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# Understanding the Drive of Chinese Players' Continuous Intention and Loyalty Towards Online Games in Wuhan, China

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## Abstract

**Purpose:** This study examines the factors impacting Chinese players' continuous intention and loyalty towards online games in Wuhan, China. The research framework is built upon achievement, challenge, social interaction, enjoyment, flow, loyalty, and continuous intention. **Research design, data, and methodology:** The quantitative study is to collect data via a questionnaire of 610 students from 5 colleges in Wuhan, China. The sample methods are judgmental, quota, and convenience sampling. The index of item-objective congruence (IOC) and pilot test (n=30) were conducted to validate validity and reliability before the data collection. Confirmatory factor analysis (CFA) was used to assess the convergent and discriminant validity of the measurement model. Furthermore, the structural equation model (SEM) was applied to test the effect of measured variables and conclude the research. **Results:** Achievement, challenge, and enjoyment significantly impact flow. Flow significantly impacts loyalty and continuous intention to play online games. However, social interaction has an insignificant impact on flow. **Conclusion:** The practical implications of this research indicate that game developers and designers should focus on incorporating elements such as achievement, challenge, and enjoyment into their games to enhance the flow experience among players. These factors have been found to significantly impact facilitating the continuous intention to play online games.

**Keywords:** Online Games, Enjoyment, Loyalty, Flow, Continuous Intention

**JEL Classification Code:** E44, F31, F37, G15

## 1. Introduction

In 1961, Steve Russell and MIT students created "Spacewar!"—the first influential electronic game. It allowed two players to control space vehicles, launching missiles at each other while navigating a perilous black hole at the screen's center (Li, 2014). In the early 1970s, dedicated computer systems for electronic games were developed. Software designers in the US created programs that could compete with people using pre-designed "analysis" and "judgment" abilities. An electrical engineer, Nolan Bushnell saw the potential and designed the world's first commercial video game console based on his "tennis" game. This led to the establishment of Atari, the earliest video game company. Today, electronic games are undergoing a trans-formative shift driven by digital technology advancements. Traditional games have been radically changed, and innovative gaming paradigms have propelled the industry to new heights. Leading titles, like those from Blizzard Entertainment, showcase excellence in visuals, audio effects, storytelling, and integration of computer graphics (CG) artistry. Electronic games encompass diverse forms of artistic expression, epitomizing the digitization of traditional art. The success of electronic games is attributed to talented individuals, innovation in digital art, and a supportive audience. The game industry remains vibrant, with untapped opportunities awaiting new technologies and creative endeavors. Electronic games come in different forms and

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devices: console games, PC games, handheld games, and mobile games (Xu, 2014). PC games offer powerful hardware and detailed graphics but require frequent upgrades and lack portability. Console games are played on dedicated home consoles, providing simplicity and affordability. Handheld games are portable and convenient, though their graphics and sound quality may be inferior. Mobile games are played on mobile devices, favored for their small size and accessibility. Electronic games are single-player and online games (Xu, 2014). Single-player games run on a single device without an internet connection, offering realistic graphics. Online games rely on the internet for multiplayer interactions, emphasizing player communication and collaboration, but may have limitations in graphics due to network constraints.

Online games are multiplayer electronic games played through network transmission on computers or mobile phones. They enable sustained and simultaneous participation, bridging the gap of space distance and facilitating human interaction (Li, 2014). The proliferation of smartphones and computers has further boosted the popularity of online games. Cloud gaming, leveraging cloud technology, serves as game portals accessible through cloud servers or mobile devices. It eliminates device and platform limitations, and game rendering is done in the cloud, providing a high-quality gaming experience without additional hardware or time-consuming downloads (Xu, 2014). Virtual reality (VR) technology has the potential to revolutionize online gaming. Although VR products have faced challenges, further advancements in VR can enhance game visuals and interactions, blurring the line between illusion and reality. Network latency is a significant issue in online gaming, impacting the gameplay experience. 4G technology delays 30-50 milliseconds, while 5G technology offers near real-time communication with delays of less than one millisecond. This improvement in network latency enhances online game operations and promotes the growth of the online gaming industry (Ren, 2021).

COVID-19 has had a mixed impact on China's game industry. Initially, online entertainment and game consumption increased with people staying home, benefiting the industry. However, by the first half of 2022, the industry faced challenges, including declining sales revenue and a shift from new users to existing customers. Production efficiency decreased due to remote work and limited resources, while consumer spending decreased. Investment and financing in the industry also slowed down. The industry must focus on high-quality content, explore new markets like cloud and VR games, and pursue international expansion to develop further. The online game industry has thrived with the growing number of internet users in China. The industry has benefited from the widespread adoption of technologies like 5G, VR, and big data. China's internet user base has experienced significant growth, reaching 1.032 billion users with a penetration rate of 73.0 percent. Over the past 20 years, the online game industry in China has evolved into a stable and influential sector, forming a robust global market and industrial chain. It has contributed to the promotion and preservation of Chinese culture and has had a positive impact on the country's GDP. Recognizing the importance of the online gaming industry, the Chinese government has included it in key development plans and provides policy and financial support. This support attracts capital and contributes to the industry's growth, positioning it as a crucial pillar in China's economic development (Ren, 2021).

China's online game market is booming, driven by advancements in technology. With a user base of 553.54 million, China is the largest growth market globally. The industry generates significant sales revenue and holds appeal for domestic and foreign companies. Chinese residents allocate a substantial portion of their expenditure to education and entertainment. To meet the market's demands, China should accelerate the localization of domestic online games and leverage 5G technology and cultural heritage to create high-quality products for global promotion. Online games have become a dominant form of entertainment, shaping modern lifestyles and ideas. Unlike traditional games, online games offer cultural output and meet cultural communication needs. Academic interest in online games has grown, but research in China lags behind developed countries. Understanding the factors influencing Chinese players' intentions and loyalty is crucial for the industry's growth (Xu, 2014).

More research is needed on this topic in China. This study aims to explore these factors, provide a statistical description of Chinese players' behavior in the current era, and explore the relationships between achievement, challenge, social interaction, enjoyment, flow, loyalty, and the continuous intention to play online games in China. This study aimed to examine the factors influencing the intention of online game players in Chinese colleges. It utilized a conceptual framework derived from flow theory and uses and gratifications theory (U&G), incorporating previous research frameworks. The framework included independent variables (achievement, challenge, social interaction, enjoyment), a mediator (flow), and dependent variables (loyalty, continuous intention). A quantitative approach was used, with data collected through an online questionnaire. Confirmatory factor analysis and structural equation modeling were employed for analysis. The study identified significant factors influencing continuous intention and loyalty, providing research significance and suggestions for future studies.

## 2. Literature Review

### 2.1 Achievement

As defined by Linnenbrink and Pintrich (2000), achievement refers to an individual's cognitive representations that guide personal behavior. It has been found to predict peer relationships and is a crucial aspect of social development (Liem et al., 2008). In online games, personal achievement serves as a psychological need. It has been observed to enhance motivation and provide a sense of inherent success (Wan & Chiou, 2006a, 2006b). This need for achievement extends beyond online games, as previous research has shown its connection to social responsibilities, cooperation, and intergroup relations (Liem et al., 2008). These findings highlight the relevance of achievement not only to personal growth but also to social functioning. Flow and achievement goals are important factors in motivation research, shedding light on why individuals invest their time and effort in tasks (Harackiewicz & Elliot, 1993). Achievement goals can be categorized into mastery and performance objectives (Logan et al., 2015). Pursuing mastery-approach goals is positively associated with the overall flow experience in sports. This aligns with the findings of Jackson and Roberts (1992), who established a positive relationship between task-oriented goals and flow experience. In the context of games, research by Hoffman and Nadelson (2010) suggests that pursuing objectives enhances players' motivational engagement and facilitates the flow state. The process of achieving goals requires players' attention, contributing to the flow experience (Ghazali et al., 2019), which is also observed in the study of online games (Wu et al., 2010). Additionally, the satisfaction derived from achieving goals can enhance players' sense of self-efficacy in completing the game. Hence, this study hypothesizes that:

**H1:** Achievement has a significant impact on flow.

### 2.2 Challenge

Challenges in video games have received significant attention in scholarly research. These challenges refer to tasks or levels that align with a player's skill level or the difficulty level within the game environment. They can involve competition with other players or completing missions (Hoffman & Novak, 1996; Liu & Shiue, 2014). Studies indicate that incorporating appropriate challenges in video games is highly valued by players. It provides a sense of achievement and enhances overall enjoyment when players successfully overcome missions (Lee & Wohn, 2012; Teng et al., 2012). Research conducted by Teng et al. (2012) and Drachen et al. (2014) suggests that incorporating appropriate game difficulties enhances players' enjoyment and fulfillment.

Furthermore, a study by Su et al. (2016) found that interesting challenges can induce flow in-game players. Flow is experienced when players actively respond to difficulties and concentrate on overcoming obstacles. Csikszentmihalyi and Csikszentmihalyi (1988) propose that flow occurs when individuals perceive challenges that align with their abilities within the game environment. Games should balance difficulty and player skill to maintain players in a flow state (Chen, 2007). Higher levels of perceived skill and challenge directly contribute to the flow experience, indicating that greater flow occurs with higher challenges. Therefore, online game players with higher skill levels and difficulty are likelier to experience flow (Liu, 2017). However, it is important to balance the game's inherent challenges and the player's capabilities. The game should present an optimal level of challenge that matches the player's skills to maintain flow during gameplay (Chen, 2007). Players may become bored when the challenge level is too low, while if it is too high, players may become anxious (Ellis et al., 1994). Finding the right balance is crucial for an engaging and satisfying gaming experience. Thus, a hypothesis is conducted:

**H2:** Challenge has a significant impact on flow.

### 2.3 Social Interaction

Social interaction is crucial in online games, encompassing communication and mutual influence among multiple entities (Laurel, 1993). Interactions in online games can be divided into interactions between the user and the system (human-computer interaction) and interactions between users. In the context of this paper, social interaction specifically refers to interactions among users (Lee, 2009). Social interaction in online games is significant in promoting players' understanding of the importance of communication and relationship-building with others (Li, 2014). Online games allow players to engage, meet, compete, and converse with fellow players (Merhi, 2016). This fosters strong friendships and emotional connections within highly social and interactive environments, such as online games (Cole & Griffiths, 2007). Pilke (2004) discovered that flow experiences can occur during interactions with information technology.

On the other hand, Kim et al. (2005) found that social interaction serves as an antecedent to the flow experience. Therefore, it is reasonable to assume that social connection aids players in entering a state of flow and increases their desire to engage in online games. Empirical research conducted by Rodríguez-Ardura and Meseguer-Artola (2016) supports the claim that interactivity significantly impacts flow in e-learning. Furthermore, studies on extended 3D immersive virtual worlds have confirmed a positive

relationship between interactivity and the sense of flow (Animesh et al., 2011; Qiu & Benbasat, 2005). Hence, a hypothesis is developed:
**H3:** Social interaction has a significant impact on flow.

## 2.4 Enjoyment

The concept of enjoyment has received considerable attention in research on online behavior. Moon and Kim (2001) define enjoyment as the subjective pleasure individuals experience while engaging in a specific activity or behavior. Enjoyment has been identified as the primary motivator for online game players (Wei & Lu, 2014). Players participate in games primarily for the pleasure and enjoyment they derive from the experience. This is supported by research indicating that online games offer a diverse range of entertaining functions that users find enjoyable (Lee, 2009). Some scholars argue that online games can be viewed as technology focused on entertainment, providing enjoyable content and playful services (Chen et al., 2016; Lee & Tsai, 2010) and Perttula et al. (2017) affirm that flow encompasses key characteristics such as enjoyment, control, focus, and self-reinforcement. Enjoyment, in particular, is a prevalent aspect of the gaming experience. Perceived enjoyment, control, delight, and temporal distortion contribute to the overall flow experience (Hausman & Siekpe, 2009; Koufaris, 2002). Among these factors, enjoyment is important in the flow experience (Hoffman & Novak, 1996). As a result, a hypothesis is proposed:
**H4:** Enjoyment has a significant impact on flow.

## 2.5 Flow

The concept of flow has received extensive research and practical applications in various domains, including psychology, sports, and business. Initially introduced by Csikszentmihalyi (1975), flow refers to complete engagement in an activity characterized by deep immersion where individuals lose track of time and space. In this state, individuals experience heightened enjoyment, fulfillment, and a profound sense of accomplishment. This mental state is also known as the optimal experience or colloquially referred to as being "in the zone" (Chen, 2007). Flow theory has gained significant recognition in gaming in recent years, particularly in measuring the online consumer experience (Koufaris, 2002) and video games (Klasen et al., 2012). Teng (2017) defines flow in gaming as a state in which players become fully immersed in the gameplay, losing track of time and experiencing intense enjoyment. This state of mind enhances the gaming experience, increasing engagement and satisfaction among players. Research has demonstrated a positive correlation between flow and purchase intentions concerning internet use (Koufaris, 2002; Moon & Kim, 2001) and online purchasing (Aren et al., 2013; Siekpe & Kamssu, 2005). Numerous studies within the online context suggest that flow directly impacts web loyalty. For instance, when sports fans engage with a particular website in a state of flow, they are more motivated to prolong their engagement and continue their experience, enhancing website loyalty (Carlson & O'Cass, 2010). Another study by Korzaan (2003) revealed that flow experiences influence behavioral intentions, including an increased likelihood of purchasing from a website. Based on the above discussions, the following hypothesis is set:
**H5:** Flow has a significant impact on loyalty.

## 2.6 Loyalty

Oliver (1999) comprehensively defines loyalty, encompassing behavioral and attitudinal aspects. The behavioral dimension relates to the intention to make repeat purchases, while the attitudinal dimension involves a favorable attitude or preference for specific products. Therefore, loyal customers are characterized by an intention to make repeat purchases and a positive attitude toward the product (Homburg & Giering, 2001; Wangenheim & Bayon, 2004). It is worth noting that the definition of loyalty can vary across different domains. In marketing, loyalty primarily refers to the intention of repeatedly purchasing a particular product or service (Homburg & Giering, 2001). Huang et al. (2017) also highlight that loyalty is defined as a combination of repurchase and recommendation intentions in electronic commerce.

## 2.7 Continuous Intention

Fishbein and Ajzen (1975) state that behavioral intention refers to the intention to engage in a specific behavior. In the context of online games, this concept is highly relevant as players continuously make decisions regarding whether they will continue playing a particular game. The continued intention to play online games can be defined as the momentary conviction that a person will persistently engage in a specific online game based on previous experiences (Wu & Liu, 2007; Wu et al., 2007). This definition emphasizes two important aspects of continuance intention: the current state of the player's belief and their past encounters with the game. Essentially, the continuance intention to play a specific game can be seen as a forward-looking intention towards the game. At the same time, previous experiences encompass the accumulated encounters derived from playing the game (Jang & Liu, 2020). Previous research has provided empirical evidence supporting the idea that the state of flow has a positive impact on user enjoyment (Chang & Zhu, 2012; Woszczynski et al., 2002) as well as the behavioral intention to continue using a particular service or product (Lee & Tsai,

2010; Zhou, 2013). Hsu and Lu (2004) suggest that flow will likely influence usage intention favorably. Additionally, Hausman and Siekpe (2009) conducted a study in which they found that the concept of flow can predict users' intention to revisit online purchasing sites. Thereby, the sixth hypothesis is as follows:

**H6:** Flow has a significant impact on continuous intention.

## 3. Research Methods and Materials

### 3.1 Research Framework

The research framework drew upon two fundamental theories and three existing theoretical frameworks. These two theories were the flow theory by Csikszentmihalyi (1975) and the Uses and gratifications theory (U&G) by Weibull (1985). Moreover, the first previous theoretical framework was conducted by Ghazali et al. (2022). It provided four variables: challenge (C), flow (F), continuous intention (CI), and enjoyment (E). The second previous theoretical framework was developed by (Ghazali et al., 2019). It supplied social interaction (SI) and achievement (A). The third previous theory was built by (Liao et al., 2019). It provided loyalty (L). The research framework is shown in Figure 1.

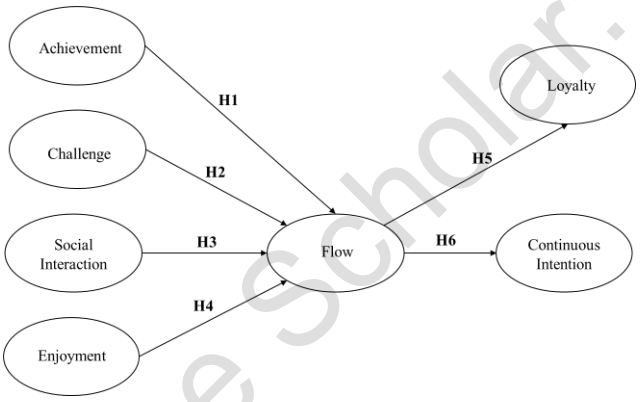


**Figure 1:** Conceptual Framework

**H1:** Achievement has a significant impact on flow.
**H2:** Challenge has a significant impact on flow.
**H3:** Social interaction has a significant impact on flow.
**H4:** Enjoyment has a significant impact on flow.
**H5:** Flow has a significant impact on loyalty.
**H6:** Flow has a significant impact on continuous intention.

### 3.2 Research Methodology

In this study, questionnaires were utilized to examine the respondents who are college students studying in five selected colleges in Wuhan, China, and the students must have played online games. The questionnaire consisted of three sections: screening questions, measurement variables, and demographic questions. Measurement variables were assessed using a Likert five-point scale (Likert, 1932). Before the survey, the researchers evaluated the content validity through the index of item objective consistency (IOC). To test the questionnaire's reliability, a pilot test was conducted by distributing questionnaires to 30 individuals from the target population, and Cronbach's Alpha was used to assess reliability. For validity and reliability test, three experts were invited to validate the content by using the index of item-objective congruence (IOC) with all items are approved at a score of 0.6 or over. Subsequently, Cronbach's alpha reliability (CA) results show that all items were passed at a score of 0.7 or above (Nunnally, 1978). Subsequently, the questionnaires were distributed to 650 students, resulting in 610 valid responses. Finally, Confirmatory Factor Analysis (CFA) and structural equation modeling (SEM) were performed using SPSS AMOS software to analyze the data.

### 3.3 Population and Sample Size

Weathington et al. (2012) defined the target population as the complete elements relevant to the study. In this research, the target population consisted of students who had experienced playing online games in five selected colleges in Wuhan. Kotler and Armstrong (2016) emphasized that the sample size refers to the number of sample elements extracted from the population. The target population in this study are 64,461 students from 5 colleges in Wuhan, China. To determine the appropriate sample size, the researchers utilized the calculator developed by Soper (2015). The recommended minimum sample size was found to be 425. However, Hair et al. (2010) noted that the appropriate sample size may vary depending on the complexity of the model being tested. Considering these factors, 650 questionnaires were distributed to the target population, and ultimately, 610 valid questionnaires were utilized for analysis in this study.

### 3.4 Sampling Technique

The researcher employed non-probability sampling as the sampling technique in this study. The sampling procedure consisted of three steps: judgmental, quota, and convenience. Initially, judgmental sampling was utilized to select respondents who are college students studying in five selected colleges in Wuhan, China, and have played online games. Subsequently, quota sampling was employed to

collect data proportionately, as indicated in Table 2. Once the consent of the outpatients was obtained, convenience sampling was used to distribute online questionnaires to participants through email, social media platforms, and WeChat.

**Table 1:** Sample Units and Sample Size

| College Name | Population Size | Proportional Sample Size |
|---|---|---|
| Hubei Communications Technical College | 15,022 | 147 |
| Hubei Vocational College of Bio-Technology | 10,454 | 92 |
| Wuhan Institute of Shipbuilding Technology | 15,124 | 177 |
| Wuhan University of Engineering Science | 14,635 | 124 |
| Wuhan College of Arts and Science | 9,226 | 70 |
| **Total** | **64,461** | **610** |

**Source:** Constructed by author

## 4. Results and Discussion

### 4.1 Demographic Information

As shown in Table 2, among 610 respondents, 123 (20.2%) were females, and 487 (79.8%) were females. Most students are 18-20 years old, representing 75.4%, followed by 21-25 years old (23.9%) and more than 25 years old (0.7%). Regarding education, most respondents were first-year students, 63.6%, and second-year students, 23.6%. Moreover, third-year students 118, representing 19.3%. The rest were fourth-year students, 46, representing 7.5%, respectively.

**Table 2:** Demographic Profile

| Demographic and General Data (N=610) | | Frequency | Percentage |
|---|---|---|---|
| **Gender** | Female | 123 | 20.2% |
| | Male | 487 | 79.8% |
| **Age range** | 18-20 | 460 | 75.4% |
| | 21-25 | 146 | 23.9% |
| | More than 25 | 4 | 0.7% |
| **Education level** | First year student | 388 | 63.6% |
| | Second year student | 126 | 23.6% |
| | Third year student | 118 | 19.3% |
| | Fourth year student | 46 | 7.5% |

**Source:** Constructed by author

### 4.2 Confirmatory Factor Analysis (CFA)

Table 3 presents the results of using Cronbach's Alpha to assess the reliability of the questionnaire. In this study, the alpha coefficient values for all groups exceeded 0.7, indicating a high level of reliability for all constructs. Moreover, Byrne (2001) highlighted that construct validity can be established through convergent validity and discriminant validity, which can be confirmed through confirmatory factor analysis (CFA). In this study, factor loading, average variance extracted (AVE), and composite reliability (CR) were used to evaluate the convergent validity of the conceptual model (Hair et al., 2013). Specifically, factor loading values exceeding 0.5 and p-values below 0.05 were considered acceptable indicators of convergent validity (Hair et al., 2013). Additionally, CR values above 0.7 and AVE values above 0.5 were considered adequate for evaluating the convergent validity of the variables in this study.

**Table 3:** Confirmatory Factor Analysis Result, Composite Reliability (CR) and Average Variance Extracted (AVE)

| Variables | Source of Questionnaire (Measurement Indicator) | No. of Item | Cronbach's Alpha | Factors Loading | CR | AVE |
|---|---|---|---|---|---|---|
| Achievement (A) | Liem et al. (2008) | 4 | 0.919 | 0.887-0.905 | 0.919 | 0.804 |
| Challenge (C) | Teng et al. (2012) | 5 | 0.937 | 0.888-0.907 | 0.964 | 0.797 |
| Social Interaction (SI) | Laurel (1993). | 4 | 0.856 | 0.821-0.853 | 0.866 | 0.696 |
| Enjoyment (E) | Moon and Kim (2001) | 3 | 0.887 | 0.891-0.914 | 0.894 | 0.815 |
| Flow (F) | Chen (2007) | 4 | 0.823 | 0.800-0.840 | 0.826 | 0.653 |
| Loyalty (L) | Oliver (1999) | 3 | 0.893 | 0.897-0.925 | 0.893 | 0.824 |
| Continuous Intention (CI) | Fishbein and Ajzen (1975) | 4 | 0.910 | 0.875-0.900 | 0.913 | 0.787 |

Ainur et al. (2017) indicated that Good-of-Fit (GoF) was used to measure the fitting degree of the measurement model. Table 4 showed the acceptable values; CMIN/DF =3.539, GFI = 0.890, AGFI = 0.863, NFI=0.914, CFI = 0.937, TLI = 0.927, and RMSEA = 0.065.

**Table 4:** Goodness of Fit for Measurement Model

| Fit Index | Acceptable Criteria | Statistical Values |
|---|---|---|
| **CMIN/DF** | < 5.00 (Al-Mamary & Shamsuddin, 2015; Awang, 2012) | 3.539 |
| **GFI** | ≥ 0.85 (Sica & Ghisi, 2007) | 0.890 |
| **RMSEA** | < 0.08 (Pedroso et al., 2016) | 0.065 |
| **AGFI** | ≥ 0.80 (Sica & Ghisi, 2007) | 0.863 |
| **NFI** | ≥ 0.80 (Wu & Wang, 2006) | 0.914 |
| **CFI** | ≥ 0.80 (Bentler, 1990) | 0.937 |
| **TLI** | ≥ 0.80 (Sharma et al., 2005) | 0.927 |
| **Model Summary** | | **In harmony with empirical data** |

Remark: CMIN/DF = The ratio of the chi-square value to degree of freedom, GFI = Goodness-of-fit index, RMSEA = Root mean square error of approximation, AGFI = Adjusted goodness-of-fit index, NFI = Normed fit index, CFI = Comparative fit index and TLI = Tucker-Lewis index.

Discriminant validity was confirmed when the AVE's square root was larger than any intercorrelated construct coefficient (Fornell & Larcker, 1981). In this study, the square root of all AVE values is greater than inter-construct correlations. Thus, discriminant validity can be accepted for the measurement model (Table 5)

**Table 5:** Discriminant Validity

| | CI | A | C | E | F | L | SI |
|---|---|---|---|---|---|---|---|
| **CI** | **0.887** | | | | | | |
| **A** | 0.301 | **0.896** | | | | | |
| **C** | 0.356 | 0.309 | **0.893** | | | | |
| **E** | 0.666 | 0.327 | 0.312 | **0.903** | | | |
| **F** | 0.680 | 0.372 | 0.347 | 0.658 | **0.808** | | |
| **L** | 0.661 | 0.241 | 0.260 | 0.587 | 0.612 | **0.908** | |
| **SI** | 0.324 | 0.324 | 0.403 | 0.263 | 0.258 | 0.211 | **0.835** |

**Note:** The diagonally listed value is the AVE square roots of the variables
**Source:** Created by the author.

## 4.3 Structural Equation Model (SEM)

SEM is a statistical method to analyze the relationship between variables based on the covariance matrix of variables (Zhang et al., 2007). The Good-of-fit indices are shown in Table 6. The results of statistical values are CMIN/DF = 4.535, GFI = 0.855, AGFI = 0.823, NFI= 0.888, CFI = 0.910, TLI = 0.898, and RMSEA = 0.076. Consequently, from the values above, the fit of structural models is confirmed.

**Table 6:** Goodness of Fit for Structural Model

| Index | Acceptable | Statistical Values |
|---|---|---|
| **CMIN/DF** | < 5.00 (Al-Mamary & Shamsuddin, 2015; Awang, 2012) | 4.535 |
| **GFI** | ≥ 0.85 (Sica & Ghisi, 2007) | 0.855 |
| **RMSEA** | < 0.08 (Pedroso et al., 2016) | 0.076 |
| **AGFI** | ≥ 0.80 (Sica & Ghisi, 2007) | 0.823 |
| **NFI** | ≥ 0.80 (Wu & Wang, 2006) | 0.888 |
| **CFI** | ≥ 0.80 (Bentler, 1990) | 0.910 |
| **TLI** | ≥ 0.80 (Sharma et al., 2005) | 0.898 |
| **Model Summary** | | **In harmony with Empirical data** |

**Remark:** CMIN/DF = The ratio of the chi-square value to degree of freedom, GFI = Goodness-of-fit index, RMSEA = Root mean square error of approximation, AGFI = Adjusted goodness-of-fit index, NFI = Normed fit index, CFI = Comparative fit index and TLI = Tucker-Lewis index.

## 4.4 Research Hypothesis Testing Result

To integrate the measurement structure of factor analysis with the path analysis framework, incorporating potential and unobserved constructs. It allows for differentiation between the measurement and structural models (Lefcheck, 2021). The measurement model encompasses the observed variables of the measurement concept, while the structural model establishes the relationships between constructs, including intermediary paths. The path coefficients in the structural equation model quantify the correlations between external and internal latent variables. Based on the findings presented in Table 7, the results of hypothesis testing indicate that H1, H2, H4, H5, and H6 are supported, while H3 is not.

**Table 7:** Hypothesis Results of the Structural Equation Modeling

| Hypothesis | (β) | t-Value | Result |
|---|---|---|---|
| H1: A→F | 0.184 | 4.917* | Support |
| H2: C→F | 0.143 | 3.917* | Support |
| H3: SI→F | 0.004 | 0.113 | Not support |
| H4: E→F | 0.727 | 13.740* | Support |
| H5: F→L | 0.585 | 7.914* | Support |
| H6: F→CI | 0.584 | 8.582* | Support |

**Note:** * p<0.05
**Source:** Created by the author

The explanation of research hypothesis testing is as follows (see Table 7):

In structural models, the significance of relationships between variables is evaluated by analyzing regression weights and the R2 variance. All of the proposed hypotheses have been supported based on the findings, indicating significant relationships between the variables.

**H1:** The standardized path coefficient between achievement and flow was determined to be 0.184, exhibiting a significant t-value of 4.917*. These results align with previous empirical studies conducted by Logan et al. (2015), Jackson and Roberts (1992), and Wu et al. (2010). It Implied that pursuing objectives enhances players' motivational involvement in the game and promotes a flow state. The hypothesis was supported, indicating a significant relationship between achievement and flow. Therefore, H1 has been confirmed.

**H2:** Results showed that challenge significantly impacts flow, which supports the standardized path coefficient of 0.143 and t-value at 3.917*. The results of those interesting challenges can cause game players to enter a state of flow. The findings agreed with (Teng et al., 2012), (Drachen et al., 2014), (Su et al., 2016), and (Chen, 2007). Hence, H2 was supported.

**H3:** The standardized path coefficient between social interaction and flow was 0.004, and the t-value was 0.113. Therefore, H3 was rejected. This implied that establishing and expanding interpersonal networks through social interaction does not contribute to generating flow and moments of optimal experience among players.

**H4:** Our findings indicated that enjoyment significantly impacts flow with a standardized path coefficient of 0.727 and a t-value of 13.740*. A similar result was found by (Hoffman & Novak, 1996) (Koufaris, 2002), (and Hausman & Siekpe, 2009) that perceived enjoyment, control, delight, and temporal distortion are crucial factors of the entire flow experience.

**H5:** The present study showed that flow significantly impacts loyalty for the standardized path coefficient of 0.585 and t-value at 13.740*. According to Guo and Barnes (2009) (Ali, 2016) and Hoffman and Novak (1996), low and buy intentions are positively correlated with both internet use and online purchasing. Therefore, H5 was confirmed.

**H6:** The hypothesis was supported that flow significantly impacts continuous intention from a standardized path coefficient of 0.584 and t-value at 8.582*. It was aligned with the study of (Woszczynski et al., 2002), (Chang & Zhu, 2012), (Zhou, 2013). It implied that flow is anticipated to exert a favorable influence on the intention to use to play online games.

## 5. Conclusion and Recommendation

### 5.1 Conclusion and Discussion

This research examined factors impacting flow to continuance intention and loyalty to online games of Chinese players in Wuhan, China. The conceptual framework was developed based on two core theories and three previous theoretical frameworks. The variables included in the conceptual framework encompassed challenge, flow, continuous intention, enjoyment, social interaction, achievement, and loyalty. Additionally, the researcher formulated six hypotheses aligned with the research questions.

To ensure the validity and reliability of the questionnaire, a pilot experiment was conducted with 30 respondents, and the item objective consistency (IOC) and Cronbach's alpha index were utilized. Subsequently, data was collected from 610 Wuhan, China players using non-probabilistic sampling techniques. Confirmatory factor analysis (CFA) was employed to assess the convergent and discriminant validity of the measurement model. A structural equation model (SEM) was then utilized to examine the effects of the measured variables and draw conclusions for the research.

The findings of this research can be described as follows. First, the results of the present study revealed that enjoyment has the strongest significant impact on flow. According to Perttula et al. (2017), flow in a gaming experience is characterized by fundamental aspects such as enjoyment, control, focus, and self-reinforcement. Enjoyment is identified as one of the prominent elements of a gaming experience. In a study by Ha et al. (2007) that focused on mobile games, it was discovered that offering users an enjoyable experience had a positive influence on both the flow experience and attitude of the users. Second, achievement and challenge have a significant impact on flow.

Furthermore, the study by Hoffman and Nadelson (2010) highlights that pursuing objective in a game enhances players' motivational involvement and promotes a state of flow. When players actively engage in tasks and strive to achieve specific goals within the game, their focus and concentration increase, leading to a heightened sense of immersion and enjoyment. Moreover, Su et al. (2016) emphasizes the role of interesting challenges in inducing a state of flow among game players. When players encounter challenging and stimulating tasks or levels within the game, it triggers their intrinsic motivation and deepens their engagement. This heightened level of challenge, combined with the player's skill level, can lead to a state of flow characterized by a seamless integration of action and awareness, a sense of timelessness, and a feeling of being completely absorbed in the game. These findings highlight the importance of pursuing objectives, maintaining attentiveness, and encountering interesting challenges in fostering a state of flow during gameplay. By designing games that offer meaningful objectives, captivating challenges, and a sense of progression, developers can facilitate the flow experience, resulting in increased player enjoyment, engagement, and satisfaction. Third, however, social interaction has no significant impact on flow. Indeed, social interaction is not typically considered a direct antecedent of the flow experience; it does not necessarily imply that social connection cannot contribute to entering a state of flow or increase players' desire to engage in online games. The relationship between social interaction and flow experience can be more nuanced. Fourth, flow significantly impacts loyalty and continuous intention to play online games. Indeed, flow has been found to have a significant impact on both player loyalty and the continuous intention to play online games. When individuals experience a state of flow during gameplay, characterized by deep immersion, focused concentration, and a sense of enjoyment, it can foster a strong connection and attachment to the game. Flow experiences are often associated with positive emotions, heightened engagement, and fulfillment. These factors contribute to players developing loyalty towards the game, as they derive great satisfaction and enjoyment from the experience. The more frequently players enter a flow state while playing, the more likely they are to develop a long-lasting commitment to the game.

In summary, the flow determinants were achievement, challenge, and enjoyment. In addition, flow was a key factor in predicting loyalty and continuous intention to play online games.

### 5.2 Recommendation

For theoretical implications, the researcher developed the conceptual framework based on two core theories: flow theory and uses and gratifications theory (U&G). According to Csikszentmihalyi (1975), individuals experience a distinct psychological phenomenon and state called "flow" when participating in sports, work, games, and hobbies. The Uses and Gratifications (U&G) theory presents a valuable framework for comprehending the gratifications or benefits that attract individuals to various forms of media. It provides insights into why people choose specific media providers and how they derive satisfaction from them, as highlighted by Chaouali et al. (2016) and Luo and Remus (2014). Researchers and practitioners can gain insights into user motivations, satisfaction, and the design elements contributing to a fulfilling gaming experience by applying these theories to the online gaming industry.

The practical implications of this research indicate that game developers and designers should focus on incorporating elements such as achievement, challenge, and enjoyment into their games to enhance the flow experience among players. These factors have been found to significantly impact facilitating flow, which in turn can influence player loyalty and the continuous intention to play online games. With the understanding that flow is crucial in fostering player loyalty and sustaining their intention to play, game developers can prioritize creating gameplay experiences that promote a sense of achievement, provide challenging tasks, and offer enjoyable gameplay mechanics. By designing games that offer clear goals, balanced difficulty levels, and engaging mechanics, developers can increase the likelihood of players entering a state of flow, leading to enhanced loyalty and a higher propensity to continue playing. However, it is important to note that the research findings indicate that social interaction has an insignificant impact on the flow experience. This suggests that while social interaction may not directly contribute to flow, it should not be overlooked entirely. Game developers can still incorporate social features and multiplayer components to provide players with additional enjoyment, competition, and collaboration opportunities. While social interaction may not directly influence flow, it can still contribute to overall player engagement, satisfaction, and the formation of online communities.

### 5.3 Limitation and Further Study

While this research has yielded intriguing findings, it is important to acknowledge certain limitations that should be considered. Additionally, recommendations for further research can be suggested. Firstly, it is essential to recognize that this study focused specifically on the online game industry, which shares common characteristics with the broader entertainment industry. Therefore, the generalizability of the results to other industries may be limited. Future studies should explore the applicability of these findings in different industry contexts to gain a more comprehensive understanding.

Additionally, it is important to note that the data collected for this study were limited to Wuhan in China. As a result, the generalizability of the findings to other regions or countries may be restricted. Future research should include a more diverse range of locations to ensure the broader applicability and generalizability of the research findings.

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