

Factors determining gamers' in-app purchase decision: Evidence from Bangladesh

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Abstracts

The concept of in-app purchase intention within the context of online games pertains to the probability of a game player to engage in the act of acquiring virtual products, currency, objects, or premium features within the game by using actual monetary resources. This research intends to fill the knowledge gap on game players' continuation intentions and the antecedents that lead to in-app purchases in an emerging economy, Bangladesh in particular. The proposed framework of gamer's intention to continue games and in-apps purchase intent has formed with the variables such as social influence, difficulty, game design quality, and escapism through structural equation modeling where 400 responses have been collected by using a seven-point Likert scale questionnaire. The collected data is coded and analyzed in AMOS 22 for final recommendations. These findings provide significant insights for game marketers seeking to succeed in Bangladesh's gaming industry. Developers may better match players' expectations through game design, marketing campaigns and increase in-app purchase revenue by gaining a deeper grasp of the factors that influence players' intentions to continue playing a game.

Keywords Game players, Game design, In-App purchases, Continuance intentions, Bangladesh.

Paper type Research paper

1. Introduction

In-app purchase behavior in mobile games describes how people spend money while playing games on their smartphones. The motive behind player participation can exhibit substantial variation among individuals and is influenced by a diverse range of elements, such as game design, player engagement, and their willingness to invest financial resources in the expected games. With the explosion of the mobile gaming industry, in-app purchases have become an essential revenue stream, serving 2.7 billion customers worldwide as of 2020. Since March 2020, video game participation has increased dramatically as people have tried to pass the time while the pandemic has continued to worsen.

During the global lockdown caused by the COVID-19 outbreak, people turned to video games as a way to connect with others (WARC report, 2020). The remarkable growth of the industry has led to a substantial flow of venture capital, with investments exceeding \$9.6 billion.

However, especially in the context of developing countries (like Bangladesh), little is



known about what motivates gamers to keep spending money in gamer. Developers cannot hope to successfully implement monetization tactics that are not tailored to the specific demographics and habits of the players in each market. This research sets out to fill this void by exploring the factors that encourage in-app purchases and shape gamers' propensity to stick with gamer in developing nations.

Some research has demonstrated that gaming on the internet can be beneficial to a student's education by improving their critical thinking, math skills, social abilities, and memory (SNS, 2019). In order to keep a game online, developers face the challenge of luring and keeping players make money from the sale of in-game currency, items, and enhancements. Until recently, in-app purchase intent was largely ignored by the academic community. The primary objective for developers of free-to-play mobile games is to broaden their user base and enhance their revenue potential by means of in-app sales. Accordingly, knowing what makes players want to keep playing and, more crucially, pay real money within the app is critical for the long-term viability of these games. The video game industry's market value exceeds the combined worth of the football and cinema industries. India is an expanding market for mobile games in the South Asian area, which are projected to reach a market value of \$934 million by 2023. Being the same geographical area as an emerging economy Bangladesh has been getting more and more attention from academics. Millennials, born between 1980 and 1990, constitute the initial cohort of individuals who grew up with digital technology and prefer either written or spoken communication whereas Generation Z (post Millennials born between the mid-1990s and early 2010s) favors video communication and dedicates more time to smartphones and social media (Thomas, 2011). Millennials emphasize individuality, work life balance and a dedication to social and environmental concerns. When interacting with this age group during leisure time, the emphasis should be on virtual experiences. The ways in which Millennials engage with online games have attracted the attention of academics, developers and professionals in the field. Thus, the literature on the subject of millennial and digital gaming is expanding (Kurz, Li, & Vine, 2019).

In an emerging economy like Bangladesh, it is crucial to start coping with the challenges of game-purchase behavior. Games like Candy Crush and Angry Birds, which are played by billions of people every year, have already proven the financial viability of the mobile gaming industry (Clement, 2019; Statista, 2022). Hypercasual games are characterized by their uncomplicated principles, easy gameplay, and brief play periods. The games have been intentionally developed to possess a high level of accessibility and engagement, catering to a wide range of individuals and focusing mostly on generating revenue through advertising (Hreninciuc,

2018), including both casual gamers and those who are inexperienced in the realm of gaming. Accordingly, Flappy Bird is the pioneering example of a hypercasual game that is used mostly in Bangladesh. Although the video game business in Bangladesh is very young, several domestic development companies have already attained global recognition. The software development industry in Bangladesh has experienced a substantial increase in the establishment of startup companies in recent years.

Popular Bangladeshi developers include Azmi Studio (makers of the Mega Crush and Flip Gun series as well as Motor Hill Track and Getly), The Riseup Lab is responsible for the development of the Meena Game which was created in collaboration with UNICEF to foster awareness and comprehension of children's rights (The Daily Star,2023). Additionally, they \ designed the Fun Basket game in partnership with the BBC Media Action, aimed at generating funds for Life Skill Based Education (LSBE) programs targeted toward adolescents, and Techno Magic (creators of the real-time multiplayer battle royale game wars for Robi Axiata Ltd.). Bangladeshi developers and startups have the potential to emulate the development trajectory observed in China. Hsu and Lin (2016) conducted a study using an expanded ABC model of attitudes to examine the relationships among satisfaction, attitude, stickiness, and intention to make in-app purchases. Their findings indicated that satisfaction has an indirect influence on attitude, which in turn significantly affects a user's propensity to engage in in-app purchases.

Mobile battle royale games frequently employ the free-to-play (F2P) framework, meaning that players do not have to pay anything to get started but must pay to unlock the whole game. It is a freemium business model that has proven successful for developers of mobile battle royale games (King, Delfabbro, Gainsbury, Dreier, Greer, & Billieux, 2019). The introduction of virtual goods within games has transformed gamers from spectators to consumers (Lin & Sun, 2007). Therefore, how players perceive the value of virtual products and what factors encourage in-game consumption has become a significant topic of study. The objectives are as follows:

The broad objective of this study is to identify the antecedents that lead gamers to make apps purchase decisions.

Specific objectives:

- i. to identify the antecedents of game apps for users' engagement
- ii. to evaluate the in-app purchase intentions of gamers.

Several studies have been undertaken to examine the various aspects that contribute to the sustained engagement of gamers. The Expectation Confirmation Theory, as proposed by Venkatesh, Morris, Davis, and Davis (2003) posits that the satisfaction and confirmation of expectations

have a positive effect on individuals' intentions to continue. It was found that the continuance intention of players was highly impacted by their perceptions of the game's value, enjoyment, and social norms. This hypothesis lays the groundwork for realizing what keeps gamers coming back to a game repeatedly.

Consumer behavior research can provide insights into the factors that drive individuals to engage in in-app purchases. The purchasing decisions of customers are significantly influenced by their perceptions of value. This concept is relevant in the context of in-app purchases, as users assess the value of in-game currency by considering the perceived worth of supplementary material or an enhanced user experience. The study highlights the importance of players' perceptions of value in influencing their decision to engage in in-app purchases.

In contemporary game design, the quest for optimal income generation through in-game purchases has become a priority beside the development of high-quality games. In a growing economy like Bangladesh, game developers must often provide new material and update the game based on user feedback to stay competitive. This study addresses gaps in the literature and examines the factors that impact player dedication to mobile online gaming. The findings of this study have the potential to offer significant insights for the video game industry.

2. Related literature and hypotheses

Mobile battle royale games are often free-to-play (F2P), so players do not pay to start but must pay to unlock the whole game (King, Delfabbro, Gainsbury, Dreier, Greer, & Billieux, 2019). Mobile battle royale game studios gain revenue through the sale of virtual items, which occurs when players choose to make a purchase. On the other hand, Hamari (2015) posits that there exists an inverse relationship between the level of enjoyment derived from a game and the inclination to acquire virtual goods. However, the author also suggested that prolonged engagement with the game positively influences the intention to make such purchases. Thus, developers now strive to create games that not only excel in quality but also strategically engage users to make frequent purchases of in-game content in order to generate sales. This process is typically achieved by adapting the game according to the players' actions and regularly delivering fresh content (Alves & Roque, 2007). Hence, it is crucial to comprehend the aspects that enhance in-game purchase behavior. Previous studies indicate a relationship between the type of game and the tendency to make purchases within the game. Digital game researchers have focused on role-playing and racing games (Barton & Stacks, 2019; Pacheco, Tokarchuk, & Pérez-Liébana, 2018) but Bangladeshi millennials'

in-game purchasing behavior in battle royale games like PUBG is unknown.

These aids in comprehending how various features can be employed not only to enhance the intention to purchase but also to foster favorable player communication, benefiting both games and brands. Hamari et al., (2020) conducted a study on players' perceived value in F2P modeled games, but found no game genre segmentation. They suggest that future research should consider game genres to understand behavioral motivations. The study also highlights the growing importance of millennial as a prime spending generation, making it crucial to study their preferences in the current context.

2.1. Ease of use (EOU) and CI (Continue intention)

A positive user experience can be attributed to the EOU of a technological system. In their study, Hsu and Lu(2007)examined a sample of 356 online game communities and determined that customer loyalty is influenced by factors such as perceived enjoyment, social norms, and preferences. Hsu and Lin (2016) conducted a study using an expanded ABC model of attitudes to examine the relationships among satisfaction, attitudes, stickiness, and the intention to make in-app purchases. Their findings indicate that satisfaction has an indirect effect on stickiness, which in turn significantly influences a user's propensity to engage in in-app purchases. The user interface of a mobile game needs to be simple and straightforward so that the player can concentrate on the action and not the controls. Accordingly, the following hypothesis is:

H₁: Ease of use of games has significant relation with continuation intention

2.2 Social factor (SF) relationships with other gamers and CI

Online games, much like social media, give players the chance to meet new people with similar interests. This suggests that the in-game pals have a good rapport with one another (Blinka & Mikuska, 2014). Kim and Chock (2017) argues that player engagement is best fostered through social contact in online games.

Players who engage in beneficial relationships are more likely to continue playing online games, and players who work together to accomplish in-game goals are more likely to remain committed to those goals over time (Teng, 2018). Accordingly, the following speculations are proposed:

H₂: Social factors have relations with continue intention

2.3 Challenges and CI

The challenge is to play the game repeatedly until everything is unlocked. To illustrate, when a game begins with a poor and unappealing

progression, players may become bored and stop playing the game because they lack the abilities and difficulties necessary to move further into the game. Therefore, online games continued intentions can be improved by posing challenges to players that give them an early advantage in the game and encourage them to keep playing. Therefore, the following hypothesis is proposed

H₃: Challenges has significant relation to continue intention

2.4 Game design and continuation intention

The fundamental components of a game encompass its design aspects, such as points, badges, leaderboards, narrative depth, and avatars (Werbach & Hunter, 2012). The internal systems of games need to be more interesting if they are to succeed in luring and keeping players. Players are more likely to invest in an online game if they like its aesthetics and story' structure. In sum, online games' continued intentions can be influenced favorably by the quality of a game's design. Therefore, the following hypothesis is drawn:

H₄: Game design has a significant relationship with continuance intention

2.5 Escapism and CI

Ho, Lwin, Sng and Yee (2017) found that individuals seek to divert their attention from reality by engaging in media consumption. When people feel overwhelmed or stressed, they often turn to escapism (Merhi, 2016) because it provides little distraction from their problems. Empirical research on gamers has indicated that the ability to escape reality is a significant predictor of satisfaction (Chen, Lu & Wang, 2016). The following hypothesis is drawn:

H₅: Escapism has significant relation to continuation intention

2.6 Continuous intention and in-app purchase

Based on the results of several empirical investigations (Hamari, 2015; Hsiao & Chen, 2016), it can be inferred that the key sources of revenue for game developers primarily center around in-app advertisements and in-app purchases. Further, Hsu and Lin (2016) discovered that users' commitment to keeping an app has a substantial impact on their likelihood of making in-app real purchases. As a result, it stands to reason that the desire to keep playing a game likewise affects the likelihood of making in-app purchases within that game. Therefore, the following was assumed:

H₆: Intent to continue games has significant relation to in-app purchase

Previous research, such as the study conducted by Moon and Kim (2001), has investigated the various aspects that impact user behavior within digital environments. Nevertheless, the majority of these researches

tend to prioritize western or global viewpoints. The existing literature on factors influencing in-app purchase intentions among game players in Bangladesh, an emerging economic context, demonstrates a research gap that requires localized research that takes into account cross-cultural differences.

Furthermore, game developers have been strengthened by their own experiences of failure (Khan, Tusher, Hasan, & Rokonuzzaman, 2021) because of a lack of formal academic resources. Thus, understanding game players' perceptions would help in the game development process and create marketing opportunities for the game developers by incorporating formal education. This study proposes the following conceptual model (figure1):

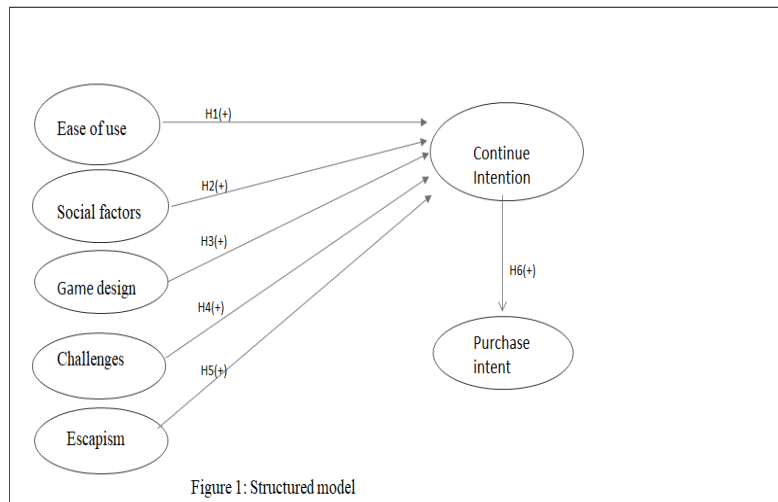


Figure 1

Structural Model

3. Methods

3.1 Data collection

This study aims to examine the factors influencing players' intention to continue playing PUBG games, as well as their inclination to make in-app purchases within the context of the facebook gaming community in Bangladesh. Therefore, the respondents sought for this study were individuals who were playing these games. A hyperlink directing recipients to the google survey form to Bangladeshi digital native millennials and Gen Z. Purposive sampling is employed to choose participants for the study, specifically individuals who engage in playing the PUBG game (Mamun, & Griffiths, 2021; Bhattacharya, 2019).

The study employed a structured questionnaire to collect primary data, which has advantages in terms of ease of analysis, administration, and cost-effectiveness, as it saves both time and money. In an initial survey a sample of 30 persons were deliberately selected from private universities in Chattogram and the online gaming community equally. The participants were requested to provide feedback on the items in the list that aligned with the constructs. Two university professors examined the scales' wording, length, and questionnaire format to assess their applicability and content validity. Thus, the question was filtered to ascertain whether the respondents actively engaged in PUBG or rabethhole.

A total of 600 questionnaires were submitted during the survey, which was conducted from February to March 2023, and 430 responses were obtained. The final number of responses were 400 after exclusion of some respondents whose informations were incomplete or inconsistent information. These sample respondents were standard with the line required sample size given by Cochran (1977), which is adequate for SEM analysis (Kline, 2011). Incomplete responses were not included in the final analysis. Furthermore, all possible precautions have been taken to protect the privacy and anonymity of users.

3.2 Survey instrument

The questionnaire was adopted from Wei and Lu (2014), Hsiao and Chen (2016). Initially, a pilot survey was done on a sample of 30 participants who were selected users from the online gaming community. The participants were requested to provide feedback on the items listed, which were aligned with the constructs. This evaluation aimed to determine the appropriateness of the instrument and its content validity. Several questions were modified moderately following feedback from respondents and experts. A seven-point Likert scale, featuring a nonforced response format and a neutral option was selected.

In questionnaire, the initial section covered the participants' demographic information, which consisted of their age, gender, and place of residence. The second section encompassed the primary portion of the study, wherein the participants were obligated to respond to inquiries pertaining to ease of use, game design, challenges, social factors and escapism, which have an impact on the continuance intention, and the continuance intentions of game players will lead to the app purchase intention.

3.3 Data analysis

The process of data analysis involves the development of a model followed by hypothesis testing. To test the validity and reliability of the model, a proposed framework is constructed to assess the numerous

elements that influence the continuation intention of hypercausal games. Afterwards, the use of structural equation modeling (SEM) is employed to empirically test and assess the offered hypotheses. SEM (a statistical method) is commonly employed in academic research to examine proposed hypotheses. The procedure involves the estimation of both the measurement and structural models utilizing AMOS 22 software for subsequent analysis, with a 5% margin of error and a 50% population percentage. Following that, the data were subjected to normality testing using the Kolmogorov-Smirnov and Shapiro-Wilk tests.

The response data can be classified into factor analysis based on the median values, as determined by the results of the normality test. The researcher employed confirmatory factor analyses (CFAs) to evaluate the convergent and discriminant validity of the latent factors. Different fit indicators are used in the academic literature. The researcher solely employed the most widespread indexes. A likert scale with seven points was chosen with nonforced and neutral option.

4. Results

At the time of the survey, PUBG and RabbitHole, both games, were the most downloaded games available in the App store (Gummerus, Liljander, Pura & VanRiel, 2004). According to Kim & Chock (2017), the majority of social media users are individuals between the ages of 18 and 26, with a particular emphasis on students attending private universities. Hence, it was deemed reasonable to use university students as participants in this investigation. The survey results indicated that the majority of participants, specifically 90%, identified as male, while the remaining 10% identified as female. A significant proportion of participants (82%) were younger than 26 years. Approximately 65% of the participants possessed a gaming background ranging from 1 to 2 years, while 24% reported having more than 3 years of expertise in engaging with online games. Ultimately, a significant majority of individuals, specifically 83%, engaged in the activity of playing online games for a duration exceeding 12 hours each week. The data pertaining to playing time indicate that consumers allocate a substantial amount of their time to the online game community. The demographic findings pertaining to the respondents in this study corroborated the prior findings reported by the MIC in 2003.

4.1 Descriptive statistics and normality test

Table I shows the results of the normality tests (Kolmogorov-Smirnov and Shapiro-Wilk) as well as the descriptive statistics (N, Min, Max, and Median) for the selected values of the respondents.

Table I*Descriptive statistics and normality test*

The survey questionnaire responses were tested normality by using the Kolmogorov-Smirnov test statistic and the Shapiro-Wilk test statistic.

Sl. No	Constructs	Questionnaire	Min	Max	Kolmogorov-Smirnov Test	Shapiro-Wilk Test	Median
Purchase intention							
1.	Question1	I anticipate I will spend actual money on game coins	2	4	0.446 (0.000)	0.607 (0.000)	3
2.	Question2	I feel comfortable buying game coins	2	4	0.439 (0.000)	0.620 (0.000)	3
3.	Question3	I like to spend real money by enjoying games.	2	4	0.375 (0.000)	0.717 (0.000)	3
Continue intention							
4.	Question4	I plan to continue playing the game in the future	3	5	0.292 (0.000)	0.745 (0.000)	4
5.	Question5	I would continue playing the game	3	5	0.319 (0.000)	0.733 (0.000)	4
6.	Question6	I expect to continue playing the game	3	5	0.307 (0.000)	0.744 (0.000)	4
Escapism							
7.	Question7	To distract myself from my troubles, I play video games	3	5	0.232 (0.000)	0.793 (0.000)	4
8.	Question8	I play games as a way to escape from real-world problems	3	5	0.225 (0.000)	0.798 (0.000)	4
9.	Question9	I play games as a way to relieve stress	3	5	0.226 (0.000)	0.804 (0.000)	4
10.	Question10	I play game as a way to forget about unpleasant things	3	5	0.213 (0.000)	0.808 (0.000)	4
Challenges							
11.	Question11	Skill-testing is a strong point of the game	3	5	0.311 (0.000)	0.742 (0.000)	4
12.	Question12	Taking part in the competition pushes me to do my best	3	5	0.366 (0.000)	0.667 (0.000)	4
13.	Question13	Playing the game makes me think	3	5	0.332 (0.000)	0.731 (0.000)	4
Game Design of PUBG and Rabbithole							
14.	Question14	The screen design (i.e. colors, menus, etc.) is attractive	3	5	0.361 (0.000)	0.712 (0.000)	4
15.	Question15	The game has polished design and sound	3	5	0.300 (0.000)	0.784 (0.000)	4
16.	Question16	Graphically, the game holds its own	3	5	0.349 (0.000)	0.732 (0.000)	4
17.	Question17	The game is visually appealing	3	5	0.349(0.000)	0.732 (0.000)	4

Sl. No	Constructs	Questionnaire	Min	Max	Kolmogorov–Smirnov Test	Shapiro–Wilk Test	Median
Social factors							
18.	Question18	Many people around me use this game	4	5	0.413 (0.000)	0.607 (0.000)	4
19.	Question19	My friends often discuss this app with me	4	5	0.405 (0.000)	0.613 (0.000)	4
20.	Question20	I think the number of members of this app is large	4	5	0.428 (0.000)	0.593 (0.000)	4
Ease of Use							
21.	Question21	Learning to use the game is easy for me	3	5	0.224 (0.000)	0.803 (0.000)	4
22.	Question22	I understand the game clearly	3	5	0.232 (0.000)	0.801 (0.000)	4
23.	Question23	I find the game easy to use	3	5	0.211 (0.000)	0.807 (0.000)	4

P=0.000, Source: Calculated survey data

The minimum values of each survey questionnaire response are 3 to 4 and the maximum values of each survey questionnaire response are 4 to 5. The resulting values for the Kolmogorov-Smirnov test statistic ranged from 0.211 to 0.446, while the values for the Shapiro-Wilk test statistic ranged from 0.593 to 0.807. These tests were conducted at a significance level of 0.000. The distribution of survey answer values does not follow a normal distribution (as indicated by the p-values being less than 0.05). Hence, in factor analysis, median values are computed to facilitate the comparison of mean ranks. The median values of each survey questionnaire response are 2 to 4. As the median values vary in a wide range, a factors analysis is conducted to classify the survey questionnaire into different factor with similar responses.

4.2 Factor analysis

Factor analysis is employed to identify underlying latent factors within a set of observed variables. It helps reduce data complexity and has been used to categorize the responses to the questionnaire into distinct factors (table II) and the Kaiser-Meyer-Olkin sampling adequacy test for the factor analysis yields a value of 0.655 ($p = 0.0001$). Further, confirmatory factor analysis (CFA) serves as the preliminary step in implementing the structural equation modeling (SEM) framework the measurement model. The summary output of the measurement model is presented in table II. The fit indices of the confirmatory factor analysis (CFA) model are deemed acceptable thresholds. As an illustration, the ratio of χ^2 to df is 2.134, which is less than or equal to 3. The variable denoting the squared value of χ in the AMOS software is commonly referred to as CMIN. According to Meydan and Sesen (2011), if the minimal discrepancy per

degree of freedom (CMIN / DF) is less 3, than the overall fit of the model is within the acceptable range.

Table II
Factor analysis

Variable Name		Rotated Component Matrix ^a						
		Component						
		1	2	3	4	5	6	7
Game Design	Question17	0.965						
	Question16	0.919						
	Question14	0.909						
	Question15	0.731						
Escapism	Question7		0.930					
	Question8		0.888					
	Question10		0.851					
	Question9		0.754					
Social factor	Question20			0.959				
	Question18			0.915				
	Question19			0.876				
Purchase Intention	Question1				0.949			
	Question2				0.907			
	Question3				0.862			
Challenges	Question12					0.927		
	Question11					0.875		
	Question13					0.832		
Continuing Intention	Question4						0.907	
	Question6						0.795	
	Question5						0.789	
Ease of Use	Question21							0.948
	Question23							0.885
	Question22							0.671

a. Rotation converged in 6 iterations.

Source: Survey data factor analysis

Table II presents the findings pertaining to convergent validity, item loadings, average variance extracted (AVE), and CR (maximum shared variance). According to Hair, Black, Babin, and Anderson, (2010), all of the AVE values exceeded 0.5, while the CR values exceeded 0.7. These findings suggest that the model exhibits satisfactory levels of reliability and convergent validity. Moreover, allowing for social characteristics, the loadings of every item exceeded 0.708. Each of the indicator variable factor loadings is statistically significant and extremely high in these instances ($p < 0.05$). The model index values in this instance satisfy all the prescribed criteria of the survey; therefore, the chosen model is well-fitted.

4.3 Convergent validity and discriminant validity

Convergent validity is an approach utilized to assess the extent to which multiple measurements of a specific construct generate outcomes that are consistent and interconnected. Table III presents the average variance anticipated (AVE) values for various constructs. The AVE for ease of use is 0.672, that for social factors is 0.784, that for obstacles is 0.699, that for game design is 0.742, that for escapism is 0.657, that for continuous

intention is 0.657, and that for in-app purchase intent is 0.762. The obtained AVE values in this study are larger than 0.5, which indicates that the model has achieved convergent validity.

The study demonstrates that the AVE value exceeds 0.50, as shown by Fornell and Larcker (1981). Therefore, the results of the average variance extracted (AVE) shown in Table III confirm that the appropriate parameters have been met. Cronbach's α was calculated using the reliability scale of SPSS 24 software to assess the internal consistency of the data. The results indicated that the data met the criterion of having a reliability coefficient above .7 (Hair, Black, Babin, & Anderson 2010).

Table III

Convergent validity, cronbach's alpha and discriminant validity

Construct	Cronbach's Alpha(α)	AVE	SRAVE
Ease of use	0.794	0.672	0.820
Social factors	0.909	0.784	0.885
Challenges	0.858	0.699	0.836
Game Design	0.901	0.742	0.862
Escapism	0.886	0.657	0.811
Continuous intention	0.886	0.657	0.811
In-app purchase	0.892	0.762	0.873

Source: Survey data

Discriminant Validity Analysis is used to ensure that the factors in a study are distinct from each other and not highly correlated. To test discriminant validity, the maximum shared variance (MSV) of H₁ (.067), H₂ (.041), H₃ (.084), H₄ (.154), H₅ (.003), and H₆ (.172) are found to be less than the square root of the AVE. All values were less than one, establishing discriminant validity (Henseler, Ringle, & Sarstedt, 2015).

4.4 Test of the structural equation model

In this study, the utilization of Structural Equation Modeling (SEM) is employed to uncover significant aspects associated with game players' purchase intentions. The measurement model was evaluated through the use of confirmatory factor analysis. The result of χ^2 divided by df is 2.134. The variable representing the value of χ^2 in AMOS is called CMIN. The model's overall fit is considered acceptable if the minimal discrepancy per degree of freedom (CMIN / DF) is below 3, according to Meydan & Sesen (2011). According to Scott (1994), it is recommended that the goodness-of-fit index (GFI) should be above a threshold of 0.90. According to Bagozzi and Yi (1988), a minimum value of 0.9 is necessary for the comparative fit index (CFI) and the root mean square error of approximation (RMSEA) is shown to be below 0.08.

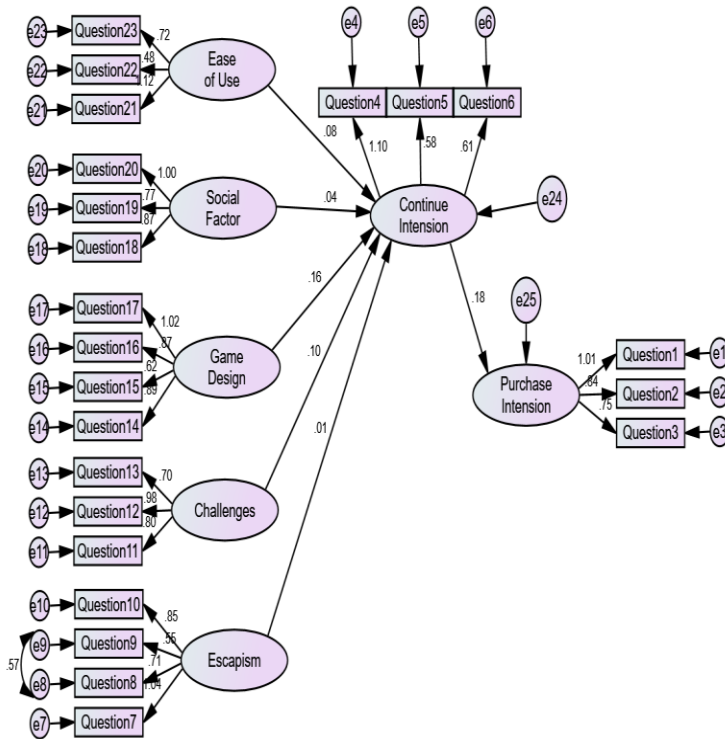


Figure 2
Structure model of purchase intention; source: compiled data

From figure 2, the standardized factor loadings for ease of use range from 0.48 to 1.12, for social factor range from 0.77 to 1.00, for game design range from 0.62 to 1.02, for challenges range from 0.70 to 0.98, for escapism range from 0.55 to 1.04, for continuing intention range from 0.58 to 1.10, and for purchase intentions range from 0.75 to 1.01. All of the factor loadings in this analysis exhibit high levels of significance ($p < 0.05$). The correlation coefficient between e8 and e9 is 0.57, which is statistically significant at a level of $p < 0.05$. The standardized regression weights for the predictors of continuing intention are as follows: ease of use (0.08), social factor (0.04), game design (0.16), challenges (0.10), escapism (0.01), and continuing intention to purchase intention (0.18). The model index values observed in the selected model are as follows: χ^2/df is 2.134 (less than 3), the incremental fit index (IFI) is 0.961, the Tucker Lewis index (TLI) is 0.956, the normed fit index (NFI) is 0.929, the relative fit index (RFI) is 0.920 (all of which are greater than 0.9), and the root mean square error of approximation is 0.053 (less than 0.08). In

this instance, the model index values satisfy every criterion of the survey; therefore, the chosen model is well-fit.

The statistical analysis revealed that the social factors associated with game continuation behavior where not exhibit a significant relationship ($p = .329$, $p < .05$). This finding aligns with previous studies that have demonstrated a correlation between perceived social support and improved health outcomes. However, it is noteworthy that the path from social factors to depression was found to be significant and consistent with the anticipated direction (Dupuis & Ramsey, 2011).

4.5 Test of the structural model

Table IV

Regression weights

Hypothesis	Paths					Hypotheses Supported/Not supported	
	Exogenous variable	→	Endogenous Variable	Regression Weight (β)	S.E. P		
H ₁	EU	→	CI	0.062	0.029	0.031	Yes
H ₂	SF	→	CI	0.067	0.069	0.329	No
H ₃	Challenges	→	CI	0.137	0.062	0.027	Yes
H ₄	GD	→	CI	0.223	0.059	0.000	Yes
H ₅	Escapism	→	CI	0.011	0.032	0.726	No
H ₆	CI	→	PI	0.122	0.032	0.000	Yes

Continuous intention=C.I., P.I. =Purchase Intent, Source: Calculated from survey

The regression weight (path coefficient) for ease of use to continuing intention is 0.062 (standardized regression weight 0.08) with p-value 0.031, which is less than 0.05. So the null hypothesis 1 is rejected and ease intension to continuing intention.

In addition, the path coefficient for the social factor to continue intention is 0.067 (standardized regression weight of 0.04) with a p-value 0.329, which is greater than 0.05. So, there is not enough evidence to reject null hypothesis 2, and the social factor has no significant contribution to continue intention.

Furthermore, the regression weight (path coefficient) for challenges to continue intention is 0.137 (standardized regression weight of 0.10), with a p-value of 0.027, which is less than 0.05. So, the null hypothesis 3 is rejected, and challenges significantly contribute to continue intention. The regression weight (path coefficient) for game design is 0.223 (standardized regression weight of 0.16), with p-value 0.000, which is less than 0.05. So, the null hypothesis 4 is rejected, and game design intension to continuing intention.

The regression weight (path coefficient) for escapism is 0.011 (standardized regression weight of 0.01) with a p-value of 0.726, which is greater than 0.05. So, there is not enough evidence to reject the null hypothesis 5, and escapism has no significant contribution to continuing

intention. Moreover, the path coefficient for continuing intention to purchase is 0.122 (standard regression weight of 0.18) with a p-value of 0.000, which is less than 0.05. So, null hypothesis 6 is rejected, and continuing intention significantly contributes to purchase intention.

According to the regression analysis presented in table IV, three variables connected to CI, namely simplicity of use, game design, and challenges, have a positive correlation with CI. The p-values associated with these variables are 0.031, 0.027, and 0.000, respectively, all of which are less than 0.05 or $p < 0.05$. Thus, H₁, H₃ and H₄ are supported. Furthermore, CI is positively related to in-apps purchase intention ($p = .000$, $p < 0.05$). Thus, H₆ is supported. However, social factors and escapism are not related to CI ($p = .329$, $p \geq 0.05$; $p = .726$, $p \geq 0.05$); hence, H₂ and H₅ are not supported.

5. Discussion

It is found in this study that three of the variables (ease of use, challenges, game design) had a statistically significant effect on the continuous intention to play game and in-app purchase behavior, out of a total of 23 items categorized into five main categories. This study involved the evaluation of five latent variables namely: ease of use (H1), social factors (H2), challenges (H3), game design (H4), and escapism (H5), each of which was assessed using a minimum of three items for the purpose of data analysis. One notable strength of the study lies in its comparative analysis of previous research on in-app purchases in gaming behavior. It is worth noting that prior studies primarily concentrated on the perspectives of university students, with a particular emphasis on non-university students from Bangladesh (Yeo, Tan, Boon, & Sheng, 2022). In contrast, the present study collected data from a sample of current students attending private universities in Chattogram. According to the findings shown in Table IV, it can be observed that the latent variables, with the exception of social factors ($p = .726$) and escapism ($p = .329$), have a statistically significant positive effect on in-app purchase continuation intentions ($p \leq .05$).

These results suggest that there is no substantial correlation between gamers and their plans to continue making in-app payments, given the p-values for social variables and escapism above the threshold of .05. In addition, the study's results show that the measurement model's fit indices are all within acceptable ranges, which means that the overall fit is good. The factor loadings examined in this study exceed the minimum criterion of 0.50, according to the results of the confirmatory factor analysis. Additionally, the composite reliability, as measured by the maximum shared variance, is greater than 0.70.

Table II demonstrates that the ease of use factor has three items, all with loadings of at least 0.671. These elements include learning games that are easy (0.948), comprehending the game readily (0.671), and understanding the game clearly (0.885). Ease of use (H₁) is linked with continued intention, which is consistent with having fun with ease while playing video games (Weibel & Wissmath, 2011).

The construct of the game design factor encompasses four distinct components, each exhibiting substantial loadings of at least 0.731. These components include visual appeal (loading: 0.965), game graphics (0.919), screen design (0.909), and polished sounds (0.731). Game design (H₄) is a crucial determinant since without attractiveness like game layout, color, and sound system, gamers will lose interest in games. Design has been proven with previous research conducted by Mayr and Mandi (2017). Thus, to succeed in this market, game developers need to focus on producing high-quality online games with interesting gameplay concepts.

Challenge involves three items including the items of doing the players best (0.875), skill testing (0.927), and playing games to take challenges (0.832). These three sub-factors were analyzed to measure the impact of the challenges. Continued intention to engage in an online game is increased through challenges (H₃) which is depicted from the study. Gamers will become bored if they finish the games quickly. Thus, these findings are consistent with those of previous studies as keeping themselves engaged and challenging in games will motivate those in-apps to purchase (Su, Chiang, James Lee, & Chang, 2016; Teng, 2018). However, too much difficulty might lead to a loss of interest.

The social interaction factor encompasses three variables, each exhibiting loadings of at least 0.876. These items include the prevalence of app usage among individuals in close proximity (0.915), frequent discussions about apps with friends (0.876), and a substantial membership base within the app (0.959). These three subfactors were considered to measure the impact of escapism. Although social interactions (H₂) between players increased their sense of community (Blinka & Mikuska, 2014), in this study, the respondents were not interested ($p=.726$). Players have a predominant inclination toward achievement as compared to the building of social connections. In the context of competitive gaming, it has been observed that players often place a higher emphasis on optimizing their in-game performance rather than engaging in social interactions (Bartle, 1996). Moreover, toxicity and trolling create a hostile atmosphere that has a detrimental effect on player enjoyment, specifically in relation to the content of in-game communication provided by other players (Kowert, 2020). As such, it was found that most millennials in Bangladesh are not considering network creation either.

Escapism is associated with four items, each of which has a minimum loading of 0.754. These items consisted of distraction from one's own problems (0.930), escape from the actual world (0.888), stress relief (0.851), and forgetting unpleasant things (0.754). The evaluation of the impact of escapism was based on these four subfactors. Escapism (H_5) has an insignificant relationship ($p=0.726$) with the CI. Although escapism was found to be a crucial element of gaming for numerous individuals, it is not considered the exclusive determinant of sustained gaming inclination. Other elements may have equal or greater influence in shaping gaming behavior which is consistent with the findings of previous studies (Zajac, Ginley, Chang, & Petry, 2017; Shen, 2021). Games that provide compelling stories, demanding gameplay mechanics or a robust social element have the potential to motivate players to persist in their engagement, even if their primary objective is not to escape reality. (Przybylski, Rigby, & Ryan, 2010; Hasan, Baten, Kamil, & Parveen, 2010).

When consumers are interested in, familiar with, and intended for intention to a product or service they will pay more for it which is partially consistent with previous studies (Xi & Hamari, 2019; Chowdhury, Islam, Haque, Chowdhury, & Hossain, 2022). If players of the game find it to be of sufficient quality, they will pay to download it. Producers of games could provide discounts or freebies to increase players' propensity to buy.

The following phase involves testing the model's validity, which is demonstrated in Table IV through the evaluation of the Average Variance Extracted (AVE), reliability, and discriminant validity of each concept. The Cronbach's alpha coefficient, when an item was removed, varied from 0.794 to 0.909. The overall alpha coefficient for the scale was 0.875. The results indicate that the Average Variance Extracted (AVE) has a value greater than 0.50, specifically with regards to the factors of ease of use (0.672), social factors (0.784), challenges (0.699), game design (0.742), and escapism (0.657). This suggests that the AVE demonstrates satisfactory discriminant validity, as outlined by Fornell and Larcker (1981). The study's findings exhibit robust internal consistency and demonstrate the importance of the items in validating the scale.

Consequently, three hypotheses (H_1 , H_3 , and H_4) are supported by the statistical analysis, with p values of 0.031, 0.027, and 0.000, respectively, all of which are statistically significant at a level of $p < 0.05$. Nevertheless, the findings do not support H_2 ($p = 0.329$ where $p > 0.05$) or H_5 ($p = 0.726$, $p > 0.05$). While it has been found that there is a positive association between consumer intention (CI) and in-app purchase behavior ($p = 0.000$, $p < 0.172$), Meydan and Sesen (2011) argue that the direct and indirect correlations among the causal factors are the most crucial aspects of structural equation modeling (SEM).

6. Conclusion

The present study aimed to provide a contribution to the existing literature by examining the characteristics that enhance in-game buying behavior, specifically focused on the millennial and Gen Z (post-millennial) demographic. The present endeavor yielded a proposed model consisting of six hypotheses and twenty three components, which were further examined using data obtained from millennial participants engaged in mobile games. The findings indicate that three constructs examined in this study exhibit statistical significance, and two constructs (social factors and escapism) show an insignificant relationship with game-continuation intention. The research findings demonstrate a negative correlation between escapism and game continuance intention. This suggests that when individuals utilize games primarily as a kind of escapism, seeking relief from real-life stressors or challenges, their inclination to persist in playing these games diminishes. The findings of Bergstrom (2021) on social network games (SNGs) indicate that the presence of toxicity, specifically in the form of bullying, can give rise to unfavorable environments in which players experience feelings of alienation or discouragement, ultimately resulting in disengagement from participation. Furthermore, individuals with introverted tendencies are more inclined to participate in activities that are solitary in nature. The activity of gaming offers a regulated and often alone setting that is harmonious with the inclinations of introverted individuals. Individuals who use gaming to escape social pressures or anxieties may not actively pursue friendships while gaming (Ferguson, 2010). Despite the fact that social factors are an insignificant relationship since millennials are not interested in becoming communicative, which still requires more study for the contributions in game studies.

This research suggests that game developers in Bangladesh should focus on enhancing users' intention to make in-game purchases. Understanding the factors influencing in-app purchases in emerging economies can help marketers and game developers customize their approaches, enhance conversion rates, and optimize monetization strategies. By focusing on pricing models, aesthetics, and game design elements, developers can cultivate player loyalty and increase user engagement. Market expansion can be facilitated by creating customized offerings that appeal to local participants and find untapped revenue streams. However, ethical and responsible approaches are crucial in emerging economies, as developers must prioritize player welfare and ensure transparency, equity, and value-oriented purchases. The mobile phone operators may offer games in Bangladesh addressing user cultural norms like Robi Axiata Limited, which already started 'Rabibthole' game apps. Furthermore, this study contributes to the existing literature on

gamification by offering empirical data to support the validity of tools employed to assess players' gameful experience, attitude towards in-game advertisements, and attitudes toward the game. Based on the findings, it is obvious that game developers may employ strategies such as adapting to changes in game design, expanding social networking opportunities, adapting to changes in educational purposes, and providing greater experiential value. For instance, they can advertise on social media to reach more people, produce content that will interest gamers and encourage word of mouth, and collect user data and comments that will inform future iterations of the product.

7. Limitations and future research

This study has some limitations but it paves the way for future studies. The Participants' opinions on the in-game advertising to purchase may not reflect those of nonparticipating members. Subsequent investigations could incorporate more behavioral and psychological variables in order to more comprehensively analyze the impact of in-game advertising on players' cognitive and emotional states, which was depicted in the lack of intention to meet social networking standards. The sample size of the study includes students from private universities in Chattogram, Bangladesh, which may be limited. Further research is needed to address any potential shortcomings. The consumption habits of both industrialized and emerging countries could be the subject of future studies. There is a lack of transferability between the research and the commercial world and the industry at large. To better understand how players interact with in-game advertisements, this model could be used in the future to duplicate this study in other marketplaces. In order to better understand how players' habits develop over time, longitudinal studies may be conducted in the future. Further research may investigate additional factors, such as perceived worth and price, that may enhance the entire model's predictive ability. Despite these constraints, future studies could broaden their scope by taking into account additional elements like player types, psychological traits, or game features that affect players' behavioral intentions.

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