experience are positively correlated with purchase intention.

4.3. Suggestion

Players can establish deep emotional connections and interaction with in-game characters by exploring different game story directions, which enhances players' heart flow experience when playing in the game, and also obtains emotional resonance, which is a key part of the game experience. Community activities and exchanges between players provide a rich episodic value for Otome games, and players can share their game experiences through social media or fan communities. Increase game interactions. Inside the game, the emotional connection between players and characters should be the core, strengthening dynamic dialogues, emotional responses and diversified side quests, and reducing mandatory player-player interactions to adapt to the needs of players who tend to prefer private immersion experiences. Outside the game, feedback platforms such as social media and player communities can be used to build a two-way communication channel between developers and players, while encouraging player creation and sharing to enhance community activity and player stickiness. This kind of internal and external interaction design not only satisfies the emotional needs of players but also provides support for

the long-term development of the game.

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