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Unveiling the Impact of Mobile Game Addiction and Negative e-WOM on Purchase Intention in Online Gaming Applications

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ABSTRACT

This study investigated the impact of mobile game addiction, loyalty, and negative e-WOM on purchase intention in online gaming applications, using a questionnaire distributed to PUBG Mobile players through game communities on WhatsApp and Telegram. The study found that online game addiction has a significant effect on online game loyalty, and online game loyalty has a significant effect on purchase intention. Additionally, online game addiction has a significant effect on negative e-WOM, and negative e-WOM has a significant effect on purchase intention. Game addiction also has a significant effect on purchase intention. These findings contribute to filling the research gap in the literature on the relationship between game addiction, loyalty, negative e-WOM, and purchase intention. The study emphasizes the importance of game developers and marketers understanding and managing these factors to encourage purchase intention in online gaming applications.

Keywords
e-WOM
Gaming Applications
Mobile Game
Purchase Intention

Introduction

The current technological advancements are rapidly changing the behavior of people in their daily lives. Technology innovation has become inevitable, and it serves as the main entertainment source for most individuals, such as using social media, applications like Maxstream, Netflix, mobile games, and so on. Among various products of technological advancement, mobile games have experienced the most phenomenal growth [1]. The mobile gaming market reached USD 77.2 billion in 2020 [2], with around 3.5 billion players, almost half of the world's total population. About 54% of the players worldwide are in the Asia region [3], which has drawn attention to the growth of the mobile gaming industry.

Among various countries in the Asia region, Indonesia is the leading country in the growth of mobile games. Of 274.5 million gamers in Asia, Indonesia contributes 43%, with mobile games in Indonesia accounting for the highest revenue in Asia, reaching USD 2.08 billion [4]. The growth of gamers in Indonesia is primarily driven by the internet. Indonesia ranks third in Asia with the highest number of internet users, reaching 212.35 million [5]. The number of mobile gaming devices has shown a significant increase year on year, indicating the highest growth and outpacing other gaming devices such as consoles, personal computers (PCs), and browser (PC) games [2].

One of the most popular mobile esports games today is Tencent's PUBG mobile, which is the highest-grossing and most popular game in the world throughout 2020-2021 [6]. Among Indonesian youth, PUBG mobile is the most prominent event due to the inter-campus tournament in Indonesia, the PUBG Mobile Campus Championship Indonesia 2020 and 2021, which was followed by almost all state and private universities in Indonesia, offering significantly higher prizes than other games [7]. PUBG Mobile has generated revenue of more than IDR 39.8 trillion until December 14, 2021 [8]. With the highest total revenue, PUBG mobile has been named the most profitable and popular mobile game in the Google Play Store and App Store.

The dominance of PUBG mobile in the gaming market is not separate from the free application equipped with the in-app purchase model [6]. Several survey institutions stated that free applications equipped with in-app purchases dominate the market, especially for PUBG mobile [9]. In-app purchases are present in free download game applications commonly known as freemium applications. Although the game is downloaded for free, PUBG mobile

requires consumers/gamers to make in-app purchases to unlock certain features or levels by buying unknown cash (UC), clothing, skins, coins, etc. In-app purchase is the main relationship to measure the success of the game. In marketing research, in-game purchases are called consumer willingness to pay for future features, and the intention to pay is understood as an indicator of gamers' attitudes towards features [10]. In this study, the concept of in-app purchase in the game context is adopted, conceptualizing in-app purchase as players' willingness to buy items in the game, such as (UC) or skins in the future [11].

From a psychological perspective, studies have also been conducted on mobile game purchasing behavior in terms of impulsive and compulsive actions [12]. In the context of PUBG mobile, previous research has explored factors that influence gamers' intentions to make in-app purchases. For example, Motivation was a significant predictor of in-app purchases, with gamers who were motivated by achievement and immersion being more likely to make purchases [11]. Perceived value was a key factor in determining the willingness of gamers to make in-app purchases [13]. Meanwhile, pricing strategies such as bundling and discounts had a significant impact on in-app purchase behavior [14]. Given the immense popularity of PUBG mobile in Indonesia, it is important to understand the factors that influence gamers' willingness to make in-app purchases. This knowledge can help game developers and marketers tailor their strategies to better target this market. Understanding the factors that influence gamers' willingness to make in-app purchases can provide valuable insights for game developers and marketers to better target this market.

Literature Review

Downloading a game is the initial action. However, appreciative experience and gameplay develop a fondness for the game, which may eventually lead to addiction. Previous research has discussed online game addiction [15]-[18]. Addiction consists of seven core components (salience, tolerance, mood modification, withdrawal, relapse, conflict, and problems), which can be applied to online gaming [16]. Online game addiction refers to uncontrollable gaming behavior and negative effects [17]. Online game loyalty is different from online game addiction, as it is manifested in two aspects. Online game addiction emphasizes the conflict between individual intentions and behaviors, where online game addicts cannot control their gaming behavior and attempt to reduce their gaming time but ultimately fail. However, loyalty has no connection with the conflict, and most research on user loyalty emphasizes the coherence of purchasing intentions and behavior.

Purchasing in games is the primary outcome used to measure game performance. In marketing research, customer purchases are referred to as the willingness to pay for a product in the future, and purchasing intent is understood as an indicator of the customer's attitude

toward the product [19]. In this study, we adopt the concept of purchasing intent in gaming applications, conceptualizing purchasing intent in games as the individual's willingness to purchase game-related items such as virtual currency or virtual tickets in the future [20].

Online game addiction can increase user loyalty [21]. Addiction influences online game loyalty [22]. Some studies have discussed loyalty as addictive behavior [23]-[25]. In the same context, previous research has investigated the role of addiction and its relationship with social seeking and peer attachment [26]. Therefore, addiction to games is an inherent reason for loyalty to certain games, as well as purchasing intent and behavior in gaming applications.

In online games, it is possible to form a community by interacting with other players and forming an online community [27]. E-WOM underlies the formation of online communities and influences members of online game forums to share their feelings and experiences with other players and invite new players [28]. A study of MMORPGs suggests that game developers must produce positive opinions to obtain positive e-WOM, as negative user experiences can spread negative e-WOM in response to system failures [29]. Another study has discussed the behavior of addiction and its potential to become aggressive. It is assumed that addiction may channel harmful behavior in the form of negative e-WOM [30]. Thus, both negative and positive e-WOM in MMORPGs can be explicitly important for continuing or stopping online game activation [31].

However, the negative relationship between e-WOM and the intention to purchase gaming applications has not been proven, and previous research on the consequences of online game addiction is still limited. Therefore, this study aims to investigate the relationship between the two. Previous research has shown that negative e-WOM can reduce purchase intention [32]. Negative e-WOM significantly affects consumer evaluations of purchase intention more than positive e-WOM [33]. Meanwhile, a study indicates that game addiction significantly influences negative e-WOM [34].

Previous studies have suggested expanding the relationship between addiction and purchase intention [15],[23],[25]. However, empirical evidence is limited in the context of online game addiction. In-app purchase is an action that requires ability and motivation [13]. In-app purchases play a major role in mobile games, especially in freemium business models and cache mechanisms. In-app purchases are currently one of the most established revenue models for game providers [35].

Addiction is an affective, cognitive, behavioral, and psychological response bias. Experts describe technology stimuli influencing users' intentions to use more often. For example, mobile game developers offer products through a seven-day trial period [35]. However, the more frequently users use the game, the more effective and emotional they become. Interested users engage with the game application and start playing more often.

According to the decision-making process theory, if users are engaged both cognitively and affectively with a particular product or service, it will influence prolonged usage and sticking to the object. Thus, users will have an addiction to the application. To the best of the author's knowledge, only one study has investigated the relationship between game addiction and in-app purchase, which was conducted by Ref. [22], and it showed that game addiction affects in-app purchase intention.

Material and Methods

This study aims to investigate the relationships between online game addiction, loyalty, negative e-WOM, and in-app purchase intention among PUBG Mobile game players using a quantitative research design with a survey method. From the literature review, a conceptual framework was obtained as shown in Fig. 1.

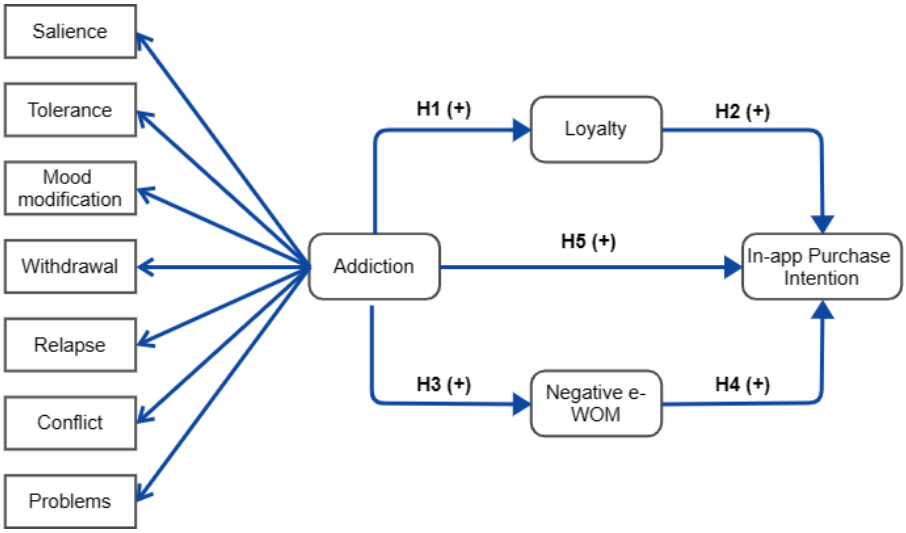

Fig. 1. The Conceptual Framework

Remark:

H1: Online game addiction positively increases online game loyalty.
H2: Online game loyalty increases purchasing intent in gaming applications.
H3: Online game addiction positively influences negative e-WOM.
H4: Negative e-WOM positively influences purchase intention in gaming applications.
H5: Online game addiction positively increases in-app purchase intention.

The population of this study is the PUBG Mobile game players. The sampling technique used was non-probability sampling. The sample size used in this study is 250 participants, which is sufficient for PLS-SEM analysis. The survey questionnaire consisted of 35 questions answered using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). All measures (addiction, loyalty, negative e-WOM, and in-app purchase intention) are derived from previous literature.

The survey was conducted from September to October 2022. The participants were informed about the purpose of the study and were asked to voluntarily participate in the survey. The questionnaire was distributed via WhatsApp and Telegram game community groups. Partial least square-structural equation modeling (PLS-SEM) was used to test the hypothesized relationships between the variables. The evaluation criteria for the PLS-SEM model followed the two-stage process. The hypotheses were tested using the critical ratio (CR) values. A CR value greater than or equal to 1.96 indicates a statistically significant relationship between the independent and dependent variables.

Results

Table 1 shows the characteristics of the respondents in a research study. The data includes the number of respondents and the percentage of respondents based on gender, age, education, income, time spent playing mobile games, and in-app purchases. The majority of respondents were male (53.3%), aged 21-25 years (56.5%), had a bachelor's degree (57.9%), and had an income of less than IDR 1,000,000 (44.1%). Additionally, 32% of respondents spent less than 30 minutes playing mobile games, while 29.4% made 1-5 in-app purchases.

This study evaluates the reflective measurement model by testing the validity and reliability of the indicators for each construct. Two types of construct validity, convergent and discriminant validity, are used in this research. After both validity tests are met, the reliability of each research structure is then tested. The results of the convergent validity calculation for each construct included in this study are shown in Table 3. The convergent validity is evaluated based on the outer loading, with the criteria being an outer loading of 0.70. Some measurement items have not yet met the minimum criteria for the convergent validity test, but they are retained for use because the AVE values in the validity test results meet the criteria. Therefore, further analysis of the convergent validity test is performed to see the results (AVE) above >0.50, Cronbach's alpha, and composite reliability values above >0.70.

In the use of partial least squares structural equation modeling (PLS-SEM), researchers must exercise caution in interpreting and utilizing model fit [36]. Structural model evaluation can be conducted by examining the coefficient of determination or R-square (indicator reliability) for dependent constructs and the t-statistic (critical ratio) of path coefficient testing. A higher R-square value indicates a better predictive model from the proposed research model. The coefficient is a measure of the accuracy of the model prediction and is calculated as the squared correlation between the actual value and the predicted value of a particular endogenous variable [35]. The value of the in-app purchase intention variable is 0.582 or equal to 58.2%, which means that mobile game addiction, mobile game loyalty, and negative e-WOM have a moderate influence in explaining the variance of in-app purchase intention.

Table 1. Characteristics of Respondents

Profile	Category	Freq.	%
Gender	Male	185	53.3
	Female	162	46.7
Age	16-20 years	125	36.0
	21-25 years	196	56.5
	26-30 years	11	3.2
	> 30 years	15	4.3
Education level	Junior high school	3	0.9
	Senior high school	131	37.8
	Diploma/ Undergraduate	201	57.9
	Postgraduate	12	3.5
Monthly Income	Less than IDR 1,000,000 (USD 70)	153	44.1
	IDR 1,000,000 - IDR 3,000,000 (USD 70- USD 210)	125	36.0
	IDR 3,000,000 – IDR 6,000,000 (USD 210-USD 420)	50	14.4
	More than IDR 6,000,000 (USD 420)	19	5.5
Duration of time for gaming	Less than 30 minutes	111	32.0
	30-60 minutes	63	18.2
	60-90 minutes	35	10.1
	90-120 minutes	48	13.8
	More than 120 minutes	90	25.9
Number of mobile games purchased	No purchase	153	44.1
	1-5	102	29.4
	5-10	42	12.1
	More than 10	50	14.4

Therefore, the remaining 41.8% is explained by variables other than those in the study. Furthermore, mobile game loyalty has a value of 0.435, or equal to 43.5%, which means that mobile game addiction has a weak influence in explaining the variance of mobile game loyalty. The remaining 56.5% is explained by variables other than those in the study. The value of the negative e-WOM variable is 0.340 or equal to 34%, which means that mobile game addiction has a weak influence in explaining the variance of negative e-WOM. Therefore, the remaining 66% is explained by variables other than those in this study.

Hypothesis testing in research is assessed by examining the T-statistic and original sample size to determine the significance between the variables of mobile game addiction, mobile game loyalty, negative e-WOM, and in-app purchase intention. The results of the hypothesis testing are presented in Fig. 2.

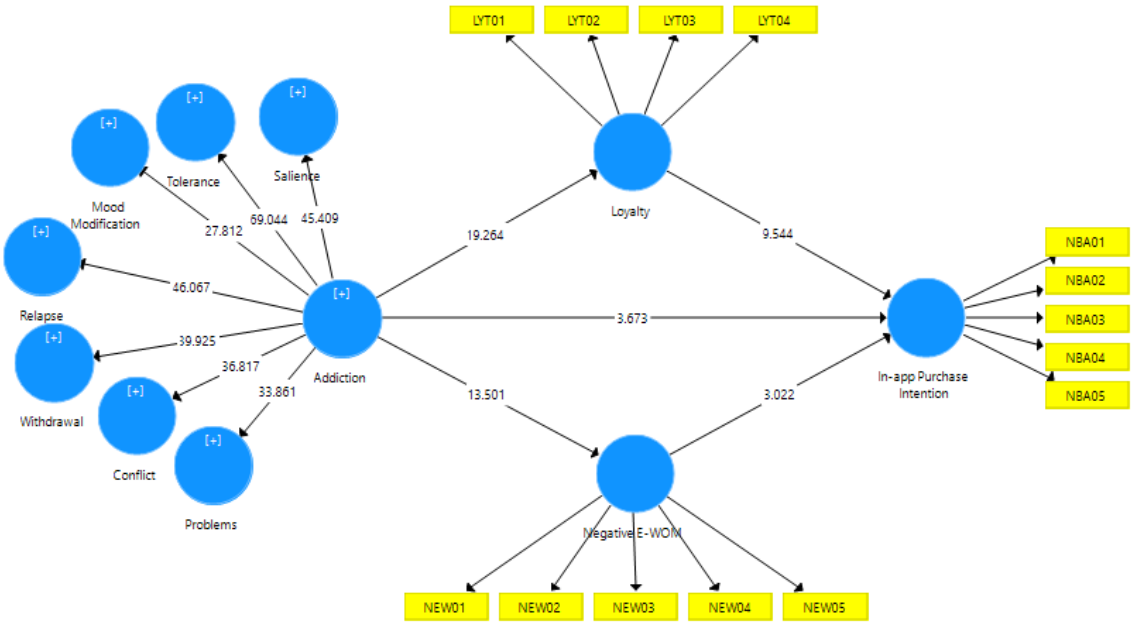

Fig. 2. The Structural Model

To ensure the validity of the influence values in the hypothesis testing, the P-values, T-statistics, and original sample size are summarized in Table 2.

Table 2. Hypothesis Test Result

	***Original Sample* (O)**	***Standard Deviation* (STDEV)**	**T *Statistics* (|O/STDEV|)**	**P *Values***
Addiction → Loyalty	0.660	0.034	19.264	0.000
Loyalty → In-app Purchase Intention	0.518	0.054	9.544	0.000
Addiction → Negative E-WOM	0.583	0.043	13.501	0.000
Negative E-WOM → In-app Purchase Intention	0.150	0.050	3.022	0.003
Addiction → In-app Purchase Intention	0.220	0.060	3.673	0.000

Hypothesis 1. Based on the hypothesis testing results, the relationship between mobile game addiction and mobile game loyalty has a T-statistic higher than 1.96, which is 19.264, and an original sample value of 0.660. This value indicates a significant relationship between mobile game addiction and mobile game loyalty because the T-statistic is higher than 1.96 and the p-value (0.000) is less than 0.05. Based on these results, mobile game addiction has a positive and significant influence on mobile game loyalty, so H1 is accepted.

Hypothesis 2. Based on the hypothesis testing results, the relationship between mobile game loyalty and in-app purchase intention has a T-statistic higher than 1.96, which is 9.544, and an original sample value of 0.518. This value indicates a significant relationship between mobile game loyalty and in-app purchase intention because the T-statistic is higher

than 1.96 and the p-value (0.000) is less than 0.05. Based on these results, mobile game loyalty has a positive and significant influence on in-app purchase intention, so H2 is accepted.

Hypothesis 3. Based on the hypothesis testing results, the relationship between mobile game addiction and negative e-WOM has a T-statistic higher than 1.96, which is 13.501, and an original sample value of 0.583. This value indicates a significant relationship between mobile game addiction and negative e-WOM because the T-statistic is higher than 1.96 and the p-value (0.000) is less than 0.05. Based on these results, mobile game addiction has a positive and significant influence on negative e-WOM, so H3 is accepted.

Hypothesis 4. Based on the hypothesis testing results, the relationship between negative e-WOM and in-app purchase intention has a T-statistic higher than 1.96, which is 3.022, and an original sample value of 0.150. This value indicates a significant relationship between negative e-WOM and in-app purchase intention because the T-statistic is higher than 1.96 and the p-value (0.026) is less than 0.05. Based on these results, negative e-WOM has a positive and significant influence on in-app purchase intention, so H4 is accepted.

Hypothesis 5. Based on the hypothesis testing results, the relationship between mobile game addiction and in-app purchase intention has a T-statistic higher than 1.96, which is 3.673, and an original sample value of 0.220. Based on these results, mobile game addiction has a positive and significant influence on in-app purchase intention, so H5 is accepted.

Discussion

This study investigated the impact of mobile game addiction, mobile game loyalty, and negative e-WOM on purchase intention in online gaming applications. Based on the results of a questionnaire distributed using Limesurvey to respondents who play PUBG Mobile through the game community on WhatsApp and Telegram groups, the data was analyzed and interpreted.

The first hypothesis testing the relationship between online game addiction and online game loyalty showed a significant effect, and thus H1 was accepted. This finding is consistent with previous research [24] which stated that online game addiction is one variable that can affect game loyalty. Game addiction is also seen as something enjoyable as it provides a sense of satisfaction and creates a desire to repeat the enjoyable activity when playing [37]. Therefore, it can be assumed that the higher the user's addiction to online games, the greater the likelihood of loyalty to the game. This study's results are also supported by [22], who found that online game addiction affects online game loyalty.

The second hypothesis testing the relationship between online game loyalty and purchase intention in applications showed a significant effect, and thus H2 was accepted. This finding is in line with previous research Ref. [13],[22], which stated that online game loyalty has a significant effect on purchase intention in online gaming applications. It can be assumed that the higher the loyalty to the game, the higher the user's intention to make purchases within the game application. Loyalty gradually grows when there is long-term engagement with the game, and users feel comfortable and supportive of the game [33]. When a user has reached a loyal stage to a game, they will be willing to spend more money to accelerate the unlocking of new characters, and even loyal players will spend more money by collecting every feature in the game.

The third hypothesis testing the relationship between online game addiction and negative e-WOM showed a significant effect, and thus H3 was accepted. This finding is supported by Ref. [34], who stated that game addiction affects negative e-WOM. Ref. [34] suggested that addiction can lead to aggression, and it is assumed that addiction will lead to harmful behavior in the form of negative e-WOM. The literature identifies limited empirical studies on the relationship between addiction and negative e-WOM. This indicates that the higher the user's addiction to online games, the more likely it will cause negative e-WOM towards the game.

The fourth hypothesis testing the relationship between negative e-WOM and purchase intention in applications showed a significant effect, and thus H4 was accepted. This finding is in line with previous research by Ref. [38], which showed that negative e-WOM significantly affects consumer behavior towards purchase intention. It can be assumed that the higher the negative e-WOM reviews circulating, the higher the purchase intention in online gaming applications. Negative e-WOM is the main result of hatred towards an application and is seen as an act to recover losses caused by unsatisfactory products or services [39]. This study has proven that negative e-WOM significantly affects purchase intention in applications. Therefore, this study investigated the relationship and filled the research gap.

The fifth hypothesis testing the relationship between game addiction and purchase intention in applications showed a significant effect, and thus H5 was accepted. This finding is in line with previous research by Ref. [13], which stated that game addiction has a significant effect on purchase intention in online gaming applications. It can be assumed that the higher the user's addiction to the game, the higher the intention to make purchases.

The study examines the relationship between mobile game addiction, mobile game loyalty, negative e-WOM, and purchase intention in online gaming applications. The results indicate that there is a significant effect between game addiction and game loyalty, which

means that the higher the user's addiction to online games, the greater the likelihood of loyalty to the game. This finding supports previous research that addiction is enjoyable and creates a desire to repeat the enjoyable activity. The study also finds that game loyalty has a significant effect on purchase intention in online gaming applications. It suggests that the higher the loyalty to the game, the higher the user's intention to make purchases within the game application. This finding is consistent with previous research that shows loyalty gradually grows when there is long-term engagement with the game.

Moreover, the study shows that game addiction has a significant effect on negative e-WOM, meaning that the higher the user's addiction to online games, the more likely it will cause negative e-WOM towards the game. This finding is supported by previous research that suggests addiction can lead to aggression, and it is assumed that addiction will lead to harmful behavior in the form of negative e-WOM. Furthermore, the study finds that negative e-WOM significantly affects purchase intention in applications. It can be assumed that the higher the negative e-WOM reviews circulating, the higher the purchase intention in online gaming applications. The study shows that game addiction has a significant effect on purchase intention in online gaming applications, suggesting that the higher the user's addiction to the game, the higher the intention to make purchases. This finding is in line with previous research that shows game addiction has a significant effect on purchase intention in online gaming applications. Overall, these findings contribute to the understanding of the relationship between mobile game addiction, mobile game loyalty, negative e-WOM, and purchase intention in online gaming applications

Conclusion

This study aimed to investigate the impact of mobile game addiction, mobile game loyalty, and negative e-WOM on purchase intention in online gaming applications. The results of the questionnaire analysis suggest that all five hypotheses were supported, and thus, the study's objectives were achieved. The findings of this study contribute to the existing literature on online gaming applications and provide valuable insights for game developers and marketers. The study found that online game addiction positively affects game loyalty, which, in turn, positively affects purchase intention in online gaming applications. However, the study also found that addiction can lead to negative e-WOM, which can negatively affect purchase intention. Therefore, game developers and marketers need to ensure that their products are engaging and addictive but also monitor and manage negative e-WOM to maintain users' loyalty and purchase intentions. It highlights the importance of understanding the complex relationships between mobile game addiction, game loyalty, negative e-WOM, and purchase intention. Future research can build on these findings to explore other factors that influence

purchase intention in online gaming applications and provide further insights for game developers and marketers.

Limitation and Suggestions

The study was conducted through an online survey with limited respondents, which limits the generalization of the current research. Additionally, considering a larger sample size, along with the fact that about half of the sample did not make any purchases in the last six months, raises concerns about the representativeness of the sample. Nonetheless, it is worth noting that the sample had at least one year of experience playing PUBG mobile. Further studies are needed with a more diverse and representative sample with a wider frequency of gameplay to enhance the generalizability of the findings. The suggestions for future research include exploring other factors that may influence purchase intention in online gaming applications, examining the impact of different types of negative e-WOM, comparing the findings across different online gaming applications, and investigating the moderating effects of individual characteristics.

Conflict of Interest

The authors declare that there is no conflict of interest.

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