Understanding consumers' addiction to online mobile games and in apps purchase intention: Players stickiness as the mediation

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Abstract

Research on consumer behavior, particularly on online mobile games, is an emerging topic that must be more deeply explored. As a relatively new topic, the approach and discussion of consumer behavior based on the online mobile games environment challenge researchers to describe it in a theoretical study. This research investigates the user's addiction to online mobile games (OMG) in apps purchase intention through a stickiness mediation variable. The samples were determined by using purposive random sampling, which consisted of gamers or people who were playing online mobile games and ever purchase a games feature. Therefore, a total of 439 responses were collected through an online survey. This research employs SmartPLS 2.0 to test both measurement and structural models. The results showed that the addiction to online mobile games influenced app purchase intention, and stickiness also mediated the relationship between addiction to online mobile games and app purchase intention. The contribution of this research emphasizing that the addiction to online mobile games had become a behavior that created stickiness and intention is also discussed in this research.

Keywords: purchase in apps; addiction behavior; stickiness; online mobile games.

INTRODUCTION

Along with technological developments, users have been stimulated by customization with various technology products. Currently, technology users can use technology products in various ways, one of which is for entertainment purposes. Many technology products that can be used as entertainment destinations include social media, film applications such as Netflix and others, and online mobile games. Online mobile games also take many forms. According to Hussain, Williams & Griffiths (2015), online game applications are currently in the form of massively multiplayer role-playing games, which allow online mobile games to consist of many players who are brought together on

a game or server. Besides being able to play on a server or online game application, players can also communicate in real-time during the game. Communication between players is considered stimulation, which uses social interaction that impacts social exchange. So that through the exchange of resources and communication that occurs, it can also increase trust in other users, which is considered an initial stimulation in consumer behavior to carry out resource exchange.

Furthermore, these online mobile games can represent consumer stimulation and exchange from the consumer behavior perspective. It is because some online mobile games allow users to use game features in a trial way. For instance, users can get advanced skills during playing the games but in a limited time or uses such seven days trials, etc. Therefore, the online games developer creates income. Once the customer or players are engaged in the games and their features, they will get interested and intend to have more for their advanced uses on the games. According to the model of consumer decision-making Stimuli, Organism and Response (S-O-R) model by Mehrabian & Russell (1974) online mobile games can be applied following model application. According to the application of the SOR model then research questions proposes

RQ1: If online mobile games are seen as consumer activities, especially for entertaining purposes, how does it influence the consumer sequentially S-O-R and purchase the application as the outcome behavior of the user? Answering the questions is to perform this research that will dig more into the behavior towards online mobile games from the addiction to online mobile games, users' stickiness, and its impact on apps purchase intention.

Previous research has proved that consumer addiction to online mobile games can influence app purchase intention (Balakrishnan & Griffiths, 2018; Hsu & Lin, 2016). However, this online mobile game is seen from customer addiction towards mediation variable loyalty in apps purchase intention (Balakrishnan & Griffiths, 2018). Stickiness can be seen as the variable that users are engaged more frequently towards online mobile games. Therefore, to fill the SOR model in consumer decision-making, consumer engagement both cognitively and emotionally is required in the organism process. Furthermore, practical and theoretical implications are offered in consumer behavior, such as addiction towards OMG, stickiness, and apps purchase intention.

Addictive behavior by Maier (2020) is biased affective, cognitive, behavioral, and psycho-psychological reactions. Users' discriminatory behavior is formed by an undenied situation or stimulation by specific environments such as desire, atmosphere, and repeated behavior. Recently, scholars describe the technological stimuli affect users' intention to use more frequently. For instance, game application developers offer the products in trial ways for seven days (depends on the applications) (Hsu & Lin, 2016). However, the more frequently customers use the game, the more affective and emotional effect there are. Being attracted, users have engaged to the application and started to play more frequently. According to the decision-making process theory, if the customers (users) have engaged both cognitively and affectively to specific products and services, it will affect prolonging uses and sticking to the object. Thus, the users will have loyal behavior towards the application. However, this should be seen as an essential issue for marketing and social welfare. For marketing, it is a behavioral cue that should investigate the customer's addiction behavior towards produced products as the marketing production. Like social welfare, research should suggest the customer and producers meet the equilibrium benefit for using applications instead of the use gratification.

Balakrishnan & Griffiths (2018) emphasizes that downloading a game is an initial action. Moreover, experiential and appreciative gameplay develops a liking towards the game, and the liking later translates to an addiction state for small minority attention. Hence, it is the initial process for liking the games and develops an activity towards games. According to Griffiths (2005) directed the addictive behavior comprises six

components: salience, tolerance, mood modification, relapse, withdrawal, and conflict. However, since found in 2005, it is already developed and dig up by researchers. Balakrishnan & Griffith (2018) recently composite addiction behavior towards online mobile apps into seven such as salience, tolerance, mood modification, relapse, withdrawal, conflict, and problems. Furthermore, many researchers attempt to develop items for addiction behavior in a particular environment. Shahnawaz & Rehman (2020) modified addiction behavior items scale towards social networking. The research also used the seventh dimension by Balakrishnan & Griffiths (2018) to measure addiction behavior towards social networking and modified it to fit the social networking measurements. It is also considered a potential research topic that further explored the appropriate measurement variables required in different fields.

Previous research revealed that addictive behavior towards technology products has consequences. Panea-Pizarro, López-Espuela, Martos-Sánchez, Domínguez-Martín, Beato-Fernández, & Moran-García (2020) revealed that addiction to Facebook can impact women eating disorders - thus; the women in the restaurant or some places for eating purposes tend to use the mobile phone and play social media and swiping on the internet while eating. Furthermore, Bai et al (2020) have found that addiction to mobile phones affects school performance – means; mobile phones and their various features affect students' attention to study, which impacts the school performance. Various previous research focuses on addiction behavior (Chi, Hong & Chen, 2020; Gao, Li, Zhang, Gao, Kong, Hu & Mei, 2018; Hao, Jin, Li, Akram, Saeed, Ma, Ma & Huang, 2019; Khang, Kim, & Kim, 2013; Liu, 2020). However, any games that work on the mobile phone, tablet, etc., can be described as online mobile games. Users' dependence on the games, as described in the previous research, have many reasons (1) mobile gaming has been primarily had popularity in mobile devices (2) characteristically simple, highly mobile, accessible, and networkable (Koutromanos & Avraamidou, 2014), and led to user retention and visit duration become longer affect to addictive behavior.

Lee, Chiang, Sen & Hsiao (2018) revealed that games based on augmented reality affect stickiness. However, they also examine the flow and satisfaction of using the games. Futhermore, Balakrishnan & Griffiths (2017) have found that factors affecting addiction behavior consisted of gratification. Gratification can be identified as the users' comfortableness and reasonableness of individual nature utilize the media (Balakrishnan & Griffiths, 2017). Thus, individual reasonableness for using the game application can bias belief, cognition, affection, and behavior. Hence, Duman & Ozkara (2019) emphasizes that users' sense of belonging playing online mobile games affects behavior such as repetitive and prolonged play. These are the characteristics of stickiness behavior. Thus, *user's addiction playing Online Mobile Games (OMG) affects stickiness behavior (Visit Duration and User Retention)*

Hsu & Liao (2014) argued that users' stickiness when a user visits the site repeatedly spends more time than the average users and digs more profound than other users. Stickiness describes by Zott et al (2000) as the ability of a platform to attract and retain users. However, it is necessarily to underline the concepts of stickiness directed in the interactivity of specific platforms used by users (Wang et al., 2013). Therefore, the attractiveness of online mobile games developed to enhance the users' stickiness. Stickiness is also considered the profitability because users prolong their visits to platforms and buy more features offered, view more advertisements, and so on (Yen, 2016). However, Friedrich et al (2019) emphasize that stickiness is how much attention a platform receives from its users. Hence, according to Friedrich et al (2019) it becomes critical for online commercial platforms' online mobile game applications.

Previous studies have explained the stickiness behavior; however, all of them are aimed at users' repetition and duration (Yu et al., 2017). Therefore, the concepts of stickiness are composed of two general things: user retention (Li et al., 2021; Wang et al.,

2013) and visit duration (Chiang & Hsiao, 2015; W. Gao et al., 2018). Instead, the users of online mobile games who were initially downloading an app's games, if they do not get exciting or do not attractive, will quickly leave the game and uninstalled the game from their mobile phones. These circumstances become the representativeness of stickiness behavior towards online mobile games. Furthermore, users' stickiness towards online mobile games is seen as the behavioral cues that can trigger game developers to has attractive features. Thus, the psychological state between the users, games and their features will be established then intentional behavior will be predictable in the use of online mobile games. Previous research also pertaining the stickiness to in apps purchase intention. In his research, Hsu & Lin (2016) revealed that concerning social media and other online platforms and applications and its feature can influence stickiness. Therefore, stickiness towards online application platforms and their offered features effect on apps purchase intention. Thus, *users' stickiness to Online Mobile Games (OMG) affects in app's purchase intention towards its features.*

Recent technology enhancement has allowed users to purchase features massively in applications (Zhou, Yue, Liu, Shen, Tong, & Ding, 2021). According to Zhou et al (2021), apps purchase users can buy specific applications' features to help them satisfy their needs. However, online mobile games purchase can be occurred by the stickiness of the users, perceived value, and social influences (Zott et al., 2000). It has become the underlined relationship between thickness and apps purchase intention. Therefore, this research also discussed the relationship between addiction to online mobile games and their impact on apps purchases. Recently, researchers argued in apps purchases through Google Play (Android Systems) and Apps Store (IOS Systems) (Roma & Ragaglia, 2016). Furthermore, these two applications allowing users to purchase the application market in the systems. The difference between previous research addressed in online mobile games users purchased the features of the game itself. Thus, the purchase will be occurred in just one application to increase the user's satisfaction with playing the games. Thus, previous research argued that limited researchers discussed online game addiction and purchase (Balakrishnan & Griffith, 2018). Purchase intention can be seen as the motivation and ability factors of an individuals' state to take action. This research investigates the addiction and stickiness predictors to purchase games features instead of many factors affecting app purchase intention towards features in online mobile games. Thus, a*ddiction to Online Mobile Games affects apps purchase intention towards OMG's features.*

METHOD

The population used in this study are gamers or people who play online games on online platforms through online mobile. The sampling technique used is purposive random sampling (Robinson, 2014) including the criteria of someone playing online games and purchase online game features. This study used an online survey to investigate the relationship between addiction to online mobile games, stickiness, and app purchase intention in Indonesia. Furthermore, we distributed the questionnaire utilizing an online survey and obtained a total of 467 respondents. The distributions of the questionnaires utilize social media platforms such as Facebook, Gmail, WhatsApp, and Instagram, and attached the google docs (online questionnaire) into the message sent to respondents. From a total of 467 questionnaires were obtained, 439 were considered valid through screening data. Screening of this data was performed due to some of the questionnaires collected was incomplete.

After the screening data has been performed, the next step is testing the measurement and structural model in this study. The Smart-PLS is employed for data analysis commences from the validity, reliability, and hypothesis examination (Hulland,

1999). For this reason, the Smart-PLS instrument is an adequate tool to test the data. In addition, with a sample size of 439, Smart-PLS is an adequate data analysis tool in marketing research (Henseler et al., 2015). In testing the measurement model with discriminant validity, the approaches used are composed of the Fornell – Larcker criterion and the Heterotrait – Monotrait ratio. The Fornell-Larcker criterion explains the AVE's square root and the correlation between each variable (Fornell & Larcker, 1981). Next, the HTMT as the new criteria assessing discriminant validity can effectively test data cross-loadings of variables and have high sensitivity (Henseler et al., 2015). The suggested value for testing HTMT is 0.85 (Henseler et al., 2015). Once the required criteria for measurement and structural models are met, hypothesis testing is further performed.

RESULTS AND DISCUSSION

Results

Respondents profile as shown in table 1 consisted of gender, male 60.5%, female 39,5%; marital status, married 19,3%, single 80,7%; educational level, bachelor 58,9, master 5%, doctoral 0,7% and senior high school or equal 35,5% and so on. Besides the respondent demographics, table 1 also describes the respondent's behavior towards games, such as 23% of respondents spending 30 minutes a day playing mobile games; however, 15% of respondents also spend more than 120 minutes a day playing OMG and more detailed describes in table 1 below.

Table 1
Respondents Profile and Behavior Towards Online Mobile Games (OMG)

Variables	Descriptions	Frequencies	Percentages (%)
Gender	Male	177	40%
	Female	262	60%
Marital Status	Married	85	19%
	Single	355	81%
Age	19 or below	75	17%
	20 - 24	226	52%
	25 - 29	98	22%
	30 - 34	19	4%
	35 - 39	6	1%
	40 or above	15	3%
Educational Level	Senior High School or Equal	152	35%
	Bachelor	256	58%
	Master	28	6%
	Doctoral	3	1%
Occupations	Senior High School or Equals	52	12%
	Undergraduate Student	168	38%
	Master Student	10	2%
	Doctoral Student	4	1%
	Government Employee (Civil Servant and Non- Civil Servant)	34	8%
	State Owned Enterprises Employee	20	5%
	Private Employee	82	19%

Variables	Descriptions	Frequencies	Percentages (%)
	Entrepreneurs	45	10%
	YouTubers Gamers	12	3%
	Others	12	3%
On average spends time in playing mobile games in a day	30 minutes or below	103	23%
	31 - 60 minutes	88	20%
	61 - 90 minutes	105	24%
	91 - 120 minutes	79	18%
	more than 120 minutes	64	15%
On average, retention to play mobile games in a day	1 or less than once a day	38	9%
	2 - 3 times a day	37	8%
	3 - 4 times a day	64	15%
	4 - 5 times a day	144	33%
	more than 5 times a day	156	35%
On average spends time on online mobile games in years	1 or less than one years	131	30%
	1 - 2 years	136	31%
	2 - 3 years	106	24%
	3 - 4 years	22	5%
	More than 5 years	44	10%

The variables observed in this study were an addiction to online games consisting of 21 items, stickiness consisting of 6 items, and in apps, purchase intention consisting of 4 items measured using the 7-Likert Scale. This study uses a quantitative method that analyzes the research data in the form of numbers and then interprets it to have meaning that can be understood and represents a conclusion. Furthermore, for further data analysis, it can be seen in the results and discussion of the research.

Furthermore, we analyze the validity and reliability test. To test the validity and reliability of this study using terms such as Cronbach's alpha > 0.70 (Bagozzi & Yi, 1988); Average Variance Extracted (AVE) > 0.5 (Bagozzi & Yi, 1988; Wong, 2013); Composite Reliability > 0.70 (Wong, 2013). The results of validity and reliability of as shown in table 2 below:

Table 2
Validity and Reliability Test

Variables	Items	Factor Loadings	CR	CA	AVE
Addiction to Online Mobile Games	I'm thinking about playing mobile games all day long.	0,810	0,971	0,969	0,616
	I spend a lot of free time playing online mobile games.	0,807			
	I felt addicted to online mobile games.	0,785			
	I play online mobile games longer than intended.	0,754			
	I spend increasing amounts of time playing online mobile games.	0,803			
	I am unable to stop once I started playing online mobile games.	0,809			
	I play online mobile games to forget about my real life.	0,798			
	I play online mobile games to release	0,788			

Variables	Items	Factor Loadings	CR	CA	AVE
	stress.				
	I play online mobile games to feel better.	0,793			
	I am unable to reduce my time spent playing online mobile games.	0,780			
	I become angry when I am unable to play online mobile games.	0,791			
	I fail when trying to reduce the amount of time playing online mobile games.	0,807			
	I feel bad when I am unable to play online mobile games.	0,757			
	I become angry when I am unable to play online mobile games.	0,715			
	I become stressed when I am unable to play online mobile games.	0,788			
	I have fights with others (e.g., family, friends, etc.) over the time I spend playing online mobile games.	0,759			
	I neglect others (e.g., family, friends, etc.) because I play online mobile games.	0,800			
	I lie about spent playing online mobile games.	0,780			
	I do spend time play online mobile games causes of sleep deprivation.	0,809			
	I neglect other important activities (i.n., school, work, sports, etc.) to play online mobile games.	0,773			
	I feel bad after playing online mobile games for a long time.	0,785			
Stickiness	I would stay for a long time while playing online mobile games.	0,960	0,950	0,943	0,897
	I usually spend a lot of time playing these online mobile games.	0,945			
	I intend to prolong my stay on these online mobile games.	0,973			
	I would stay for a long time while playing online mobile games.	0,909	0,963	0,924	0,863
	I usually spend a lot of time playing these online mobile games.	0,938			
	I intend to prolong my stay on these online mobile games.	0,940			
In Apps Purchase Intention	I intend to continue purchasing in-app products and services of online mobile games.	0,887	0,920	0,884	0,742
	I strongly recommend others to purchase in-app products and services of online mobile games.	0,867			
	I find purchasing in-app products and services of online mobile games to be worthwhile.	0,877			
	I will frequently purchase in-app products and services of online mobile games in the future.	0,812			

Notes: *CR* Composite Reliability, *CA* Cronbach's Alpha, *AVE* Average Variance Extracted

Table 2 showed that all the criteria for validation dan reliability were fulfilled. Standard loadings for each item were higher than the suggested value 0,70; suggested value for composite reliability 0,7; suggested value for Cronbach's alpha 0,7; suggested value for AVE 0,5 were fulfilled. Furthermore, this study also tests the validity by using discriminant validity. Discriminant validity describes the average variance extracted (AVE) value of a variable higher than the correlation for each variable performed. Results of discriminant validity as shown in table 3 below.

According to the results obtained, the square root of the AVE value is higher than the correlation between the variables. From these results can be concluded that discriminant validity was well performed and fulfilled the standards. Further analysis is to perform the structural model. Before analyzing the research hypothesis, first, it is necessary to meet the research model fit. According to the results obtained shows the value of SRMR 0,086 < 0,1; NFI 0,874 (closer to one); d_ULS 5,375; and x^2 4514,1 fulfilled the fit index for structural modelling in this research. According to the results, both measurement and structural models have fulfilled the requirement. Hence, this model is adequate to test the research hypothesis.

Table 3
Discriminant Validity

	Addiction to OMG	In Apps Purchase Intention	User Retention	Visit Duration
Addiction to OMG	0,785			
In Apps Purchase Intention	0,663	0,861		
User Retention	0,636	0,748	0,929	
Visit Duration	0,582	0,714	0,889	0,947

In this study, the hypothesis testing consisted of direct hypothesis testing and identified the effect of mediation—direct hypothesis testing purposes of testing addiction to OMG on stickiness and app purchase intention. Meanwhile, the mediation hypothesis testing was carried to test the mediation of the stickiness variable on the relationship between addiction to OMG and in apps purchase intention. The results of testing the direct hypothesis results can be seen in Table 4 as follows:

Table 4
Direct Hypothesis Results

Parameters	T-Statistics	P Values	Conclusion
Addiction to OMG → In Apps Purchase Intention	6,097	0,000	Supported
Addiction to OMG → User Retention	19,389	0,000	Supported
Addiction to OMG → Visit Duration	17,588	0,000	Supported
User Retention → In Apps Purchase Intention	4,681	0,000	Supported
Visit Duration → In Apps Purchase Intention	2,857	0,004	Supported

Table 5
Mediating Relationship Results

Parameters	T Statistics	P Values	Conclusion
Addiction to OMG → User Retention → In Apps Purchase Intention	4,593	0,000	Mediated
Addiction to OMG → Visit Duration → In Apps Purchase Intention	2,806	0,005	Mediated

The results of direct hypothesis testing show that the variable addiction to OMG is significantly affecting the in-app purchase intention. However, user retention is more significant for the stickiness than visit duration towards OMG influences in apps purchase intention. Furthermore, to obtain more detailed results regarding the relationship between each variable, it is necessary to analyze the mediation relationship between variables. The mediating effects performed shows in table 5. Furthermore, for the mediation hypothesis, all hypotheses proposed in this study are supported.

Discussion

This research investigates addictive behavior towards online mobile games, stickiness, and app purchase intention. This study has found a significant influence both directly and through the mediation relationship between the stickiness variable in the relationship between addiction to online mobile games and apps purchase intention. The findings explain that the customers' addiction to online mobile games has a more significant direct effect than the mediation of the stickiness variable. It proves that a consumer who has an addiction to online games must have high stickiness. However, online mobile games are not the most critical thing in this case, but addiction to online mobile games is the main thing. This research also proves that the attributes of the addiction variable to online mobile games can impact repetitive behavior and are attached to online mobile games.

Research related to consumer behavior towards technology products has been growing. It proves by the development of variable measurements that refer to the use of this technology. One of the variables observed in this case is stickiness behavior. In this case, stickiness affects app purchase intention significantly and can mediate the relationship between addiction to online mobile games and app purchase intention. It means that the more attached a person is to play online mobile games, it can be assumed that the higher the purchase of feature games he/she does. Finally, the impact of purchasing behavior on the feature games is a critical output variable from a marketing perspective.

Referring to the results of previous research, that addiction to online mobile games affects variable stickiness (Balakrishnan & Griffith, 2018; Balakrishnan & Griffiths, 2018; Kang et al., 2013; Lu & Wang, 2014) and in apps purchase intention (Balakrishnan & Griffith, 2018; Balakrishnan & Griffiths, 2018; C.-L. Hsu & Lin, 2016). However, a small number of researchers analyze the mediation effect of stickiness as contributing to this research. Furthermore, all of the hypotheses proposed in this study have a significant effect and are supported by the results of previous studies. It proves that the results of this study are in line with the results of previous studies with several inputs and contributions generated in this study.

CONCLUSION

Apart from investigating addictive behavior, stickiness, and app purchase intention towards online mobile games, this research is also conducted as a form of social welfare, specifically from a social perspective. Advanced development of technology in the current industrial era 4.0, especially in Indonesia; many things are considered pros and cons, one of which is the online mobile game application which has developed rapidly in the current millennial generation market. This research has proven that there is addictive behavior towards online mobile games that can influence apps' purchasing behavior. As researchers concerned with social welfare, this research also suggested that the customers have to be aware of the predictor variables observed in this research, especially in addition to online mobile games. However, future research regarding addiction behavior will also be discussed associated with the self-control variable.

This study has confirmed that the hypothesis proposed in this study relating to addiction to online mobile games, stickiness behavior, and apps purchase intention was proven significant. It proves that there is addictive behavior towards online mobile games and purchase of feature games, and consumer stickiness to online mobile games in Indonesia. Moreover, providing a clearer picture of addictive behavior by modifying the measurement variables will be considered as suggestions in this study. Measurement of the appropriate variables and dimensions for a research phenomenon will be a solid basis for this research to provide accurate results and answer the phenomenon.

This research also has a theoretical contribution, one of which is the role of the stickiness variable in mediating the relationship between addiction to online mobile games in apps purchase intention. The results of this study have proven that the stickiness variable is a mediating variable and has a significant effect. This means the role of the stickiness mediating variable explains that repetitive attitudes and time spent playing online mobile games can increase addictive behavior and consumers purchase in-game features in the application. In addition, the practical contribution that can be given through the results of this study is the addictive behavior of consumers who will purchase features that can support an application, one of which is online mobile games. As a practical contribution, stimulating consumers to create addictive behavior towards certain products/services must be done correctly and following the use and essence of the consumer's own needs. In addition, creating purchases in the application can be done by creating stickiness behavior for consumers to extend their visits to the application repetitively. So that it can affect consumer purchasing behavior,

As the contributes to the discovery of addictive behavior towards online mobile games and in apps purchase intention, this study provides an overview for future research in analyzing addictive behavior specifically in online mobile games and in other research objects that use measurement precise and following the observed phenomena will be very useful. The point is that the closer the measurements used in a variable are to the phenomenon, the more accurate the results are given from the research. However, there is still a small number of studies that discuss addictive behavior towards in apps purchase intention, which will be a basis for future researchers to explore further the variables discussed.

The results of this study have proven that players' addiction to online mobile games can affect in-app purchase intention through stickiness. Therefore, the purpose of this research is to understand consumers' addiction to online mobile games and in apps purchase intention with players's stickiness as the mediation was performed well. Thus, this examination can be a reflection for users of online mobile games and in apps purchase behavior. The limitation of this study is the development of questionnaire items based on Asian people's behavior. Formerly, this study uses a questionnaire item based

on a western respondents' perspective. For future research suggests developing the items according to the Asian perspectives to obtained online mobile game behavior.

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Appendix:
Measurement Variables
Addicted to Online Mobile Games (Balakrishnan & Griffiths, 2018)
1. Salience
    a. I'm thinking about playing mobile games all day long.
    b. I spend a lot of free time playing online mobile games.
    c. I felt addicted to online mobile games.
2. Tolerance
    a. I play online mobile games longer than intended.
    b. I spend increasing amounts of time playing online mobile games.
    c. I am unable to stop once I started playing online mobile games.
3. Mood Modification
    a. I play online mobile games to forget about my real life.
    b. I play online mobile games to release stress.
    c. I play online mobile games to feel better.

4. Relapse
    a. I am unable to reduce my time spent playing online mobile games.
    b. I become angry when I unable to play online mobile games.
    c. I fail when trying to reduce the amount of time playing online mobile games.
5. Withdrawal
    a. I feel bad when I unable to play online mobile games.
    b. I become angry when I unable to play online mobile games.
    c. I become stressed when I unable to play online mobile games.

6. Conflict
    a. I have fights with others (e.g., family, friends, etc.) over the time I spend playing online mobile games.
    b. I neglect others (e.g., family, friends, etc.) because I play online mobile games.
    c. I lie about spent playing online mobile games.
7. Problems
    a. I do spend time play online mobile games causes of sleep deprivation.
    b. I neglect other important activities (i.n., school, work, sports, etc.) to play online mobile games.
    c. I feel bad after playing online mobile games for a long time.

Stickiness (Lee et al., 2018; Li et al., 2021; Xu et al., 2018)
1. Visit Duration
    a. I would stay for a long time while playing online mobile games.
    b. I usually spend a lot of time playing these online mobile games.
    c. I intend to prolong my stay on these online mobile games.
2. User Retention
    a. I am playing these online mobile games almost every day.
    b. I am in the habit of playing these online mobile games while using mobile phones.
    c. I would visit online mobile games frequently.

In Apps Purchase Intention (Hsu & Lin, 2016)
1. I intend to continue purchasing in-app products and services of online mobile games.
2. I strongly recommend others to purchase in-app products and services of online mobile games.
3. I find purchasing in-app products and services of online mobile games to be worthwhile.
4. I will frequently purchase in-app products and services of online mobile games in the future.