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Prof. Dr. Abdul Aziz Ali Hassan

Professor of Marketing and

Head of Business Administration

Department

Former Vice Dean for Post Graduate Studies,

Research and Cultural Affairs

Faculty of Commerce - Mansoura University

Aliaa Ali Mohamed Hassan Farag

Teaching Assistant at Business

Administration Department

Faculty of Business Administration

Horus University

Dr. Lamees Mohsen Elagamy

Doctor of Business Administration

Faculty of Commerce - Mansoura University

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Prof. Dr. Abdul Aziz Ali Hassan
Professor of Marketing and
Head of Business Administration Department
Former Vice Dean for Post Graduate Studies, Research and Cultural Affairs
Faculty of Commerce - Mansoura University

Aliaa Ali Mohamed Hassan Farag
Teaching Assistant at Business Administration Department
Faculty of Business Administration – Horus University

Dr. Lamees Mohsen Elagamy
Doctor of Business Administration
Faculty of Commerce - Mansoura University

ABSTRACT

This study examined the relationship between Gameful Experience and online mobile gaming adoption. The research adopted the philosophy of positivism,

the deductive approach, and the quantitative analysis method as the research methodology. Based on established measurement scales, a questionnaire-based deductive approach was used to collect data from a quota sample of 393 students from private universities. The proposed model and hypotheses were analyzed using

the structural equation modelling employing the PLS-SEM. The results indicated that Gameful Experience is positively related to online mobile gaming adoption and also showed that Gameful Experience is positively related to online mobile gaming adoption dimensions (Intention to use, Actual Use behavior, and Attitude).

One of the most important recommendations is that Gameful Experience has motivated and engaged many players to use online game services to play various games. The gamers are satisfied with their intrinsic needs and experience a feeling of enjoyment and pleasure when using the game, which helps in marketing.

Theoretical and practical implications as well as limitations and venues for future research are presented.

Keywords: Gameful Experience, online mobile gaming adoption, Intention to use, Actual Use behavior, and Attitude.

1. *Introduction*

In the last few years, gamification has become a popular and recurrent topic in many fields, such as education, marketing, and business. Teachers have coined this methodological strategy as a promising way of providing students with positive experiences that pave the road for them to attain different didactic goals.

Gamifying educational practices is nowadays an increasing tendency; although it employs characteristics aimed at emotions, which are typical of games, this does not imply that learning should be carried out entirely as a game. On the other hand, the aim is to use the elements of gaming in contexts that are not completely ludic, which will allow the creation of more game-like learning experiences, that is, gamified experiences (Llorente-Cejudo, C., 2024).

Today, in the digitalized market, innovative business tactics are now required. 'Gamification' is one of these modern methods of marketing that is used to boost target customer involvement (Behl et al., 2022).

According to a (Forbes., 2021) report, gamification has been implemented by 70% of the Forbes 2000 organizations, particularly in mobile marketing. (Bloomberg., 2019) predicted that by 2023, the global gaming market would likely surpass $525 billion. An increasing number of businesses are utilizing gaming strategies and game-like incentives to improve customer engagement.

Major industries have benefited from gamification tools since a game could significantly alter and affect consumer behaviors and attitudes toward the brand. Therefore, the use of gamification can affect how well brands market themselves (Buil et al., 2020).

Many businesses have begun incorporating game elements into their brand apps, which are software programmes created specifically to give a brand-related online experience by effectively connecting with the target audience (Lee and Jin, 2019). The virtual shoe shop app from the fashion retailer Lamoda, which was released in 2019, has amassed 150,000 mobile users and is one example of a brand app that has been effective when using gamification. Apps like IKEA Studio and Amazon's AR View have made it easier for customers to determine what they need for home purchases (Kaur et al., 2023).

Recent studies show a positive correlation between gamification and brand engagement, brand attitude, brand love, brand loyalty, and brand attitude. (Koivisto & Hamari, 2019) note that gamification and marketing research is still in its infancy (Torres et al., 2022).

Some companies activate their sales by using gamification, which is important to enhance participation and introduce them to the logo and name of the company through some procedures and mechanisms that encourage participation and increase customer motivation (Kamalodeen et al., 2021).

Effective gamification builds on the gameful experience created by gamified services (Huotari and Hamari, 2017). Within gamification research studies, the gameful experience is not well-established. The gameful experience model and its corresponding measures have been developed by various researchers (Eppmann et al., 2018; Huang et al., 2018; Jennett et al., 2008).

Mobile data sales are growing at an astonishing pace in most industrialized countries, The adoption of e-commerce has been most frequently explored using

existing theoretical frameworks, particularly the technology acceptance model (TAM). Bruner and Kumar applied TAM in the consumer context and found that a hedonic aspect or "fun attribute" is a stronger determinant of attitude toward handheld Internet use than is any utilitarian attribute (Okazaki., 2008). TAM has been used in studies on gamified technologies (Wong et al., 2021).

2. Theoretical Background

2.1 Gameful experience

A game or gameful experience can be defined as a multidimensional experience of the user's sensations, thoughts, feelings, and actions in a gameplay or game-like setting (Xi, N., 2024).

In recent years, there has been a growing acceptance that games can provide multiple cognitive, affective, social, and motivational benefits, The techno-societal development termed 'gamification' has emerged as an attempt to exploit these benefits on a larger scale (Hassan et al., 2020).

Gamification has become one of the hottest interactive technology trends of recent years. It refers to designing and transforming systems, services, and activities to provide the same gameful experiences as great games do, usually by leveraging features familiar to games (Hamari et al., 2020).

While gamification is the (technical) process of enhancing an application in a non-gaming environment by adding game elements (the affordances of a gameful experience) for this application, gameful experience is the psychological consequence resulting of using a gamified application. In other words, gamification determines a gameful experience (Eppmann et al., 2018).

Gameful experience is defined as the whole of the player's senses, thoughts, feelings, actions, and meaning-building in a game setting, that is the interaction between the game and the player. While playing the game, the player is in a playful state of mind, also known as playful, and it creates enjoyment (Vidergor, 2021).

Högberg, (2019) defined gameful experience as a psychological state that refers to positive emotions and engaging qualities of using a gamified application, and has been described as being the result of (a) experiencing conflict or being challenged by goals that are considered achievable and non-trivial; (b) motivation to pursue those goals by rules prescribed by the service; and (c) that participation is voluntary.

While Eppmann et al., (2018) indicate that Gameful experience in a non-gaming context refers to the positive emotions and engagement qualities of using a gamified application.

Huotari and Hamari (2012) categorize the gameful experience as "hedonic, challenging, and suspenseful".

2.2 Dimensions of gameful experience

Gameful experience is a multi-dimensional construct and is considered as an essential characteristic of gamification when using a gamified application. Poels et al., (2012) explored experiential dimensions of pleasure, arousal, and dominance for the gameful experience. Mullins and Sabherwal, (2020) also highlighted the potential effects of gamification on the emotions, cognitions, and behaviors of users.

The researcher chose a gameful experience scale (GAMEX) developed by (Mishra and Malhotra, 2021), encompassing six dimensions: enjoyment, absorption, activation, creative thinking, absence of negative affect, and dominance, to enhance users' experiences of involvement with the gamified application:

Enjoyment:

Davis (1986) first introduced perceptual enjoyment to the Technology Acceptance Model (TAM) "The activity [of using] technology is considered enjoyable in itself". At first, the role of enjoyment was associated with computer games. Today, many studies aim to investigate the role of perceived enjoyment in other contexts, such as communication, loyalty, or shopping (De Canio et al, 2021)

Enjoyment is the using technology without regard to the consequences of its performance, enjoyment indicate to the degree to which performing an activity is seen as providing pleasure and joy, in addition to performing the consequences (Venkatesh., 2000).

Enjoyment is a positive emotional state that occurs when a person engages in an experience or activity that satisfies a desire, goal or need. The meaning of enjoyment is not limited to pleasure but also meaning, security, safety, respect, belonging, or love. Researchers can assess people's enjoyment by participating in a task or activity that enjoys them. Specific (eg, sports or exercise). Enjoyment is an immediate and fleeting emotional response to a positive experience (Smith and Abrams, 2019).

Absorption

Absorption is a personal character or trait defined as an intrinsic measure of personality that results, in periods of undivided attention that occur when all one's attention capacity is focused on a particular point of interest (Piteira et al., 2018).

It has four components: (1) readiness to experience deep immersion, (2) a keen sense of authenticity of a focus of interest, (3) non-acceptance of behaviors that would normally distract, and (4) an assessment of special and non-traditional ways to obtain information (Shevchuk et al., 2019).

Absorption is defined as a state of deep involvement with the game, Cognitive absorption builds on several interrelated concepts: the personality trait absorption, flow, and cognitive engagement (Shevchuk and Oinas-Kukkonen, 2020).

Creative thinking

It includes a wide range of cognitive skills to model knowledge in new, innovative ways, it allows customers to generate something new, creativity and innovation skills in the 21st- century include refining ideas, seeking alternative perspectives, and implementing innovations (Kingsley and Grabner-Hagen, 2015).

Creative thinking is the ability to types of ideas, and manipulate them in unusual ways and connections to outline new possibilities that have the potential to elegantly serve a particular purpose (Hunter et al., 2020).

Activation

It focuses on the level of activity a customer achieves while performing a gamified experience. Therefore, activation is understood here as the state of the client and how he/she faces the task, and his/her tendency to achieve the goals and objectives envisioned by the task (López-Belmonte et al., 2020).

It measures the level of activity, emotion, or tension that the user feels they are experiencing during a gamified experience (González et al., 2022).

Absence of negative affect

It indicates a lack of negative emotional aspects to enhance the gameful experience (Mishra and Malhotra, 2021).

It is based on the reflection or perception of users' negative emotions, such as feeling annoyed, hostile, or frustrated while carrying out the activities (López-Belmonte et al., 2020), and also examines the gamification process to determine if or to what extent the user is frustrated, annoyed, or stressed (González et al., 2022).

Dominance

It is associated with the control users experience when playing (Mishra and Malhotra, 2021).

The dominance behavioral system (DBS) can be conceptualized as a biologically-based system that guides domination motivations, domination, and subordination behavior, and responses to perceptions of power and subordination (Johnson et al., 2012).

2.3 Online Mobile Gaming Adoption

In recent years, the interest of game makers and gamers has shifted from traditional games to mobile gaming (i.e., smartphones and tablets). The revenue share of mobile games has grown steadily since 2012. In the future, mobile games will produce revenues of $95.4 billion, in 2022, growing with a compound annual growth rate of + 11.3% to account for almost half (49%) of the entire games market (Cai et al., 2022).

The development of mobile games began with the development of the internet and mobile device technology. The explosion of the internet has shown the potential social benefits of Internet-based services (Chen et al., 2018).

Mobile games refer games that are played on mobile phones and are uploaded through apps; these games can be played both with and without the Internet. Internet-based mobile games fall into two categories (i.e. personal Internet-based mobile games and social networking Internet-based mobile games) (Baabdullah., 2020).

Mobile games can be defined as "games played on handheld devices with network capabilities" (Nguyen., 2015). According to this definition, mobile games are games that are played on mobile devices such as mobile phones and tablets with wireless communication capabilities.

According to Pan, (2011), a mobile game refers to a video game played on mobile devices, including mobile phones, smartphones, personal digital assistant PDA's, or handheld computers.

Several previous studies have used the technology acceptance models (TAM) to analyze mobile game adoption. In analyzing mobile game adoption, this study integrates and modifies TAM and the theory of reasoned action (TRA) (Mulyawan and Rafdinal, 2021).

The model of TAM is the most influential model for examining user acceptance of technology, as previous research on the adoption of various technologies such as digital games has provided substantial support (Rafdinal et al., 2020).

The Technology Acceptance Model (TAM) is considered the leading theory in the field of technology adoption. TAM has two main constructs, which are Perceived Usefulness (PU) and Perceived Ease of Use (PEU) (Hokroh and Green, 2019).

According to TAM, Perceived usefulness (PU) and perceived ease of use (PEU) are factors that explain users' acceptance behavior toward using a system (Ha et al., 2007).

Perceived usefulness is a function of perceived ease of use, while the internet is a function of perceived usefulness. In detail, perceived ease of use refers to "the degree to which a person believes using a particular system as effortless".

Perceived usefulness is defined as "the degree to which a person believes that using a particular system will improve his or her job performance" (Liu and Li, 2011).

2.4 Dimensions of Online Mobile Gaming Adoption:

Different scholars have relied on the central Technology acceptance models that measure **intention to use** and **actual use behavior** in their studies (Venkatesh and Davis, 2000; Venkatesh et al., 2003), and most research on mobile services adoption only focuses on intention (Zhang et al., 2010; Liang and Yeh, 2011). One study only measured **attitude** (Ha et al., 2007).

Several other studies have measured both outcomes, but unlike the original TAM and its derivatives, they have focused on attitudes and intentions (Qi et al., 2009; Liu and Li, 2011). There doesn't appear to be a single commented article that contains all the attitudes, intentions to use, and actual use behavior items. Instead, (Pan, 2011) measures all three items related to use to see if there is a real difference between them from the respondents' point of view.

2.4.1 Attitude:

According to Venkatesh and Bala, (2008) indicate to a user's attitude to a technology is focused via the user's Perceived Usefulness and Perceived Ease of Use of the technology.

Kemp et al., (2019), define attitude as "the individual's positive or negative evaluation of performing the behavior".

Attitude refers to a learned tendency to consistently respond favorably or unfavorably to an object. Since attitudes are learned, they are influenced by information and experience. Further, the fact that attitudes are propensities to respond leads to their relationship to actual consumer behavior (Ruiz-Molina and Gil-Saura, 2008).

According to (Uncles et al., 2003), the Theory of Reasoned Action (TRA), consumer attitude affects consumer purchase behavior.

Jahangir and Begum, (2008) pointed out that customer attitude consists of one's beliefs about an attribute of an object and the perceived importance of that attribute in making an adoption decision.

2.4.2 Intention to use:

Sun and Gao, (2020) defined behavioral intention to use as "the strength of one's intention to perform a specified behavior".

The intention to use a particular technology depends directly or indirectly on attitudes towards use, its perceived usefulness, ease of use, social influence, hedonic motivation, price value, and habit (Ivanov and Webster, 2019).

Intent to use based on behavioral intention, behavioral intention has a positive effect on behavior in studies that depend on the theory of planned behavior (TPB) and theory of reasoned action (TRA) that the Technology Acceptance Model (TAM) supports the positive relationship between structures in Studies using mobile phone services (Lai, 2005; Hung et al., 2007).

According to (Keszey, 2020), there are factors affecting intent to use, categorized in:

- ***Perceived usefulness:***

It is the first component of technology acceptance theory, which is defined as the degree to which a person believes that his use of a particular system will enhance his functional performance (Bagheri et al., 2019).

Many researchers have studied the effect of perceived utility as a major component of technology acceptance theory as Wamai and Kandiri (2017) study.

- ***Ease of use:***

It is defined as the degree to which a person believes that using a particular system will not require much effort, and is the second component of technology acceptance theory that has attracted the attention of many researchers (Li et al., 2020).

Wang and Wu (2009) stated that a system that is easy to use will help to complete tasks more easily than a system that is difficult to use. Selamat (2009) believes that a system that is perceived as easy to use and does not require effort to use will lead to its increased use and thus more acceptance on the part of the users.

- ***Social influence:***

It is the degree to which an individual realizes that important people around him think he should use the system, Gebba and Aboelmaged (2013) state that an individual's criterion justifies his awareness of the influence of his social environment (such as family, friends, and co-workers) (Crivelli and Fridlund, 2018).

2.4.3 Actual Use Behavior:

According to Lee et al., (2005), a use context can be defined as "the set of personal and environmental factors that may affect a person when he or she is using a mobile Internet service".

In many domains, there is a clear relationship between behavioral intention (BI) and actual use behavior (AUB), suggesting that behavioral intention is an affective predictor of actual use behavior. Empirically, behavioral intention constructs have been tested and found to be able to explain the user's actual use behavior of technology (Siyam, 2019).

Chumo and Kessio (2015) applied the Theory of Acceptance and Use of Technology model to assess Information and communication technology ICT adoption, the results indicate that effort expectancy, performance expectancy, and social influence factors affect the customer's behavioral intention and ultimately affect actual usage:

•Performance expectancy refers to "the extent to which the individual believes that using the system will help him or her to achieve job performance improvements".

•Effort expectancy refers to "the extent of ease about the use of the system".

•Social influence refers to "the extent to which an individual perceives that important of others believe he or she should use the new system".

•Facilitating conditions refer to "the degree to which an individual believes that an organizational and technical infrastructure exists to support using the system".

3. Research Gap

This study aims to close some gaps and contribute to several streams of research regarding literature and empirical studies on Gameful experience, and online mobile gaming adoption.

In the past researchers have examined how the gameful experience of the consumers influences product acceptability (Müller-Stewens et al., 2017), how gamified advertisements influence the purchase intention of the consumers (Bittner and Shipper, 2014), and how gamified interfaces influence the brand and its consumers, but this study will study the impact of gameful experience on online mobile gaming adoption (intention to use, actual use behavior and attitude).

This means that gameful experiences and online mobile gaming adoption influence marketing strategies within games.

Overall, this research likely explores how elements of game design (gameful experience), and player behavior (online mobile gaming adoption) interact to influence marketing efforts within gaming contexts. By understanding these dynamics, marketers can potentially develop more effective strategies for promoting products within games in a way that resonates with players and enhances their overall gaming experience.

Eventually, (Jang et al., 2018) studied the relationship between gamified customer benefits and characteristics on behavioral engagement and purchase, the contribution of this study represents the direct impact of gameful experience on online mobile gaming adoption.

4. Research Problem and Questions

Based on the research gap, this study's problem is stated as follows: to investigate the relationship between gameful experience and online mobile gaming adoption for Egyptian private university students.

Based on the above-mentioned research problem, this study is trying to find answers to the following research questions:

Q1: What is the nature of the relationship between the research variables dimensions (gameful experience, online mobile gaming adoption)?

Q2: What is the effect of gameful experience on online mobile gaming adoption?

Q3: What is the nature of the difference in the perceptions of students toward the Research Variables (gameful experience, online mobile gaming adoption) according to their different demographic variables (gender, geographic area, years of experience, and nature of study)?

5. Research Objectives

The study aims to find answers to its questions to solve the research problem.

Research Objectives are:

O1: Determining the nature of the relationship between the research variables dimensions (gameful experience, online mobile gaming adoption).

O2: Measuring the effect of gameful experience on online mobile gaming adoption.

O3: Analysing the nature of the difference in the perceptions of students toward the Research Variables (gameful experience, online mobile gaming adoption) according to their different demographic variables (gender, geographic area, years of experience, and nature of study).

6. Research hypotheses and conceptual framework

6.1 Gameful experience and online mobile gaming adoption

Nowadays, empirical research has begun to explore the impact of gamification on shaping individuals' perceptions toward gamified objects and promoting relevant behavioral changes in different contexts through different applications (Landers et al., 2020).

For example, gamification has been found to increase consumers' adoption of innovative products; trigger a positive response to smartphone marketing techniques, such as advertising and loyalty programs, and reduce energy consumption (Gunther et al., 2020).

Additionally, other research has shown that the application of gamification had shapes individual behaviour through fin-tech, such as improving in financial management by facilitating customer engagement in e-banking usage (Bayuk and Altobello, 2019).

Gameful experiences are initially widely implemented in technologies involving health and well-being monitoring, such as geotechnology, to encourage user engagement (Hamari and Koivisto, 2015).

According to Technology Acceptance Model TAM, a core tenet of TAM is the individuals' perceptions mechanism of the usefulness and ease of use of a technology to shape subsequent attitudes and behaviors (Wong et al., 2021).

To understand the specific determinants of gamification that lead to technology adoption, gamification is further theorized by introducing the perceived effectiveness of gamification into TAM, based on this conceptualization, the

perceived effectiveness of gamification reflects users' perceptions and assessment of the degree that belief game element facilitates their interaction with the technology.

In TAM, attitude reflects overall evaluative beliefs and is largely influenced by the individual's perceptions in the final behavior (i.e., adoption), the use of gamification in a technology result in a more positive evaluation of the technology and a more favorable attitude toward adoption (Hamari and Koivisto, 2013), Therefore, the suggested hypothesis for the study is:

H2: Gameful experience has a significant positive effect on online mobile gaming adoption.

This Hypothesis is divided into three Sub-hypotheses:

H2a: Gameful experience has a significant positive effect on attitude.

H2b: Gameful experience has a significant positive effect on Intention to use.

H12c: Gameful experience has a significant positive effect on actual use behavior.

6.2 The difference in students' perception toward Research Variables (Gameful experience, online mobile gaming adoption) according to Demographic variables.

Exploring the role of students' demographic factors such as gender, geographic area, years of experience, and nature of the study, in the perception of Gameful experience, online mobile gaming adoption has been documented in many prior studies. Starting with gender factor the findings of (Denden, M., 2021;

Eppmann, R., 2018; Högberg, J., 2019) reveal that there are gender differences toward these two variables. Moving to geographic area, (Landi, F., 2010) studied the impact of geographic area on the students and classified the sample into two groups: Urban area and Ruler area, this result includes that Urban area residents have more tendency to play online gaming.

Moreover, (Pradhan and Mishra, 2019; Tomkova et al., 2021) investigated the impact of the different years of experience groups on the previously mentioned two variables, the results revealed a significant difference between these groups. Spronken-Smith, R., (2012) studied the difference between different Nature of study, this result includes that respondents from the Practical Faculty category have more tendency to play online gaming.

Thus, the study suggests the following hypothesis:

H3: There is a significant difference in the perceptions of students toward the Research Variables (gameful experience, online mobile gaming adoption) according to their different demographic variables (gender, geographic area, years of experience, and nature of study).

7. Research hypotheses

To achieve study Objectives, the researcher developed the following hypotheses based on the literature review

H1: There is a significant relationship between the research variables dimensions (gameful experience, online mobile gaming adoption).

H2: Gameful experience has a significant positive effect on online mobile gaming adoption.

This Hypothesis is divided into three Sub-hypotheses:

H2a: Gameful experience has a significant positive effect on attitude.

H2b: Gameful experience has a significant positive effect on Intention to use.

H12c: Gameful experience has a significant positive effect on actual use behavior.

H3: There is a significant difference in the perceptions of students toward the Research Variables (gameful experience, online mobile gaming adoption) according to their different demographic variables (gender, geographic area, years of experience, and nature of study).

8. Conceptual Framework for the Relationships Between Research Variables

Based on the Literature, and the research hypotheses, ***Figure 1.*** shows the Conceptual Framework for the Relationships between Research Variables.

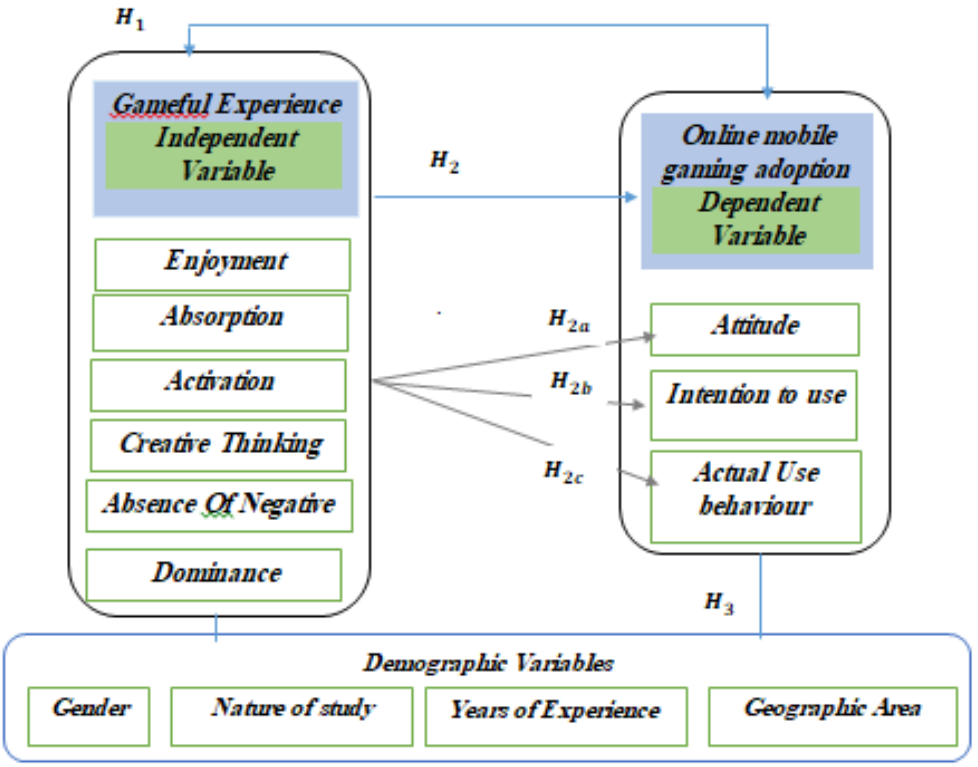

Figure 1 Conceptual Framework for the Relationships between Research Variables.

Source: Prepared by the Researcher Based on Literature Review.

9. Research Methodology

9.1 Sample and Procedures

The study targets the student population of Egyptian private universities, totaling 293,000 approximately students across 28 institutions, as reported by the (Supreme Council of Private Universities in 2023/2024). To streamline the research process, the researcher has opted to concentrate on three private universities in close geographical proximity. These universities must be chosen judiciously to

ensure they adequately reflect the broader demographic and institutional characteristics of Egyptian private universities also Horus University, New Mansoura University, and Delta University are dedicated to establishing a high-quality academic framework throughout their campuses, The exclusion of Mansoura National University from the population as it was established when the researcher registered her PhD thesis in 2022 and It's important to note that Mansoura National University has a distinct nature compared to private universities, as it aligns more closely with public universities in terms of governance, funding, and educational mission. By selecting universities with diverse attributes in terms of size, location, and student composition, the researcher aims to gain a thorough understanding of the subject under scrutiny. This focused approach not only simplifies data collection and facilitates engagement with university stakeholders but also provides insights that may be applicable across a wider spectrum of institutions. Through the selection of representative universities, the study endeavors to shed light on gameful experiences and online mobile gaming adoption within the Egyptian private university landscape.

The total number of students in each sector in the University is shown in table (1).

University	Number
Horus University	11839
Delta University	16981
New Mansoura University	2900
Total	31720

Source: Private University's Report 2023/2024.

9.2 Measures

All constructs were measured with a 5-point Likert-type scale (5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree, 1 = strongly disagree).

9.2.1 Gameful experience

Gameful experience is analyzed by a construct that includes 30 items proposed by (Mishra and Malhotra, 2021). Five items are used as indicators for Enjoyment, five items are used as indicators for Absorption, five items are used as indicators for creative thinking, five items are used as indicators for activation, five items are used as indicators of Absence of negative affect, and five items are used as indicators for Dominance.

9.2.2 Online Mobile Gaming Adoption

Online mobile gaming adoption is assessed using a 3 Dimension, five items are used for Attitude, five items are used for Intention to use, and five items are used for Actual to use.

Table 2. Sample Characteristics.

Demographic Characteristics	Frequency	Percentage
Gender		
Male	183	46.56%
Female	210	53.44%
Total	393	100.00%
Place of Residence		
Urban	239	60.81%
Rural	154	39.19%

Demographic Characteristics	Frequency	Percentage
Total	393	100.00%
Experience Years		
Less than 3 months	91	23.16%
From 3 months to less than 6 months	109	27.74%
6 months or more	193	49.11%
Total	393	100.00%
Study Nature		
Theoretical Faculty	135	34.35%
Practical Faculty	258	65.65%
Total	393	100.00%
University		
Horus	172	43.77%
Delta	118	30.03%
New Mansoura	103	26.21%
Total	393	100.00%

Source: Prepared by the researcher based on statistical analysis

9.3 Data Analysis and Results

The Partial Least Squares Structural Equation Modeling (PLS-SEM) approach was applied to evaluate the proposed model and test the proposed hypotheses. PLS analysis is divided into two major models: the measurement model and structural model. The measurement model estimates the association between the observed variables and their latent variables, while the structural model examines the relationships between the latent variables (Ullman, 2012).

9.3.1 Measurement Model

The assessment of reflective measurement models which the current study model is) in terms of reliability includes composite reliability to evaluate internal consistency reliability. In terms of validity, convergent validity is assessed using average variance extracted (AVE), and the Fornell-Larcker criterion is used to assess discriminant validity. As Table 3 shows, the items' Indicator loadings are adequate according to the suggested threshold value (Hair et al., 2021).

Table 3. Loadings, Composite Reliability, and Average Variance Extracted

Variables	*Dimensions*	*Factor Loading and Reliability*			*Convergent Validity*	
		Code	*Factor Loading*	*Cronbach's Alpha*	*AVE*	*CR*
Gameful experience	Enjoyment	EN_1	0.863	0.937	0.869	0.922
		EN_2	0.895			
		EN_3	0.942			
		EN_4	0.878			
		EN_5	0.765			
	Absorption	AB_1	0.824	0.90 8	0.814	0.868
		AB_2	0.776			
		AB_3	0.800			
		AB_4	0.805			
		AB_5	0.866			
	Creative thinking	CT_1	0.843	0.943	0.878	0.928
		CT_2	0.885			
		CT_3	0.881			

Variables	Dimensions	Factor Loading and Reliability			Convergent Validity	
		Code	Factor Loading	Cronbach's Alpha	AVE	CR
		CT_4	0.892			
		CT_5	0.887			
	Activation	AC_1	0.831	0.898	0.796	0.855
		AC_2	0.584			
		AC_3	0.823			
		AC_4	0.840			
		AC_5	0.902			
	Absence of negative affect	ANF_1	0.888	0.954	0.899	0.945
		ANF_2	0.921			
		ANF_3	0.873			
		ANF_4	0.929			
		ANF_5	0.883			
	Dominance	DO_1	0.850	0.941	0.874	0.925
		DO_2	0.851			
		DO_3	0.914			
		DO_4	0.885			
		DO_5	0.869			
Online mobile gaming adoption	Attitude	AT_1	0.914	0.951	0.892	0.940
		AT_2	0.930			
		AT_3	0.892			
		AT_4	0.832			
		AT_5	0.893			
	Intention to use	IU_1	0.891	0.949	0.889	0.937
		IU_2	0.838			
		IU_3	0.920			

Variables	*Dimensions*	*Factor Loading and Reliability*			*Convergent Validity*	
		Code	*Factor Loading*	*Cronbach's Alpha*	*AVE*	*CR*
		IU_4	0.908			
		IU_5	0.886			
	Actual to use	AU_1	0.837	0.833	0.855	0.910
		AU_2	0.779			
		AU_3	0.885			
		AU_4	0.902			
		AU_5	0.874			

Source: Prepared by the researcher according to statistical analysis.

The values of cronbach's alpha are higher than 0.6 which are accepted. Further, the values of AVE are greater than 0.5 composite reliability values are higher than 0.6 which can be accepted according to Fornell & Larcker (1981). Furthermore, discriminant validity is assessed in Table (3). This table presents the Correlations between the factors and the square roots of AVEs and also shows that the values of the square root of AVE are higher than the inter-constructs correlations (Fornell & Larcker, 1981). Therefore, the discriminant validity is achieved. Finally, the measurement model has satisfied all factors used to assess validity and reliability.

Table 4. Fornell-Larcker Criterion Analysis for Checking Discriminant Validity

	EN	AB	CT	AC	ANF	DO	AT	IU	AU
EN	0.932								
AB	0.700	0.902							
CT	0.794	0.686	0.937						
AC	0.695	0.666	0.819	0.892					
ANF	0.758	0.768	0.835	0.680	0.948				
DO	0.763	0.657	0.797	0.772	0.703	0.935			
AT	0.776	0.735	0.758	0.708	0.809	0.679	0.945		
IU	0.671	0.757	0.852	0.774	0.763	0.703	0.834	0.943	
AU	0.790	0.754	0.676	0.775	0.660	0.695	0.740	0.831	0.925

Source: Prepared by the researcher based on statistical analysis

9.3.2 Hypothesis Testing

9.3.2.1 Correlation nature among variables' dimensions Assessment:

In statistics, the Pearson Correlation Coefficient (PCC) — also known as Pearson's r, the Pearson product-moment correlation coefficient (PPMCC), the bivariate correlation, or colloquially simply as the correlation coefficient is a measure of linear correlation between two sets of data. It is the ratio between the covariance of two variables and the product of their standard deviations; thus it is essentially a normalized measurement of the covariance, such that the result always has a value between −1 and 1. As with covariance itself, the measure can only reflect a linear correlation of variables, and ignores many other types of

relationship or correlation. In this study, Pearson's r correlation among variables' dimensions can be shown in Table (5).

The results included in this table ensure a positive significant relationship among all dimensions for each variable. Additionally, the results ensure a positive significant relationship between Gameful experience dimensions and online mobile gaming adoption dimensions.

In addition, the strongest relationship between the Gameful experience dimensions and online mobile gaming adoption dimensions is the relationship between (Absence of negative affect & Attitude, where R = 0.843).

Table (5) Pearson Correlation Matrix

	EN	AB	CT	AC	ANF	DO	GEX	AT	IU	AU
EN	1									
AB	.711**	1								
CT	.724**	.851**	1							
AC	.702**	.819**	.862**	1						
ANF	.720**	.790**	.815**	.880**	1					
DO	.678**	.777**	.837**	.864**	.890**	1				
GEX	.827**	.906**	.933**	.938**	.933**	.925**	1			
AT	.723**	.691**	.752**	.808**	.843**	.812**	.847**	1		
IU	.679**	.688**	.750**	.801**	.820**	.780**	.827**	.920**	1	
AU	.615**	.647**	.702**	.743**	.765**	.760**	.775**	.830**	.888**	1

**. Correlation is significant at the 0.01 level (2-tailed).

Source: Prepared by the researcher based on statistical analysis results.

Therefore, I can accept the first hypothesis in the alternative form as follows:

H1: ***There is a significant relationship between all the research variables (gameful experience, online mobile gaming adoption).***

9.3.2.2H2: The effect of gameful experience on online mobile gaming adoption:

Table (6) The effect of gameful experience on online mobile gaming adoption

As Table 6 shows, Gameful experience has a significant positive impact on online mobile gaming adoption and its dimensions so the research hypothesis is supported.

Table 6. Direct Relationships between Gameful experience and online mobile gaming adoption

Hypothesis		*Hypothesis direction*			*Estimate*	*Sig.*	*Hypotheses result*
H2	H2a	Enjoyment		Attitude	0.230	0.000	Accepted
	H2b	Absorption			-0.146	0.005	Accepted
	H2c	Creative thinking			0.027	0.651	rejected
	H2d	Activation			0.212	0.001	Accepted
	H2e	Absence of negative affect			0.395	0.000	Accepted
	H2f	Dominance			0.213	0.001	Accepted
	H2g	Enjoyment		Intention to use	0.142	0.001	Accepted
	H2h	Absorption			-0.109	0.053	rejected
	H2i	Creative thinking			0.104	0.114	rejected
	H2j	Activation			0.269	0.000	Accepted
	H2k	Absence of negative affect			0.394	0.000	Accepted

Hypothesis		*Hypothesis direction*			*Estimate*	*Sig.*	*Hypotheses result*
	H2l	Dominance			0.099	0.141	rejected
	H2m	Enjoyment			0.086	0.075	rejected
	H2n	Absorption			-0.074	0.252	rejected
	H2o	Creative thinking		Actual to use	0.075	0.317	rejected
	H2p	Activation			0.176	0.027	Accepted
	H2q	Absence of negative affect			0.292	0.000	Accepted
	H2r	Dominance			0.284	0.000	Accepted

Source: Prepared by the researcher based on statistical analysis

According to Table (6), it is clear that Enjoyment, Activation, Absence of negative affect, and Dominance have a significant positive direct impact on Attitude where (β = 0.230, 0.212, 0.395, 0.213; Sig. < 0.05) respectively, besides Absorption has a significant negative direct impact on Attitude where (β = -0.146; Sig. < 0.05). On the other side, Enjoyment, Activation, and Absence of negative affect have a significant positive direct impact on Attitude where (β = 0.142, 0.269, 0.394; Sig. < 0.05) respectively. Finally, Activation, Absence of negative affect, and Dominance have a significant positive direct impact on Attitude where (β = 0.176, 0.292, 0.284; Sig. < 0.05) respectively. These results indicate that increasing the gameful experience dimensions lead to increasing in on line mobile gaming adoption. Therefore, ***H2: which represents the positive significant impact of gameful experience on online mobile gaming adoption was partially accepted.***

9.3.2.3 The difference in the players' perceptions of the Research Variables according to their different demographic variables:

For testing differences between the views of players' perceptions, the researcher uses non parametric tests such as: Kruskal-Wallis test and Mann-Whitney test. In

addition, using parametric tests such as ANOVA, the researcher can illustrate these tests as follows:

Non-parametric tests:

In this regard, the researcher will use Mann-Whitney and Kruskal-Wallis tests to identify the differences among the players' perceptions about the Research Variables according to their different demographic variables and the results can be revealed in the following table as follows:

Table (7) The results of non-parametric tests

Variables	Dimensions	Gender			Place of residence			Study Nature			Experience Years			University		
		Mann-Whitney		Result	Mann-Whitney		Result	Mann-Whitney		Result	Kruskal-Wallis		Result	Kruskal-Wallis		Result
		Z-Value	Sig.		Z-Value	Sig.		Z-Value	Sig.		Chi-Square	Sig.		Chi-Square	Sig.	
Gameful experience	EN	-1.127	0.260	NS	-1.546	0.122	NS	-0.864	0.388	NS	22.086	0.000	***	1.807	0.397	NS
	AB	-1.177	0.239	NS	-0.197	0.844	NS	-1.519	0.129	NS	10.650	0.005	***	1.490	0.476	NS
	CT	-1.872	0.061	NS	-0.163	0.870	NS	-2.084	0.037	***	6.456	0.040	***	2.787	0.122	NS
	AC	-1.050	0.294	NS	-0.851	0.395	NS	-1.716	0.086	NS	12.312	0.002	***	3.743	0.505	NS
	ANF	-1.212	0.225	NS	-0.904	0.366	NS	-1.203	0.229	NS	13.736	0.001	***	2.889	0.374	NS
	DO	-0.674	0.500	NS	-0.747	0.455	NS	-0.788	0.430	NS	9.310	0.010	***	2.038	0.454	NS
Online mobile gaming adoption	AT	-0.710	0.477	NS	-1.806	0.071	NS	-1.262	0.207	NS	7.459	0.024	***	3.531	0.439	NS
	IU	-0.269	0.788	NS	-1.877	0.061	NS	-1.890	0.059	NS	5.458	0.065	NS	3.820	0.124	NS
	AU	-1.433	0.152	NS	-1.302	0.193	NS	-2.498	0.012	***	7.861	0.020	***	2.151	0.072	NS

Source: Prepared by the researcher based on statistical analysis results.

According to Table (7), the researcher can conclude some results as follows:

- For the gender variable, there are no significant statistics for all variables except Congruence between brand image and customer, so the researcher concludes that there are no differences among the players' perceptions about the Research Variables according to gender for the majority of research variables.
- For the Place of residence variable, there are no significant statistics for all variables, so the researcher concludes that there are no differences among the players' perceptions about the Research Variables according to the Place of residence for all research variables.
- For the Study Nature variable, there are no significant statistics for all variables except Creative thinking and actual to use, so the researcher concludes that there are no differences among the players' perceptions about the Study Nature for the majority of research variables.
- For the Experience Years variable, there are significant statistics for all variables except Intention to use and, so the researcher concludes that there are differences among the players' perceptions about the Experience Years for the majority of research variables.
- For the university variable, there are no significant statistics for all variables, so the researcher concludes that there are no differences among the players' perceptions about the university for all research variables.

Therefore, H3 can be partially accepted because there are non-significant differences between the players' perceptions in (gender, Place of residence, Study Nature, and University) and significant differences in (Years of Experience) towards the research variables (gameful experience, online mobile gaming adoption) according to their Demographic Variables (gender, Place of residence, Study Nature, Years of Experience and University).

Parametric tests:

Multivariate statistics is a subdivision of statistics encompassing the simultaneous observation and analysis of more than one outcome variable. Multivariate statistics concerns understanding the different aims and background of each of the different forms of multivariate analysis, and how they relate to each other.

The practical application of multivariate statistics to a particular problem may involve several types of univariate and multivariate analyses to understand the relationships between variables and their relevance to the problem being studied. In this study, multivariate analysis was used to identify the differences between the players' perceptions, consequently, Table (8) shows the results of multivariate analysis for the demographic variables related to the players' perceptions and the main variables of the research.

Table (8) The results of parametric tests

Variables	Dimensions	Gender		Place of residence		Study Nature		Experience Years		University	
		F	Sig.	F	Sig.	F	Sig.	F	Sig.	F	Sig.
Gameful experience	EN	2.163	0.142	3.117	0.078	1.115	0.292	11.776	0.000	0.716	0.388
	AB	1.052	0.306	0.088	0.767	2.324	0.128	5.234	0.006	0.663	0.301
	CT	2.846	0.092	0.092	0.762	3.879	0.050	3.774	0.024	0.539	0.127
	AC	1.045	0.307	0.999	0.318	2.869	0.091	5.974	0.003	0.871	0.346
	ANF	1.370	0.242	1.412	0.235	1.061	0.304	7.194	0.001	0.703	0.499
	DO	0.534	0.465	0.784	0.377	0.639	0.424	3.764	0.024	1.040	0.145
Online mobile gaming adoption	AT	0.435	0.510	3.432	0.065	1.830	0.177	3.909	0.021	1.069	0.296
	IU	0.359	0.549	4.243	0.040	4.379	0.037	2.675	0.070	0.729	0.376
	AU	1.850	0.175	1.704	0.193	7.052	0.008	3.422	0.034	0.542	0.521

Source: Prepared by the researcher based on to statistical analysis results.

According to Table (8), the researcher can conclude some results as follows:

- For the gender variable, there is no significant F-value for all variables, so the researcher concludes that there are no differences among the players' perceptions about the Research Variables according to gender for all research variables.

- For the Place of residence variable, there is no significant F-value for all variables except Intention to use, so the researcher concludes that there are no differences among the players' perceptions about the Research Variables according to the Place of residence for the majority of research variables.

- For the Study Nature variable, there is no significant F-value for all variables except Intention to use and actual to use, so the researcher concludes that there are no differences among the players' perceptions about the study nature for the majority of research variables.

- For the Experience Years variable, there is a significant F-value for all variables except Intention to use, so the researcher concludes that there are differences among the players' perceptions about the Experience Years for the majority of research variables.

- For the university variable, there is no significant F-value for all variables, so the researcher concludes that there are no differences

among the players' perceptions about the University for All Research Variables.

Therefore, I can assure the results of non-parametric tests of H3 which indicates this hypothesis can be partially accepted because there are non-significant differences between the players' perceptions in (gender, Place of residence, Study Nature, and University) and significant differences in (Years of Experience) towards the research variables (gamefull experience, online mobile gaming adoption) according to their Demographic Variables (gender, Place of residence, Study Nature, Years of Experience and University).

10. Discussion

10.1 The relationship between the research variables dimensions (gameful experience, online mobile gaming adoption).

This section reflects the first research objective by discussing the nature of the relationship between the research variables dimensions, it also answers Q1: "What is the nature of the relationship between the research variables dimensions (gameful experience, online mobile gaming adoption)?".

The correlation matrix which was previously discussed as the hypothesis result was accepted provide sufficient evidence to prove that there are positive relationships between the research variables dimensions, which represents the positive relations between Gameful experience dimensions and online mobile

gaming adoption. Also, these hypnotized relationships are supported by the following sections.

10.2 The relationship between Gameful experience, and online mobile gaming adoption.

This section reflects the second research objective by discussing the impact of Gameful experience on Online mobile gaming adoption, it also answers Q2: "What is the direct effect of gameful experience on online mobile gaming adoption (attitude, intention to use, and actual use behavior)?

Aligned with the hypothesized relationship, research findings reveal that gameful experience is positively related to online mobile gaming adoption, and also the three sub-hypotheses are supported which indicated that gameful experience is positively related to intention to use, actual use behavior and attitude.

The results reveal the perceived effectiveness of gamification is determined by the perceived enjoyment of the game and contributes to users' attitude development, directly and through its perceived usefulness positively affected by mobile payment adoption (Wong, D., 2021). A systematic overview of game design notes how principles derived from that field are highly applicable to gamification in mobile marketing settings (Hofacker, C. F., 2016). This result is consistent with the previous studies which indicate that gameful experience is positively associated with online mobile gaming adoption.

10.3 The difference in students' perception toward Research Variables (gameful experience, online mobile gaming adoption) according to their Demographic variables.

This section reflects the last research objective through discussing the difference in students' perception toward Demographic variables, it also answers Q3: "What is the nature of the difference in the perceptions of students toward the Research Variables (gameful experience, online mobile gaming adoption) according to the difference in their demographic variables (gender, geographic area, years of experience, and nature of study)?"

In contrast with the anticipated hypothesis, the results indicate a non-significant difference in the perceptions of students about the research variables according to their different demographic variables, starting with gender according to the results there is no difference in the perceptions of students about the research variables according to gender, although contrary to the majority of previous research that have found that gender mediates the students' perception, this finding is consistent with a few of the previous studies where gender is shown to have no significant relationship (Pradhan & Mishra., 2019; Akhtar et al., 2021; Błachnio et al., 2023).

This result can be explained by the fact that both genders may have similar motives toward power or status, another explanation may be the Notwithstanding of gender, each student of the university is expected to display

Nature of study also is inconsistent with the predicted hypothesis, the results indicate a non-significant difference in the perceptions of students about the

research variables according to their nature of study, dissimilar to the majority of previous studies that have found that nature of study moderates the students' perception, this finding is consistent with a few of the previous studies which nature of study has no significant impact. Years of experience represent a significance difference in the students' perception and Geographic Area don't represent a significance difference in the students' perception as well in contrary to some previous studies (Pradhan and Mishra, 2019; Tomkova et al., 2021).

Research Findings Table (9) below shows the summary of research findings compared to the literature:

Research Findings Compared to Literature	Research Findings Compared to Literature
There is a significant relationship between all the research variables dimensions (gameful experience, online mobile gaming adoption).	**Agreed with**: (Xi, N., 2024), (Wong, D., 2021), (Hofacker, C. F., 2016), (Mishra, S., and Malhotra, G. 2021).
There is a significant positive effect of gameful experience on online mobile gaming adoption.	**Agreed with**: (Xi, N., 2024), (Wong, D., 2021), (Hofacker, C. F., 2016).
There is a significant difference in the perceptions of students toward the Research Variables (gameful experience, online mobile gaming adoption) according to their different demographic variables (gender, geographic area, years of experience, and nature of study).	Within the researcher's knowledge, there are no previous studies that have previously investigated this relationship.

***Source: prepared by the researcher based on the literature* review.**

11. Theoretical Implications

The results of this study contribute to the literature. This study reveals a significant positive relationship between Gameful experience and online mobile gaming adoption. Most of the prior studies' results reveal the perceived effectiveness of gamification is determined by the perceived enjoyment of the game and contributes to users' attitude development, directly and through its perceived usefulness positively affected by mobile payment adoption (Wong, D., 2021). So, this study focuses on how Gameful experience and online mobile gaming adoption are positively related as the study contribution to current literature.

12. Practical Implications

Based on the literature review, these relationships were not analyzed in the same depth before, in addition to that the application field still needs more investigation. The results of the current study provide some practical contributions as follows:

1. On a practical marketing level by proposing insights relevant to developing games accessible on a device that is becoming almost ubiquitous, this research adds knowledge that can be used through a broad range of potential applications.

2. Gameful Experience has motivated and engaged many players to use online game services to play a variety of games. The gamers are satisfied with their intrinsic needs and experience a feeling of enjoyment and pleasure when using the game, which helps the product to be in the market.

13. Limitations and further research recommendations

Despite the implications of this study, several limitations should be highlighted, which point toward propositions for future investigations.

First, as previously mentioned, the research design of the present study is cross-sectional, which makes it difficult to ensure causality. Future scholars should conduct longitudinal studies with meaningful time lags to measure how students' Gameful experience impacts their online mobile gaming adoption.

Second, despite the study findings reinforced the argument that Gameful experience positively affect the online mobile gaming adoption, the researcher recommends that future studies can investigate the impact of Gameful experience on other online mobile gaming adoption, or to investigate the impact of Gamification on online mobile gaming adoption.

Lastly, the present study was conducted using a sample from a private universities university (Horus, Delta, and New Mansoura University), so the findings derived from this work are largely applicable to private higher education institutions (HEIs) located in Egypt, however, the results of this study may differ in magnitude in local public (HEIs), so, perhaps future researchers might be interested in undertaking comparative research to address probable differences in the impact of Gameful experience on online mobile gaming adoption in public (HEIs) and in private (HEIs) in Egypt.

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العلاقة بين خبرة الألعاب وتبنى العاب الهاتف المحمول الإلكترونية: دراسة تطبيقية "على طلاب الجامعات الخاصة المصرية"

الملخص

ويهدف هذا البحث إلى التحقيق في أثر خبرة الألعاب وتبنى العاب الهاتف المحمول الإلكترونية، بالتطبيق على طلاب الجامعات المصرية من القطاع الخاص. تبنت الدراسة فلسفة المنهج الاستنتاجي، وطريقة التحليل الكمي كمنهجية للدراسة، وكانت الأداة المستخدمة في جمع البيانات هي الاستبيان ونتيجة لذلك، جُمع ٣٩٣ استبيانا قابلا للاستعمال يدويا من جامعات مصرية خاصة. بالإضافة إلى ذلك، استُخدم تحليل المسار PLS V.4 الذكي لاستكشاف العلاقات السببية بين متغيرات الدراسة.

وتكشف النتائج عن وجود علاقة ارتباط هامة بين أبعاد متغيرات الدراسة (خبرة الألعاب وتبنى العاب الهاتف المحمول الإلكترونية)، ولهذه التجربة تأثير إيجابي كبير على تبني طلاب الجامعات الخاصة المصرية العاب الهاتف المحمول الإلكترونية، ولا يوجد فرق معنوي في تصورات الطلاب عن متغيرات الدراسة وفقاً لمتغيراتهم الديمغرافية المختلفة (النوع، المنطقة الجغرافية، طبيعة الدراسة)، ويوجد فرق معنوي في سنوات الخبرة فقط وفقاً للمتغيرات الديمغرافية.

بالإضافة إلى ذلك، فإن هذا البحث له أيضًا آثار عملية وإرشادات للجامعة، وآثار نظرية للباحثين المهتمين بمتغيرات الدراسة.

الكلمات المفتاحية: خبرة الألعاب، تبنى العاب الهاتف المحمول الإلكترونية، القصد من الاستخدام، سلوك الاستخدام الفعلي، الموقف