

Determinants of mobile gaming need satisfaction in South Africa

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ABSTRACT

Mobile gaming is one of the fastest growing industries in the world and is playing a significant role in the entertainment industry, yet not much is known about the psychological drivers of mobile gaming need satisfaction. The purpose of this study was to explore how mobile gamers are inherently drawn to play games enthusiastically. Understanding the psychological game need satisfaction would be invaluable to game developers to develop mobile games that smartphone users will actually play. The study adopted a quantitative approach and descriptive research, using a non-probability convenience and snowball sampling technique. A self-administered questionnaire was distributed to 307 adult consumers who had downloaded a mobile game application at the time of the survey. The results of the Structural Equation Modelling (SEM) suggest that enjoyment is the most significant predictor of mobile gaming need satisfaction, followed by gaming facilitating conditions, while personal gratification and effort expectancy are insignificant factors. Mobile gaming developers can improve mobile gaming need satisfaction by developing mobile games that are satisfying and that enhance enjoyment through improved game features pertaining to novelty, design and competence. This study is one of the first in a developing economy to address the unexplored relationships between variables drawn from different theoretical frameworks within the context of mobile gaming, contributing to understanding mobile game need satisfaction through smartphones that are already well-integrated into users' lifestyles.

Keywords: Mobile games, gaming need satisfaction, enjoyment, effort expectancy, personal gratification, gaming capability, psychological drivers, South Africa

INTRODUCTION

The exponential adoption of smartphones has brought about a myriad of mobile enabled services, including mobile payments, mobile marketing, mobile commerce and mobile gaming, to mention but a few. Literature indicates that there is an increase in the number of apps that are downloaded every year across mobile operating systems. A recent study by Rutz, Aravindakshan and Rubel (2019) reported that 197 billion apps were downloaded in 2019 across mobile operating systems. It is certain that mobile app downloads will keep growing.

The exponential growth in smartphone gaming apps that seemingly have no age or gender boundary anymore is of particular interest to this study. While mobile gaming is currently a \$106 billion industry, it is forecasted to reach \$256 billion by 2025 (Mordor Intelligence, 2021). The growth of the gaming industry across the globe is partly due to increasing smartphone penetration and increased adoption of trending technologies for developing mobile games

(Mordor Intelligence, 2021). In Africa, consumers have an average of 33 apps downloaded per device at any point (Deloitte, 2017), and games account for the majority of app downloads (eMarketer, 2017). A total of 15.2 billion mobile phone games were downloaded from the Apple App Store and Google Play across the globe during the first quarter of 2020 (Clement, 2021). Yet, not much is known about what drives consumer satisfaction with mobile gaming apps, especially in emerging markets. It is clear that there is a strong correlation between the growth of mobile gaming and increased smartphone ownership (Harrop, 2020).

It is crucial to understand the psychological drivers of mobile gaming need satisfaction, particularly from an emerging market perspective, such as South Africa. South Africa is of particular interest for a number of reasons. First, South Africa is currently the second largest gaming market on the continent after Egypt (Morocco is in the third place) (Clement, 2021). Based on the report by Clement (2021), mobile gaming is expected to be a R5 billion industry by 2023. Second, a larger proportion of the population cannot afford a gaming personal computer or console, but the availability of cheap smartphones and tablets and easier internet access could strengthen this growth (PricewaterhouseCoopers, 2018). Third, due to increasing cases of positive COVID-19 cases, the country has been under lockdown to curb the spread of the virus, resulting in a significant growth in the consumption of mobile entertainment, including mobile games (Africa.com, 2021). Fourth, the access to high speed internet and increased 3G/4G coverage across the country could see the mobile gaming market rise. It would not be advisable for researchers to neglect market research in Southern Africa where 477 million people subscribed to mobile services in 2019; a number that is projected to reach 500 million in 2022 (Clement, 2021). Due to limited available research, the study contributes by focussing on smartphone gaming need satisfaction in South Africa where mobile games, including short videos and navigation, are the most popular content-related activities among consumers (Africa.com, 2021).

Despite an increase in literature on mobile gaming app adoption and utilisation, most available reports focus primarily on download decisions (Bulduklu, 2019; Nam & Kim, 2020; Bowman, Jöckel & Dogruel, 2015) rather than psychological game need satisfaction. These studies either investigated purchase intention of mobile game apps (Lu et al., 2016), predictions of mobile game success (Alomari, Ncube & Shaalanet, 2018), or the relationship between gaming on smartphone use and self-perceived problematic smartphone use (Lopez-Fernandez, Männikkö, Kääriäinen, Griffiths & Kuss, 2018). It is safe to assume that the development of mobile apps requires substantial investment by mobile game developers, yet success is not guaranteed (Zheng, 2020). There seems to be a paucity of studies investigating psychological drivers of mobile gaming need satisfaction from an emerging market perspective, a knowledge gap that this study attempts to address.

Although the success of a product or service depends on continued use (Yang & Lin, 2019), excessive gaming can be detrimental to the health of players as they can suffer from depression, anxiety and low self-control because playing mobile games is usually not straightforward (Lopez-Fernandez et al., 2018). Therefore, there is a need for further research into users' psychological gaming need motivations to enhance the game relevance and utility of the application features that in turn could lead to satisfaction (Alomari et al., 2018). Satisfaction is a crucial outcome in developing mobile games that are fun to play, thus ensuring user engagement in a highly competitive mobile phone game market (Yang & Lin, 2019). Also, according to Zheng (2020), only a third of downloaded apps remain active after download, making understanding the psychological need satisfaction a high priority for marketers in order to develop mobile games that capture wider audience interest. This underscores the need to develop mobile games that are satisfying, as mobile game apps are one of the most promising and profitable mobile entertainment services (Yang & Lin, 2019).

Mobile games can generally be described as gaming apps that are played on smartphones and tablets that have wireless communication functionality (Merikivi, Tuunainen & Nguyenet, 2017). Specifically, the study investigates the drivers of casual gaming need satisfaction. The casual game is the most popular genre and Candy Crush is the most widely played game (Molinillo, Japutra & Liébana-Cabanillas, 2020). According to Molinillo et al. (2020), casual games generally have uncomplicated game controls, are easy to learn, have shorter play sessions and have simple rules to progress within the game. Casual games can be downloaded and played anywhere any time and can be uninstalled from the device anytime without any cost (Nam & Kim, 2020). Lopez-Fernandez et al. (2018) also found that casual games were the favourite type of gaming on smartphones. Hence, it would be plausible to suggest that casual games

are also likely to be popular among South African players, not only because they appeal to a wider demographic but also because they could be a source of good entertainment during this depressing time of the COVID-19 pandemic. This assertion is congruent with Bowman et al.'s (2015) statement that the majority of smartphones games fit the casual game category since they do not require heavy investments in time and skill from the players.

RESEARCH OBJECTIVE

The primary objective of this paper is to further the understanding of drivers of need game satisfaction from an emerging market perspective. This objective could be realised through investigating the influence of the following factors on mobile gaming need satisfaction: Effort expectancy, facilitating conditions, personal gratification, and enjoyment. These factors are worthy of further investigation in the context of an emerging market since they have been tested and found to be significant predictors of game adoption in previous international studies (Choe & Schumacher, 2015; Kumar, Natarajan & Acharjya, 2017).

The following research question guided this study: Given the ubiquitous nature of mobile phones and the need to play games anywhere, what are the psychological drivers of mobile gaming need satisfaction among users? The answer to this question is important for game designers to develop mobile games that not only enhance the gaming experience but that are also marketable in the highly competitive industry.

The study contributes by proposing and testing a new framework that incorporates variables taken from the literature based on the following models: The updated unified theory of acceptance and use of technology (UTAUT2) (Venkatesh, Thong & Xu, 2012) and the game use experience satisfaction scale (GUESS) (Phan, Keebler & Chaparro, 2016). The UTAUT2 is an extension of the UTAUT, which was originally developed to test the acceptance of technology in the workplace, and has been updated to apply to new contexts such as collaborative technology and health information systems (Venkatesh et al., 2012). The GUESS framework was developed by Phan et al. (2016) following a rigorous system of scale development, modification, refinement, and validation to measure satisfaction with gaming experience.

The theoretical underpinning of the study is the basic psychological need theory (Peng, Lin, Pfeiffer & Winn, 2012), which has rarely been applied in the context of mobile gaming, and in particular, from an emerging economy perspective. It has been hypothesised in literature that psychological need satisfaction is a strong predictor of behavioural engagement in that satisfaction significantly provides the energy to continue with the behaviour (Sailer, Hense, Mayr & Mandl, 2017). Thus, the basic psychological need theory underpins this study to determine the extent to which mobile gamers will be satisfied with a gaming experience so that they will continue to play. The application of this theory is also important to determine the applicability of the model in a new setting such as South Africa, which has the highest mobile penetration rates in Africa (GSMA Intelligence, 2016), with a view to growing the South African mobile gaming app market.

LITERATURE REVIEW

Basic psychological need theory

The basic psychological theory is an extension of the broad self-determination theory predominantly used to understand human intrinsic and extrinsic motivation and to understand individual differences (Peng et al., 2012). Of the six mini theories of the self-determination theory, the basic psychological need theory proposes that humans yearn to satisfy the following three basic needs: The needs for competence (i.e. feeling effective and skilled), autonomy (i.e. making conscious decisions based on one's values and goals) and relatedness (i.e. feeling of self-connection to peers) (Mills & Allen, 2020). According to Peng et al. (2012), the underlying principles of the basic psychological need theory propose that satisfying the needs for autonomy, competence and relatedness results in better mood, vitality and self-esteem. Extant literature indicates that need satisfaction predicts psychological wellbeing (Mills & Allen, 2020; Sailer et al., 2017), suggesting that mobile game need satisfaction during an engagement is associated with increased gaming frequency, enhanced intention to replay and higher enjoyment. Thus, the psychological need

theory helps to explain how mobile game players are inherently drawn to play enthusiastically. Understanding the need to play mobile games would be invaluable to game developers to develop mobile games that smartphones users will actually play.

Mobile game need satisfaction

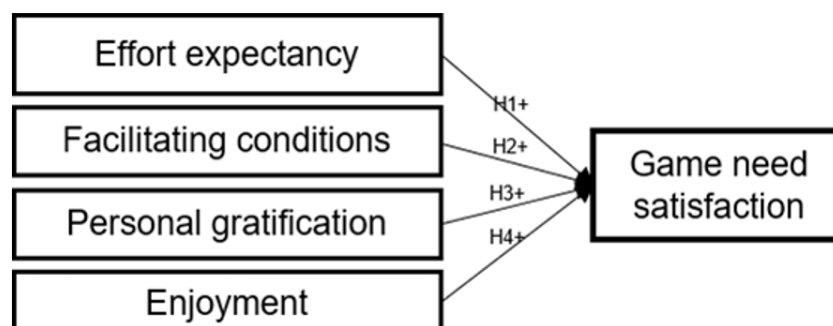
The topic customer satisfaction topic has attracted research interest from scholars for many years, driven in part by the notion that customer satisfaction has long term customer benefits such as loyalty and increased profitability (Huang, Hsu, Chen & Chanet, 2014; Mills & Allen, 2020). Mobile game players seek to satisfy their psychological needs during game play. In this study, satisfaction is described as an emotional reaction that is produced by the feeling that the consumer experiences during game play and the performance level of the mobile game. Previous researchers concurred that satisfaction judgements are made from both cognitive (knowing and perceiving) and affective (relating to moods and feelings) perspectives (Mills & Allen, 2020). Despite this concurrence, several studies have produced conflicting results, which prompted some scholars to suggest that satisfaction varies depending on the product and situation. Lin and Lekhawipat (2016) reported that perceived product performance and customer experience influence customer satisfaction. With reference to this study, it suggests that customer expectations of satisfaction may differ depending on the performance of the mobile gaming app.

Various studies investigated gaming need satisfaction with regard to the influence of game features (Peng et al., 2012) or gamification (Sailer et al., 2017). Traditionally, when factors that influence user satisfaction for new technologies or information systems are investigated, function-orientated designs are emphasised. However, the focus of this study is on the entertainment of the user. Consequently, it is important to focus on improving hedonic satisfaction, because that will sequentially increase satisfaction and actual continued use of a mobile gaming app (Choe & Schumacher, 2015).

DEVELOPMENT OF THE CONCEPTUAL FRAMEWORK AND HYPOTHESES

As alluded to earlier, the conceptual framework of this study uses factors from the GUESS and UTAUT2 theoretical frameworks. These factors, as illustrated in Figure 1, are worthy of further investigation in the context of mobile gaming to add to the existing body of literature on mobile gaming need satisfaction.

**FIGURE 1
PSYCHOLOGICAL DRIVERS OF MOBILE GAMING NEED SATISFACTION**



Effort expectancy

Effort expectancy is also described as ease of use in the technology acceptance model (Davis, 1989), and can be explained as the usability associated with the system (Venkatesh et al., 2012). In this study, effort expectancy reflects the degree of ease of downloading, installing and playing the mobile game. Hence, the goal of effort expectancy in

mobile gaming is to ensure that players can easily interact with the game to achieve satisfaction. When the effort expectancy goal is achieved, game players can focus on experiences within the game. If players struggle to play a game, they will lose interest in the game (Kimberly, Lim, Khong & Wong, 2016). Therefore, effort expectancy is integral for players to satisfy the need for competence and a sense of effectiveness, skill and game need satisfaction, which could lead to their comfort and a positive attitude toward the game (Kimberly et al., 2016). The hypothesis that effort expectancy is positively associated with user satisfaction has been tested in varied contexts such as online shopping experience (Taheri & Akbari, 2016) and mobile apps (Tam, Santos & Oliveira, 2018). Although Baabdullah (2018) postulated that the level of effort expectancy depends on the device used, this study hypothesised the following:

H₁: Effort expectancy is positively associated with smartphone gaming need satisfaction.

Facilitating conditions

Facilitating conditions can be defined as the degree to which an individual believes that organisational and technical support structures are set up to support them while using the system to overcome any usage barriers (Baabdullah, 2018). In this study, facilitating conditions translates to the available technical support when players get 'stuck' to enable them to continue playing the mobile game (Kumar et al., 2017). Baabdullah (2018) reported that facilitating condition is a fundamental requirement for users to be practically proficient in all the steps involved in browsing the internet and downloading and playing the game. The level of support could enable the player to make conscious decisions on which game to play and when to play it based on their goal at the time of playing the mobile game. Thus, creating an enabling environment for a better mobile gaming experience increases user satisfaction, and it can be assumed that facilitating conditions facilitate game need satisfaction. Thus, it is hypothesised that:

H₂: Facilitating conditions are positively associated with smartphone gaming need satisfaction.

Personal gratification

According to Phan et al. (2016), personal gratification can be described as the motivational and challenging aspects of a game that stimulate players to accomplish game goals and complete challenges, thus creating a desire to succeed and continue to play the game. A need for competence can be achieved when the mobile game offer points as feedback that is directly connected to the player's abilities. According to Sailer et al. (2017), some mobile games provide performance benchmarks or graphs to indicate progress over time, which could be a great source of motivation to continue playing. Individual players often value feelings of self-connection with peers, which underscores players' need to connect and join groups that socially connect with others (Merikivi et al., 2017). Personal gratification and a sense of social relatedness could be achieved when players and peers compare their accumulated game points that are awarded in playing a similar game. Based on the above, it is hypothesised that:

H₃: Personal gratification is positively associated with smartphone gaming need satisfaction.

Enjoyment

Enjoyment can be described as the extent of happiness and excitement players experience as a result of playing the game (Molinillo, Japutra & Liébana-Cabanillas, 2020). Molinillo et al. (2020) described enjoyment as perceived fun that comes from engaging in mobile games that are so absorbing as to provide an escape from the demands of busy daily life. Game enjoyment has been researched extensively from different angles, including playing tennis via an active video game (Wadsworth et al., 2014) and horror games (Lin, Wu & Tao, 2018). One of the main aims of mobile games is to satisfy players' need for pleasure and fun, competence, autonomy and relatedness (Merikivi et al., 2017). Most authors researching enjoyment during game play agree that players are unlikely to continue playing a game if it is not enjoyable or fun (Bulduklu, 2019; Rutz et al., 2019; Molinillo et al., 2020). According to these authors, game players do not only want to satisfy objective needs but also play to fulfil fantasies or develop a desired 'unreality'. Thus, it can be hypothesised that:

H₄: Enjoyment is positively associated with smartphone gaming need satisfaction.

METHODS

Sampling profile

As previously alluded to, mobile gaming transcends age groups. Hence, the target population consisted of Baby Boomers (born between 1946 and 1965), Generation X (born between 1966 and 1985), and Generation Y (born between 1986 and 2005) (Shams, Rehman, Samad & Oikarinen, 2020). These would be South African smartphone users who had downloaded a casual mobile gaming app on their mobile device in the six months before the survey was initiated during 2019.

The population was accessed through an online survey by distributing the link on specific Facebook pages, such as public profiles for businesses, brands and celebrities, that had granted permission to post the survey on their wall. The use of paid social advertising to boost the survey's visibility on third-party individuals' social media pages was also sought and granted.

The sample was drawn using a non-probability convenience sampling method supported by snowball sampling. The snowball sampling method was used as suggested by Parker, Scott and Geddes (2019) to provide referrals or nominate other potential participants who fit the research criteria. Thus, the qualified participants shared the invitation with acquaintances that fit the defined targeted population. Respondents who fully completed the survey qualified for entry into a lucky draw. Three respondents' names were drawn and each received a voucher valued at R500 from a popular South African online store. If the winners mentioned that a specific individual had referred them, the person who referred them received a R250 voucher from the same store. This assisted in effecting snowball sampling. A total sample of 307 respondents was obtained and yielded a margin of error of 5.55% with a 95% confidence level (Raosoft, 2014).

Measures

The questionnaire consisted of 25 statements measuring the psychological drivers that predict mobile gaming need satisfaction. The questionnaire was structured into three sections. Section A comprised screening questions to establish whether respondents were eligible to complete the survey with respect to smartphone ownership and having downloaded a casual mobile game app during the six months preceding the survey. Section B consisted of questions pertaining to device used and frequency of play. Section C comprised statements measuring psychological gaming need satisfaction. The last section, Section D, compiled demographic information with respect to gender, population group and age. Participants were asked to answer all questions regardless of whether they also played mobile games other than casual games.

The five items that measured effort expectancy and four items measuring facilitating conditions were taken from Baabdullah (2018). The six items measuring mobile gaming need satisfaction and personal gratification and the four items measuring enjoyment were taken from Phan et al. (2016). All scales had proven internal consistency reliabilities ranging between 0.77 and 0.88 Cronbach's alpha values; the average variance extracted [AVE] of the constructs ranged from 0.650 to 0.850; and the factor loading values were greater than 0.50. The adopted scales were also previously used in the context of mobile payments

All responses were measured using a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The questionnaire was pre-tested with 20 respondents randomly selected from the target population. Their feedback guided changes in the wording and grammar to ensure the questions were clear and understandable.

Common method bias

Several of the steps suggested by Rodríguez-Ardura and Meseguer-Artola (2020) were taken during the questionnaire design for this study to prevent common method bias. First, the wording of the questions was slightly adapted to be concise, clear and accurate, and clear definitions were provided for unfamiliar constructs before the questionnaire was pre-tested. Second, the item wording was improved after pre-testing the questionnaire with 20

participants from the study population. Third, the respondents were guaranteed anonymity and confidentiality in the introduction to discourage them from providing socially desirable responses. Fourth, respondents were assured that the research was purely for academic purposes to encourage honest responses.

RESULTS

Sample profile and mobile gaming habits

Table 1 shows the sample profile of the respondents as well as their mobile gaming habits. In total, 307 respondents participated in this study but not everyone completed the demographic questions at the end of the survey (n-values denoted per question). Overall, more respondents were male (55.5%) than female (43.5%). The respondents were predominantly Whites (46.2%), followed by Black Africans (21.3%), and the remainder of the sample was an almost equal split between Coloured (15.3%) and Indian/Asian (15.0%) respondents. Most of the respondents were aged between 18 and 25 years (46.5%) and between 26 and 35 years (39.5%). More than half the respondents indicated that they played mobile games daily (63.2%). The sample was dominated by respondents who played mobile games on an Android device (81.0%).

TABLE 1
DESCRIPTIVE STATISTICS OF THE MOBILE GAMING RESPONDENTS

Sample characteristic		Frequency (n)	Percentage (%)
Gender	Male	167	55.5
	Female	131	43.5
	Other	1	0.3
	Prefer not to answer	2	0.7
	Total	301	98.1
Population group	Black African	64	21.3
	Coloured	46	15.3
	Indian/Asian	45	15.0
	White	139	46.2
	Other	1	0.3
	Prefer not to answer	2	2.0
Total	301	98.1	
Age	18–25 years	139	46.5
	26–35 years	118	39.5
	36–45 years	38	12.7
	46–55 years	4	1.3
	Total	299	97.4
Mobile game play frequency	Daily	194	63.2
	Weekly	91	29.6
	Monthly	21	6.8
	Total	307	100
Device mobile games are played on	iPhone	47	15.4
	Android	248	81.0
	Others	11	3.6
	Total	306	99.7

Measurement model

Covariance-based structural equation modelling (SEM) was applied to explore the factors that influence gaming need satisfaction. The study adopted a two-step approach to evaluate the measurement and the structural model (Hair, Black, Babin & Anderson, 2016). The measurement model was used to test construct validity and reliability using

confirmatory factor analysis (CFA) (Pallant, 2016) by using AMOS Version 26 software. The initial results indicated two scale item factor loadings (GR1 related to personal gratification, and FC4 related to facilitating conditions) to be below the recommended threshold of 0.5 (Pallant, 2016). A decision was made to exclude the scale items from further analysis. Scholars recommend that when certain items are removed, the CFA should be tested again to determine its goodness of fit (Hair et al., 2016; Hooper, Coughlan & Mullen, 2008). The resultant second CFA produced model fit indices normed χ^2 (220) = 2.828 ($p = 0.000$); incremental fit index (IFI) = 0.907; comparative fit index (CFI) = 0.906; root mean square error of approximation (RMSEA) = 0.077; and standardised root mean square residual (SRMR) = 0.516 to indicate adequate model fit according to the recommended threshold values indicated in Table 2. Although values for the SRMR range from 0 to 1.0 with well-fitting models obtaining values less than 0.05 (Diamantopoulos & Sigauw, 2000), values as high as 0.08 are deemed acceptable (Hu & Bentler, 1999).

TABLE 2
FIT INDICES FOR THE MEASUREMENT MODEL

Fit indicators	Measurement model	Recommended thresholds	Recommending authors
χ^2/df	2.018	≤ 5.00	Hooper et al., 2008
CFI	0.920	≥ 0.90	Hu & Bentler, 1999
IFI	0.921	≥ 0.90	Hu & Bentler, 1999
RMSEA	0.077	≤ 0.08	Hu & Bentler, 1999
SRMR	0.516	≤ 0.08	Hu & Bentler, 1999

Convergent validity

Table 3 shows the average variance extracted (AVE), Cronbach's alpha coefficients and composite reliability values of the factors tested in this study. The results depict that the reliability of the factors range between 0.75 and 0.91, which meets the cut-off point of 0.7 or greater (Hair et al., 2016) to indicate internal consistency and construct reliability of the scales. The AVE values for the latent constructs range from 0.50 (FC) to 0.68 (ENJ), which all meet the minimum threshold of 0.5, as suggested by Fornell and Larcker (1981), to indicate that the scale items are representative of the underlying constructs. Thus, meeting or exceeding the recommended thresholds for the AVE, Cronbach's alpha and composite reliability values indicate convergent validity of the scales.

TABLE 3
AVE, CRONBACH'S ALPHA VALUES AND COMPOSITE RELIABILITY

Construct	AVE	Cronbach's alpha	Composite reliability
Effort expectancy (EE)	0.64	0.90	0.89
Personal gratification (GR)	0.58	0.87	0.87
Enjoyment (ENJ)	0.68	0.90	0.91
Facilitating condition (FC)	0.50	0.82	0.75
Gaming need satisfaction (SAT)	0.56	0.86	0.88

Discriminant validity of the constructs

All items had significant regression weights meeting the cut-off point value (0.5) together with their latent constructs ($p < 0.0001$) to show compliance with Hooper et al.'s (2008) cut-off points for achieving discriminant validity of the constructs.

According to Fornell and Larcker (1981), all latent constructs should have the squared root of AVE higher than their inter-correlation estimates with other corresponding constructs to confirm discriminant validity. Table 4 shows that all latent constructs had the squared root of AVE higher than their inter-correlation estimates with other corresponding constructs to show that discriminant validity is accomplished.

TABLE 4
RESULTS OF THE DISCRIMINANT ANALYSIS

	Effort Expectancy	Facilitating Conditions	Personal Gratification	Enjoyment	Satisfaction
Effort Expectancy	0,800				
Facilitating Conditions	0,462	0,707			
Personal gratification	0,398	0,571	0,762		
Enjoyment	0,415	0,654	0,672	0,825	
Satisfaction	0,349	0,682	0,579	0,701	0,748

Notes: The diagonal elements in bold represent the square roots of the AVE.

Structural model

After the measurement model confirmed convergent and discriminant validity of all constructs, the second step was to evaluate the structural model to test the hypothesised paths. Structural equation modelling (SEM) is highly recommended because of its capability to simultaneously test hypothesised relationships and the overall model fit (Hair et al., 2016). The results of the goodness of fit indices depicted in Table 5 for the structural model meet the cut-off points to indicate adequate model fit.

TABLE 5
RESULTS OF THE STRUCTURAL MODEL

Fit indicators	Structural model	Recommended thresholds	Recommending authors
χ^2/df	2.828	≤ 5.00	Hooper et al., 2008
CFI	0.906	≥ 0.90	Hu & Bentler, 1999
IFI	0.907	≥ 0.90	Hu & Bentler, 1999
RMSEA	0.077	≤ 0.08	Hu & Bentler, 1999
SRMR	0.516	≤ 0.08	Hu & Bentler, 1999

Hypotheses testing

Table 6 shows that facilitating conditions ($\beta = 0.375$, $p > 0.05$) and enjoyment ($\beta = 0.393$, $p > 0.05$) are statistically significant predictors of gaming need satisfaction, thereby respectively supporting H₂ and H₄. Effort expectancy ($\beta = -0.032$, $p > 0.05$) and personal gratification ($\beta = 0.114$, $p > 0.05$) emerged as statistically insignificant predictors of gaming need satisfaction. Hence, H₁ and H₃ are not supported. Overall, the model explained 58.6% of the variances in mobile gaming need satisfaction.

TABLE 6
THE RESULTS OF THE HYPOTHESES TESTING

Alternative hypotheses	SRW	P value	Result
H ₁ : Satisfaction \leftarrow Effort expectancy	-0.032	0.561	Not supported
H ₂ : Satisfaction \leftarrow Facilitating conditions	0.375**	0.000	Supported
H ₃ : Satisfaction \leftarrow Personal gratification	0.114	0.115	Not supported
H ₄ : Satisfaction \leftarrow Enjoyment	0.393**	0.000	Supported

Notes: H, Hypothesis; SRW, standardised regression weight; **Significant at $p < 0.05$

DISCUSSION AND MANAGERIAL IMPLICATIONS

The purpose of this study was to determine the psychological drivers that best predict mobile gaming need satisfaction from an emerging economy perspective. The exponential growth of the mobile gaming industry warrants the need to understand mobile game success by predicting gaming need satisfaction. This is important because

increased satisfaction leads to improved loyalty (Sailer et al., 2017), repurchase intention (Chong, 2013), reduced price sensitivity, (Low, Lee & Chenget, 2013), and positive word of mouth (Popp & Woratschek, 2017). The results of this study may provide some insights to mobile game developers and marketers on how to invest strategically in the mobile gaming industry.

The results of the study reveal that a large proportion of the mobile game market in South Africa fall within the Generation Y cohort. These findings are congruent with reports by Price (2019), who reported that Generation Y students in South Africa are psychologically committed and behaviourally loyal towards their favourite mobile game. Therefore, it is plausible for marketers to pursue this cohort when promoting their mobile games, as Baby Boomers and Generation Xers seem not as technologically inclined.

It was not surprising that enjoyment emerged as the strongest driver of mobile gaming need satisfaction because previous studies had similar results (Merhi, 2016; Merikivi et al., 2017) that suggest enjoyment can lead to game need satisfaction. The key findings indicate that a relative understanding of the impact of satisfaction is fundamental in retaining players and attracting new players. According to Lee, Chiang and Hsiao (2018), there is a strong correlation between mobile game players' persistency and revenue for the game providers through advertisements. Turning a profit is becoming increasingly difficult, especially given that some authors (Merikivi et al., 2017) suggested that the time mobile gamers spend playing games is plateauing. Mobile game developers, particularly in South Africa, should leverage the availability of free Wi-Fi in the 4G era to develop more appealing and enjoyable games. Players can download and play mobile games for free at hotspots in all major cities, and can use the mobile game play to connect with friends and colleagues. Thus, mobile game developers should be innovative by providing enjoyable game experiences that enhances continued use. As suggested by Merikivi et al. (2017), mobile game developers could focus on the enjoyment aspects that pertain to game design, such as new features and contents, including new games or themes. Increased enjoyment and satisfaction relating to game design can also be achieved by enhancing game features that hold an element of surprise and unfamiliarity (novelty) and that are aesthetically pleasing in terms of attractiveness, layout and colours (design) (Baabdullah, 2018; Lu, Lin & Lin, 2016; Rutz et al., 2019).

Facilitating conditions emerged as the second predictor of mobile gaming need satisfaction. Facilitating conditions speaks to the responsiveness of the game providers whenever they are needed by the players. Lu et al. (2016) concurred that the game design and user interface have significant impact on the gaming experience to the extent that players can easily be offended or frustrated by a game if the features are implausible. User interaction is more desirable if players understand the game, navigation is consistent, the screen layout is efficient and the key controls follow standard conventions (Bulduklu, 2019). Reports on the South African Millennial consumer indicate that the cohort demand speed and need to be continuously engaged by brands. Being responsive to mobile gamers expeditiously in time of need may go a long way in avoiding the negative word of mouth on social media platforms that may be detrimental to branded game apps. If reports that 46.5% of South African consumers say they have been influenced to buy a product or service following social media reviews is anything to go by, (PricewaterhouseCoopers, 2018), then mobile game marketers need to provide helpful and frictionless gaming experiences to avoid any backlash. Patrathiranond (2019) suggested that introducing a YouTube channel can give companies a platform to allow for feedback from players and for conversations with them where they can comment and give suggestions for improvement, if possible, making them part of the game design and ensuring continued need satisfaction.

Contrary to the results of previous studies (Baabdullah, 2018; Kumar et al., 2017), it was surprising to note that personal gratification did not emerge as a significant predictor of mobile gaming need satisfaction. As noted earlier, personal gratification is achieved when game players find games that are intellectually challenging, are educational and allow them to escape boredom. Thus, a plausible explanation for the anomalous result could be that this study focussed primarily on casual games that do not require any special skills to play, and are not as challenging. Perhaps some game players seek games that require planning and forethought or fantasy-based games that require crucial decisions that can end in success or failure in the game to ensure satisfaction. Harrop (2020) reported that mobile gaming has long ceased to be a niche market but still contains different segments. It is therefore imperative for game developers to understand the unique needs of each segment in order to develop games that are more stimulating. Even though the results of this study may be skewed towards Millennials, caution should be taken

against treating the cohort as one population group because of stark differences in their beliefs, attitudes, norms and customs (PricewaterhouseCoopers, 2018). Despite the unexpected result, personal gratification should be given due consideration as literature suggests that personal gratification is as good as players' motives (Baabdullah, 2018; Kumar et al., 2017). Yang and Liu (2017) and Yang and Lin (2019) indicated that the motives for playing games for personal gratification range from having fun, stress relief, escape, competency, passing time, autonomy and social interaction (relatedness). Although authors recommended continuous inclusion of attractive contents in mobile games for personal gratification (Yang & Lin, 2019), mobile game developers should be cautious when they upgrade or add new features because that may decrease personal gratification. For example, players may quit the game, especially when asked to pay for an update or if features change the usability and playability of the game. As suggested by Sailer et al. (2017), mobile games could offer reward points that numerically represent a players' progress, such as redeemable, reputation or experience points to satisfy the need for competency and enhance personal gratification.

This study's result indicate that effort expectancy has an insignificant influence on mobile gaming need satisfaction, making the results even more surprising. Extant literature concur that game players tend to value the ease of use of a game (Baabdullah, 2019; Kimberly et al., 2016). A plausible explanation for the unexpected finding could be that perhaps some game players find mobile games too simplistic so that no effort is required on the part of the players. This finding concurs with that of Molinillo et al. (2020), who reported that when a mobile game is too easy to play, players quickly tire of it and can easily abandon the game. According to Molinillo et al. (2020), mobile games that reflect hedonic values (enjoyment and fun) can mitigate the effects of simplicity that leads to game abandonment. Although effort expectancy should be integral in developing mobile games that are easy to play, developers should be wary of new designs that changes the game play in a way that discourage players.

Based on the findings of this study, it is evident that facilitating conditions and enjoyment are two of the psychological drivers that game developers should address to enhance game need satisfaction among mobile game players.

STUDY CONTRIBUTIONS

The study makes both theoretical and practical contributions. The first theoretical contribution of this study is in testing a new framework that incorporates variables taken from the UTAUT2 and the GUESS frameworks. The UTAUT2 and the GUESS frameworks were considered most applicable to this study as they include relevant constructs to explain hedonic motivation in the context of mobile gaming. The need to develop the new framework was precipitated by inherent shortcomings of existing scales measuring gaming satisfaction, such as inability to cover other important gaming aspects or measures that would apply to only one aspect of the mobile gaming. The resultant framework was not only found to have strong psychometric properties, but was also found to have high content validity and good internal consistency and construct validity (Phan et al., 2016). Hence, it felt prudent to explain the two theories together in determining psychological gaming need satisfaction in this study. Chong (2013) posits that combining theories can collectively provide a better and more comprehensive understanding of consumer behaviour than when each theory is considered alone.

Second, and based on the literature review, the current study is the first in a developing economy to address the unexplored relations between variables drawn from different theoretical frameworks within the context of mobile gaming to understand mobile gaming need satisfaction through smartphones that are already well-integrated into users' lifestyles.

Third, the study focussed on adult consumers who had downloaded a mobile game application onto their devices at the time of the survey. The mobile gaming industry is growing rapidly in tandem with demographics and can be considered a pastime of children and adolescents (AdColony, 2021). As most prior studies focussed on the youth who are regarded as tech savvy (Applebaum, 2018), changing the focus to adult consumers could further the understanding of what motivates game play across a spectrum of users, thus making a theoretical contribution. Lundberg (2019) also proclaim that mobile gaming has gone mainstream, increasingly becoming a more fragmented cohort. This claim is consistent with that of Koch (2019), who found that 53% of internet users aged 45–54 years admitted to playing games on their smartphones during the first quarter of 2019. Due to increased accessibility of smartphones with

readily available mobile games, even older gamers are not just playing games casually, but have become committed game players too (AdColony, 2021).

From a practical standpoint, understanding mobile game need satisfaction is important for game designers, developers and advertisers. Thus, the practical contribution of the study is that understanding the nuances of the gaming audience helps to adopt a more targeted approach as not all games succeed in generating high numbers of downloads (Merikivi et al., 2017). Hence, the findings from this study could provide useful pointers to mobile game developers to better understand significant factors that make mobile games more marketable and acceptable.

LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

The study has some limitations worth noting. First, the results of the study include some players whose frequency of play was minimal (6.8%), and that may skew results. Future studies could focus on more keen players who would then answer the questionnaire more effectively. Second, the convenience sampling method limits the generalisability of the results across South Africa. The age disparity of Generation Y cohort (85%) compared to Baby Boomers and Generation X (15%) may also have caused skewed results. The study did not make provision for any moderators such as gender and age, specifically to determine their impact on the different generations. This is important considering that more than 65% of Generation Z males in South Africa claim that gaming forms part of their identity (Wallace, 2019). Comparing generations could add to the available body of knowledge regarding psychological drivers of mobile gaming satisfaction and provide new research opportunities.

Future studies should also investigate additional factors, such as the influence of mobile gaming need satisfaction on motivation for future play and loyalty, to enhance the understanding of gaming need satisfaction. Despite these shortcomings, the study made significant contributions to the body of academic knowledge by furthering the understanding of gaming need satisfaction from an emerging country perspective.

REFERENCES

- AdColony, 2021. The modern mobile gamer: A study of everything. <https://www.adcolony.com/reports/the-modern-mobile-gamer/> (Accessed 20 May 2021).
- Africa.com. 2021. The unprecedented rise of mobile gaming in South Africa with 'Zero Data Game Sharing'. <https://africa.com/the-unprecedented-rise-of-mobile-gaming-in-south-africa-with-zero-data-game-sharing/> (Accessed 24 May 2021).
- Alomari, K. M., Ncube, C. & Shaalan, K. 2018. 'Predicting success of a mobile game: A proposed data analytics-based prediction model', Springer International Publishing AG. 127–134.
- Applebaum, M. 2018. Are younger shoppers always more tech friendly? Generational contrasts may be less stark than retailers think. <https://www.emarketer.com/content/are-younger-shoppers-always-more-tech-friendly?ecid=NL1014> (Accessed 20 October 2020).
- Baabdullah, A.M. 2018. 'Consumer adoption of mobile social network games (M-SNGs) in Saudi Arabia: The role of social influence, hedonic motivation and trust', *Technology in Society*, 53: 91–102.
- Batchelor, J. 2018. GamesIndustry.biz presents ... the year in numbers 2018. <https://www.gamesindustry.biz/articles/2018-12-17-gamesindustry-biz-presents-the-year-in-numbers-2018> (Accessed 19 June 2019).
- Bowman, N.D., Jöckel, S. & Dogruel L. 2015. 'The app market has been candy crushed: Observed and rationalized processes for selecting smartphone games', *Entertainment Computing*, 8: 1–9.
- Bulduklu, Y. 2019. 'Mobile games on the basis of uses and gratifications approach: A comparison of the mobile game habits of university and high school students', *Convergence: The International Journal of Research into New Media Technologies*, 25(5–6): 901–917.
- Choe, P., & Schumacher, D. 2015. 'Influence of different types of vibrations on technical acceptance of a mobile game aiming for hedonic satisfaction', *International Journal of Human-Computer Interaction*, 31: 33–43.

- Chong, A.Y.L. 2013. 'Understanding mobile commerce continuance intentions: An empirical analysis of Chinese consumers', *Journal of Computer Information Systems*, 53(4): 22–30.
- Clement, J. 2021. App Store and Google Play mobile game downloads worldwide 2016–2020. <https://www.statista.com/statistics/661553/global-app-stores-mobile-game-downloads/> [Accessed 24 May 2021].
- Davis, F.D. 1989. 'Perceived usefulness, perceived ease of use, and user acceptance of information technology', *MIS Quarterly*, 13: 319–340.
- Deloitte. 2017. Global mobile consumer survey: The South African cut. https://www2.deloitte.com/content/dam/Deloitte/za/Documents/technology-media-telecommunications/ZA-Deloitte-South-Africa-Mobile-Consumer-Survey-2017-Mobile_090718.pdf (Accessed 12 June 2019).
- Diamantopoulos, A. & Siguaw, J.A. (2000). *Introducing LISREL*. Sage Publications.
- eMarketer. 2017. Mobile app store revenues and downloads for mobile games and total mobile apps worldwide by OS, 2017 & 2018. <https://www.emarketer.com/chart/225874/mobile-app-store-revenues-downloads-mobile-games-total-mobile-apps-worldwide-by-os-2017-2018-billions> (Accessed 18 May 2019).
- Fornell, C. & Larcker, D.F. 1981. 'Evaluating structural equation models with unobservable variables and measurement error', *Journal of Marketing Research*, 18: 39–50.
- Greenland, S. & Kwansah-Aidoo, K. 2012. 'The challenges of market research in emerging markets: A practitioner perspective from Sub-Saharan Africa', *Australasian Journal of Market & Social Research*, 20: 9–22.
- GSMA Intelligence. 2016. The mobile economy: Africa. <http://www.gsma.com/mobileeconomy/africa/> (Accessed 16 June 2019).
- Hair, J.F., Black, W.C., Babin, B. J. & Anderson, R.E. 2016. *Multivariate Data Analysis*. Seventh Edition. Pearson.
- Harrop, J. 2020. The modern mobile gamer: A study of everything. https://www.adcolony.com/reports/the-modern-mobile-gamer/?utm_source=eMarketer&utm_medium=Ad&utm_campaign=DISQO&utm_content=FYISpotlight (Accessed 17 May 2021).
- Hooper, D., Coughlan, J. & Mullen, M. 2008. 'Structural equation modelling: Guidelines for determining model fit', *Electronic Journal of Business Research Methods*, 6: 53–60.
- Hu, L.T. & Bentler, P.M. 1999. 'Cut-off criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives', *Structural Equation Modeling*, 6: 1–55.
- Huang, C.Y., Hsu, C.H., Chen, D.Y. & Chan, K.T. 2014. 'Quantifying user satisfaction in mobile cloud games', In *Proceedings of Workshop on Mobile Video Delivery (MoViD'14)* (pp. 1–6). Association for Computing Machinery. <https://doi.org/10.1145/2579465.2579468>.
- Huang, L. & Hsieh, Y.J. 2011. 'Predicting online game loyalty based on need gratification and experiential motives', *Internet Research*, 21: 581–598.
- Kimberly, C., Lim, T.Y., Khong, C.W. & Wong, C.Y. 2016. 'Usability and player experience of input device for mobile gaming', *International Journal of Mobile Human-Computer Interaction*, 8: 52–69.
- Koch, L. 2019. Gaming goes mainstream, but play varies by gender and age. <https://www.emarketer.com/content/who-is-gaming-and-how-can-marketers-level-up?ecid=NL1009>. (Accessed 23 April 2019).
- Korhonen, H. & Koivisto, E.M.I. 2006. 'Playability heuristics for mobile games. In *Proceedings of the 8th conference on Human-computer interaction with mobile devices and services (MobileHCI '06)*', (pp. 9–16). Association for Computing Machinery.
- Kumar, K.A., Natarajan, S. & Acharjya, B. 2017. 'Understanding behavioural intention for adoption of mobile games', *ASBM Journal of Management*, 10: 6–18.
- Lee, C.H., Chiang, H.S. & Hsiao, K.L. 2018. 'What drives stickiness in location-based AR games? An examination of flow and satisfaction', *Telematics and Informatics*, 35: 1958–1970.
- Lin, C. & Lekhawipat, W. 2016. 'How customer expectations become adjusted after purchase', *International Journal of Electronic Commerce*, 20: 443–469.

- Lin, J.H.T., Wu, D.Y. & Tao, C.C. 2018. 'So scary, yet so fun: The role of self-efficacy', *New Media & Society*, 20: 3223–3242.
- Lopez-Fernandez, O., Männikkö, N., Kääriäinen, M., Griffiths, M.D. & Kuss, D. 2018. 'Mobile gaming and problematic smartphone use: A comparative study between Belgium and Finland', *Journal of Behavioral Addictions*, 7: 88–99.
- Low, W.S., Lee, J.D. & Cheng, S.M. 2013. 'The link between customer satisfaction and price sensitivity: An investigation of retailing industry in Taiwan', *Journal of Retailing and Consumer Services*, 20: 1–10.
- Lu, H.K., Lin, P.C. & Lin, Y.C. 2016. 'A study of factors affecting the purchase intention on mobile game apps', *Journal of Advances in Information Technology*, 7: 239–244.
- Lundberg, S. 2017. Who are the new gamers and how can you reach them? <https://www.businessofapps.com/news/half-of-mobilegamers-find-in-game-ads-memorable/15>. [Accessed December, 2020].
- Mediakix. 2019. An inside look at the massive \$70 billion-dollar mobile gaming industry. <https://mediakix.com/blog/mobile-gaming-industry-statistics-market-revenue/>. (Accessed 20 October 2020).
- Merhi, M.I. 2016. 'Towards a framework for online game adoption', *Computers in Human Behavior*, 60: 253–263.
- Merikivi, J., Tuunainen, V. & Nguyen, D. 2017. 'What makes continued mobile gaming enjoyable?', *Computers in Human Behavior*, 68: 411–421.
- Mills, D.J. & Allen, J.J. 2020. 'Self-determination theory, internet gaming disorder, and the mediating role of self-control', *Computers in Human Behavior*, 105: 1–12.
- Molinillo, S., Japutra, A. & Liébana-Cabanillas, F. 2020. 'Impact of perceived value on casual mobile game loyalty: The moderating effect of intensity of playing', *Journal of Consumer Behaviour*, 19: 493–504.
- Mordor Intelligence. 2021. Mobile gaming market—growth, trends, covid-19 impact, and forecasts (2021–2026). <https://www.mordorintelligence.com/industry-reports/mobile-games-market> (Accessed 20 May 2021).
- Nam, K. & Kim, H.J. 2020. 'The determinants of mobile game success in South Korea', *Telecommunications Policy*, 44: 1–13.
- Pallant, J. (2016). *SPSS Survival Manual: A Step by Step Guide to Data Analysis Using IBM SPSS*. Fifth Edition. McGraw-Hill.
- Park, J. & Lee, G. 2012. 'Associations between personality traits and experiential gratification in an online gaming context', *Social Behavior and Personality*, 40: 855–862.
- Parker, C, Scott, S. & Geddes, A. 2019. *Snowball Sampling*. SAGE Research Methods Foundations. doi:10.4135/
- Patrathiranond, G. 2019. Top mobile games marketing strategies 2019. <https://appradar.com/blog/mobile-games-marketing/> (Accessed 04 January 2020).
- Peng, W., Lin, J.H., Pfeiffer, K.A. & Winn, B. 2012. 'Need satisfaction supportive game features as motivational determinants: An experimental study of a self-determination theory guided exergame', *Media Psychology*, 15: 175–196.
- Phan, M.H., Keebler, J.R. & Chaparro, B.S. 2016. 'The development and validation of the game user experience satisfaction scale (GUESS)', *Human Factors*, 58: 1217–1247.
- Popp, B. & Woratschek, H. 2017. 'Consumer-brand identification revisited: An integrative framework of brand identification, customer satisfaction, and price image and their role for brand loyalty and word of mouth', *Journal of Brand Management*, 24: 250–270.
- Price, D.G. 2019. *Modelling the antecedents of mobile gaming brand loyalty amongst Generation Y students*. Unpublished PhD thesis, North-West University, South Africa.
- PricewaterhouseCoopers (PwC South Africa). (2019). Consumer spend online. <https://www.pwc.co.za/en/press-room/consumer-spend-online.html> (Accessed 20 May 2021).
- Raosoft. 2014. Sample size calculator. <https://www.raosoft.com/samplesize.html> (Accessed 5 April 2020).
- Rodríguez-Ardura, I. & Meseguer-Artola, A. 2020. 'Editorial: How to prevent, detect and control common method variance in electronic commerce research', *Journal of Theoretical and Applied Electronic Commerce Research*, 15(2): 1–4.

- Rutz, O., Aravindakshan, A. & Rubel, O. 2019. 'Measuring and forecasting mobile game app engagement', *International Journal of Research in Marketing*, 36: 185–199.
- Sailer, M., Hense, J.U., Mayr, S.K. & Mandl, H. 2017. 'How gamification motivates: An experimental study of the effects of specific game design elements on psychological need satisfaction', *Computers in Human Behavior*, 69: 371–380.
- Shams, G., Rehman, M.A., Samad, S. & Oikarinen, E.L. 2020. 'Exploring customer's mobile banking experiences and expectations among generations X, Y and Z', *Journal of Financial Services Marketing*, 25: 1–13.
- Statista. 2019. Number of smartphone users in South Africa from 2014 to 2023 (in millions)*. <https://www.statista.com/statistics/488376/forecast-of-smartphone-users-in-south-africa/> (Accessed 18 May 2021).
- Taheri, F. & Akbari, N. 2016. 'Moderating effects of online shopping experience on customer satisfaction and repurchase intentions', *International Academic Journal of Business Management*, 3: 140–146.
- Tam, C., Santos, D. & Oliveira, T. 2018. 'Exploring the influential factors of continuance intention to use mobile Apps: Extending the expectation confirmation model', *Information Systems Frontiers*, 22: 243–257.
- Venkatesh, V., Thong, J.Y. & Xu, X. 2012. 'Consumer acceptance and use of information technology: extending the unified theory of acceptance and use of technology', *MIS Quarterly*: 157–178.
- Wadsworth, D., Brock, S., Daly, C. & Robinson, L. 2014. 'Elementary students' physical activity and enjoyment during active video gaming and a modified tennis activity', *Journal of Physical Education and Sport*, 14: 311–316.
- Wallace, F. 2019. The impact of generation z on the gaming community. <https://www.headstuff.org/entertainment/gaming/the-impact-of-generation-z-on-the-gaming-community/> (Accessed 13 July 2020).
- Yang, H.L. & Lin, R.X. 2019. 'Why do people continue to play mobile game apps? A perspective of individual motivation, social factor and gaming factor', *Journal of Internet Technology*, 20: 1925–1936.
- Yang, C.C. & Liu, D. 2017. 'Motives Matter: Motives for playing Poke'mon Go and implications for well-being', *Cyberpsychology, Behavior, and Social Networking*, 20: 52–60.
- Zheng, L. 2020. 'The role of consumption emotions in users' mobile gaming application continuance intention', *Information Technology & People*, 33(1): 340–360.