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Gamification and neuromarketing: A unified approach for improving user experience

Abhishek Behl[1] | Nirma Jayawardena[2] | Amit Shankar[3] | Manish Gupta[4] | Le Dang Lang[5]

[1]Management Development Institute, Gurgaon, India

[2]O P Jindal Global University, Sonipat, India

[3]Indian Institute of Management, Vishakhapatnam, India

[4]School of Management, Mahindra University, Hyderabad, India

[5]Ho Chi Minh City Open University, Ho Chi Minh City, Vietnam

Correspondence
Abhishek Behl, Management Development Institute, Gurgaon, India.
Email: abhishekbehl27@gmail.com

Abstract

Neuroscience and its offshoot as neuromarketing have helped marketers understand neuroscientific aspects of customers while gamification has helped them understand the psyche of consumers. Despite neuromarketing's many potential benefits to businesses, little academic work has been done on the field so far. Most studies have examined consumer shifts during and after pandemics without analyzing them from two critical perspectives: neuroscientific theories and psychology theories. As the two streams of knowledge lean on each other, their interdependence in the field of e-engagement needs exploration. The purpose of this study is to answer an important question – "How do marketers use gamification and neuromarketing to understand online engagement of consumers?". We used a quantitative empirical research approach to assess the inter-relationship between neuromarketing and gamification. The study collected data from digital marketing strategists of retail firms to propose a theoretical framework for self-determination theory in successfully implementing new age technologies by plugging the cues of gamification and neuromarketing. The framework would be useful for retail firms to design digital marketing strategies for capturing the attention of consumers across different geographies. Findings indicated that, marketers are interested in neuromarketing for two main reasons: first, they think it can help them save money and improve their marketing plans, and second, they think that cutting-edge research techniques such as brain imaging can help them get more accurate findings.

1 | INTRODUCTION

Neuroscience is rooted in the technological boom that led to the development of technologies to scan and image the human body (Antoniak, 2020; Levallois et al., 2021; Shiv et al., 2005). Marketers play a crucial role in developing not only businesses' profits but, most importantly, their social contribution in today's world of consumerism and globalization (Schmitt, 2012). As a research method, neuromarketing bridges consumer science and neuroscience, creating opportunities for new, innovative studies (Shiv et al., 2005). These days, consumers are not paying for products or services by themselves, but for the experiences they receive (Schmitt, 2012).

The variety and attractiveness of products and services require marketers to go beyond the expressed needs and desires of consumers and identify the mental processes that lead to a choice (Evans, 2010). Gaming is a key customer engagement marketing strategy for businesses around the world. Gamification has enhanced customer engagement and business performance are plentiful, but they are accompanied by as many ineffective ones (Eisingerich et al., 2019; Smith & Zook, 2019). Designers and developers generally think of gamification as using game mechanics, technology, and development techniques in non-game spaces, while those outside the industry usually think of it as adding points, leaderboards, and badges to nongame activities (Law et al., 2011). A better understanding of the psyche of

consumers who have matured too quickly into the digital space is needed (Eisingerich et al., 2019, Smith & Zook, 2019). Most studies have examined consumer shifts during and after pandemics without analysing them from two critical perspectives: neuroscientific theories and psychology theories (Marulin et al., 2018).

With firms planning to use new-age technologies like metaverse to boost online engagement of customers, it is necessary to understand their strategies from a neuroscientific and psychological perspective (Anderson & Rainie, 2012). The study of neuroscience and its offshoot, neuromarketing, have helped marketers understand the neuroscientific aspects of customers, whereas gamification has helped them understand their psyche (Anderson & Rainie, 2012). Due to the interdependence of the two streams of knowledge, their interdependence in the field of e-engagement needs to be explored. However, in the existing literature, scant efforts were made to explore the above-mentioned issue. This is a gap in literature. To fill this gap, the study proposes to answer an important question – "How do marketers use gamification and neuromarketing to understand online engagement of consumers?". The study uses a quantitative empirical research approach to assess the inter-relationship of neuromarketing and gamification. The study also aim to investigate the role of intrinsic motivation on sustained change behaviour. This study collects data from digital marketing strategists of retail firms to propose a theoretical framework for self-determination theory in successfully implementing new-age technologies by plugging the cues of gamification and neuromarketing. This paper carries both theoretical and practical contributions. Theoretically, the current study enriches the literature related to neuromarketing and gamification by examining the role of cognitive psychology and cognitive neuroscience in developing gamefied experience and sustained behaviour change (Anderson & Rainie, 2012; Gauriau, 2021). Marketers can plan marketing activities and launch new products more efficiently using the knowledge and findings of this study based on user experience, gamified elements and neuromarketing approach.

The first section of the paper presents an overview on gamification and neuromarketing aspects with special reference to user experience. Second section presents the theoretical framework and the hypothesis development. Third section highlights the research method, data collection and data analysis. The next sections provide an overview of discussion of the findings with theoretical and managerial implications. Final section focuses on the limitations and future research insights.

2 | THEORETICAL UNDERPINNING AND HYPOTHESES DEVELOPMENT

Research on intrinsic and extrinsic motivations evolved into research on work organizations, among other areas (Deci et al., 2017). A specific focus of our discussion is the difference between autonomous motivation (i.e., intrinsic motivation and fully internalized extrinsic motivation) and controlled motivation (i.e., externally, and internally controlled extrinsic motivation). Self Determination Theory (SDT) can be used to create policies, practices, and environments that promote wellness and high-quality performance (Deci et al., 2017). The authors examine behavioral change, intrinsic motivation, sustained behavioral change, and the cognitive psychology of users (Deci et al., 2017). The occupational motivation, psychotherapy, and virtual worlds have all successfully applied the SDT to parenting, education, healthcare, and occupational motivation. The SDT suggested that employees' motivation for their job activities affects their performance as well as their well-being (Anderson & Rainie, 2012; Deci et al., 2017; Gauriau, 2021). The SDT therefore differentiates motivation types and maintains that they are accompanied by differing catalysts, concomitants, and consequences (Deci et al., 2017).

Neuromarketing reveals how unconscious responses and emotions affect consumers' perceptions and decision-making processes, advancing conventional marketing research (Țichindelean et al., 2018; Ulman et al., 2015). It is based on the idea that individual sensory and motor systems can be identified in specific brain networks, revealing the unconscious or emotional characteristics of consumer decision-making (Țichindelean et al., 2018; Ulman et al., 2015). Neuromarketing is an interdisciplinary field that crosses traditional boundaries between neuroscience, neuroeconomics, and marketing research (Țichindelean et al., 2018; Ulman et al., 2015). Public aversion and protests against this nascent field have grown as it focuses primarily on improving marketing strategies and promoting sales (Anderson & Rainie, 2012; Gauriau, 2021). Due to its use of neuroscience insights, neuromarketing has the potential to have a tremendous impact on society.

As far as ethical, legal, and societal impacts are concerned, Farah (2012) states that "any behavior that can understand, assess, predict, control, or improve human behavior could be classified as a neuroscience application" (p. 573) (Nemorin & Gandy Jr, 2017). Neuromarketers use direct and indirect forms of remote sensing to measure social consequences (Nemorin & Gandy Jr, 2017). It is likely that the increasing use of functional magnetic resonance imaging to visualize and analyze neuronal activation will lead to undesirable outcomes (Nemorin & Gandy Jr, 2017; Ulman et al., 2015). The impacts of greater reliance on neuroimaging and other remotely acquired consumer information are particularly serious for people with economic, social, and political disadvantages (Bailey et al., 2017; Grier & Kumanyika, 2010). Contemporary cognitive neuroscience is a more recent approach for studying the impacts of the cognitive psychology of the user (Bailey et al., 2017; Grier & Kumanyika, 2010). In order to interact with technology, you have to use both externally and internally directed cognitions (Anderson & Rainie, 2012; Bailey et al., 2017; Gauriau, 2021; Grier & Kumanyika, 2010). Therefore, the first hypothesis will be formed as follows.

H1. Cognitive neuroscience positively impacts the cognitive psychology of the user.

As video games have become increasingly visible in human culture and practice (Högberg et al., 2019), they have become

increasingly important to human life. Games are not the only systems and services that evoke these feelings. As a contemporary megatrend, gamification has joined artificial intelligence, big data, and crowdsourcing. A motivational strategy that is tailored to the user is most effective. The gamefic experience of these services drives the effect on behavior (Huotari & Hamari, 2017; Landers et al., 2018; Seaborn & Fels, 2015; Werbach, 2014). While gamification research has grown over the years, little research has been done on how gameful experiences affect neuromarketing and e-engagement. Therefore, the second hypothesis will be formed as follows.

H2. Cognitive psychology positively impacts the gameful experience of the user.

It would be unintuitive to assume that all gamification features involving different dynamics and mechanics would facilitate all aspects of gameful experiences. For more effective gameful designs, it is important to understand which gamification features or feature categories are best suited to evoke particular dimensions of gamefulness. Gamification is often used to facilitate self-regulation, monitoring, and correcting behavior in relation to internal or external goals. By self-regulating, individuals learn, improve themselves, and achieve their goals (Anderson & Rainie, 2012; Deci et al., 2017; Gauriau, 2021). Self-regulation depends on the frequency, consistency, and accuracy of self-monitoring/tracking as well as a goal-setting process (Anderson & Rainie, 2012; Deci et al., 2017; Gauriau, 2021).

Various purposes are served by civic engagement platforms and new technologies that enable government-citizen communication (Abdelghaffar & Sameer, 2013). Many communities struggle to engage actively with online civic participation channels (Al-Harbi & Alshumaimeri, 2016; Bista et al., 2014). In addition, the government must introduce serious administrative applications to satisfy users' demands for enjoyment when using IT-based artifacts (Dargan & Evequoz, 2015). Therefore, many factors affect active civic engagement, such as demographics and psychological factors. Several studies have examined how technological design methodologies affect participation and civic engagement (Al-Harbi & Alshumaimeri, 2016; Kim et al., 2021). Therefore, the third hypothesis will be formed as follows.

H3. Cognitive neuroscience positively impacts the gameful experience of the user.

Gamification has been used for a long time to help people learn through the use of serious games and gamification techniques (Hassan, 2017; Perote-Peña & Piggins, 2015; Phang & Kankanhalli, 2008; Sameer & Abdelghaffar, 2015). Recently, serious games and gamification have been used in clinical settings to help people get better at what they are doing and get better at what they are trying to achieve. It is important to note that there is very little evidence to suggest that they should be used in people who have serious mental illnesses (Kowal et al., 2021). In recent studies which involved with problem solving through gamification identified that the use of characters; the navigation ability for virtual environments through different gamified dimensions as well as the game format gave people a chance to talk about things that mattered, gave them a safe way to learn about difficult problems and how to solve them, and helped them find and try out different ways of looking at things (Fitzgerald & Ratcliffe, 2020). Deterding et al. (2011) found that game design elements can also be used outside of games. A lot of research has been done to find out what makes gameful design elements and persuasive strategies more or less noticeable. Researchers have found that age, gender (Orji & Wei, 2015), and personality traits (Jia et al., 2016) affect this situation.

The advantages of mHealth have been the subject of numerous research (Hassan, 2017; Perote-Peña & Piggins, 2015; Phang & Kankanhalli, 2008; Sameer & Abdelghaffar, 2015). Patients can use health apps for a variety of purposes, including self-monitoring, goal setting for exercise and diet, online consultations, medication compliance, health education, and weight control. People have different ideas about what makes a game fun (Hassan, 2017; Perote-Peña & Piggins, 2015; Phang & Kankanhalli, 2008; Sameer & Abdelghaffar, 2015). Games should be made so that these different ideas are considered (Hassan, 2017; Perote-Peña & Piggins, 2015; Phang & Kankanhalli, 2008; Sameer & Abdelghaffar, 2015). Sedentary lifestyles are more likely to make people less active (Rajaratnam & Arendt, 2001). Marczewski came up with the Hexad user type model to explain how users choose systems that are fun to play (Tondello et al., 2017). Therefore, gamified user involvement positively influences the sustained behavioral change via helping gameful design elements and persuasive strategies included within the content that motivates the user to quit or to adopt towards ethical behavioral patterns.

Therefore, the forth hypothesis will be formed as follows.

H4. Gamified user involvement positively impacts the sustained behavioral change of the user.

When considering the gamefic experience of the user which positively impacts the intrinsic motivation of the user, an example of a number of administrative purposes can be found by civic engagement platforms and new technologies that enable two-way communication between government and citizens (Abdelghaffar & Sameer, 2013). The idea of gamifying civic participation platforms has not been developed either theoretically or practically (Al-Harbi & Alshumaimeri, 2016; Bista et al., 2014). Civic participation platforms should be carefully gamified. Long-term success from gamification requires careful implementation (Deterding, 2012; Hamari et al., 2014). Platforms for civic engagement that aim to promote citizen participation should adhere to the norms of democratic discussion (Burkhalter et al., 2002). Further, marketers have used game mechanics and elements to promote environmentally responsible products and practices.

Researchers have only rarely looked into how gamification's various parts relate to users' commitment to the experience (Abdelghaffar & Sameer, 2013). Competitive advantages in the long run can be bolstered through marketing activities that focus on creating, communicating, and delivering exceptional value to specific consumers. When discussing the value of sustainability marketing, it's important to highlight the significance of establishing and maintaining long-term relationships with both consumers and the larger community (Deterding, 2012; Hamari

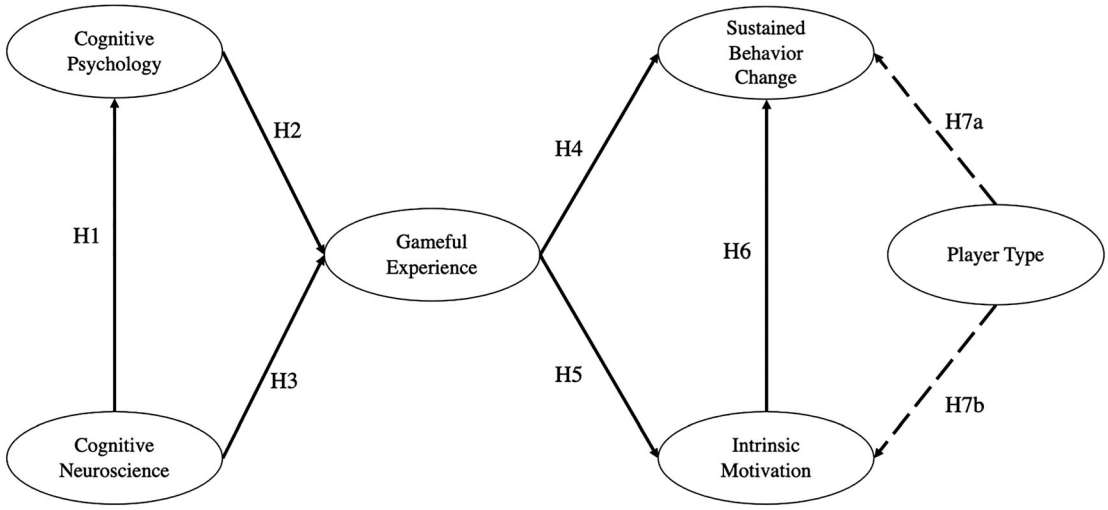

FIGURE 1 Conceptual framework

et al., 2014). Consumers can be entertained while being inspired to take an eco-friendlier stance due to gamification. In other words, businesses are using gamification to bolster their sustainability efforts and encourage customers to alter their behaviour in order to strengthen brand loyalty (Deterding, 2012; Hamari et al., 2014). This research fills a gap in our understanding by investigating how adding game dynamics to users can enhance the intrinsic motivation and increase engagement from a long-term perspective.

In light of this, let us formulate our fifth hypothesis.

> **H5.** Gamefic experience of the user positively impacts the intrinsic motivation of the user.

Personal interests can be used to personalize health and well-being recommendations (Orji et al., 2018; Tondello et al., 2017). The validity and reliability of the recognition process may be negatively affected by the disadvantages of self-reporting methods, such as forgetfulness and providing socially acceptable answers instead of the actual ones (Orji et al., 2018; Tondello et al., 2017). Our approach addresses these two challenges by inferring personal interests from smartphone location data. Motivation to live an active lifestyle is therefore important (Aldenaini et al., 2020). Researchers have studied the factors that moderate the perception of gameful design elements and persuasive strategies in the fields of gamification and neuromarketing. It has been shown that demographic factors such as age, gender (Orji & Wei, 2015), and personality traits (Jia et al., 2016) play an important role in this regard. Gameful systems, however, are not specifically designed or suited to maximize motivational impact. Therefore, the sixth hypothesis will be formed as follows.

> **H6.** Intrinsic motivation of the gamified user positively impacts the sustained behavioural change.

A gamification strategy uses game mechanics to drive game-like engagements. Through the use of game mechanics, dynamics, and frameworks, it promotes desired learning behaviors (Al-Harbi & Alshumaimeri, 2016; Bista et al., 2014). In learning tasks, gamification could enhance learning and engage learners in more social and context-rich decision-making (Al-Harbi & Alshumaimeri, 2016). To create ideal gamification instructions, game mechanics, game dynamics, and intrinsic- and extrinsic-motivated user styles should be evaluated (Deterding, 2012; Hamari et al., 2014). It was investigated in this study how four types of gaming personalities (explorers, socializers, killers, and achievers) might predict the level of game dynamics in online discussion forums. Gamification challenges the boundaries between play and games and everyday life (Deterding, 2012; Hamari et al., 2014). Due to the breakdown of this dichotomy and the increasing presence of game elements in everyday life, gamification, gamified systems should consider factors such as users' intrinsic motivation, agendas, learning preferences, and personalities.

> **H7a.** Player type characteristics (Explorer, Socializer, Killer Achiever) controls the sustained behaviour change of the user.

> **H7b.** Player type characteristics (Explorer, Socializer, Killer, Achiever) controls the intrinsic motivation of the user.

The Figure 1 presents the conceptual framework developed based on the proposed hypotheses as follows;

3 | RESEARCH METHOD

3.1 | Measures

The items measuring the construct in this study have been adopted from previously validated scales. However, specific changes were made to the phrasing of the items to make them more appropriate for

the research. A team of subject experts, including professors and professional researchers in the field of neuromarketing and gamification, were approached to examine the content of the survey instrument. In addition, a pilot study was carried out with 10 participants. Minor changes to the survey items were made in response to comments from the expert group and the pilot study. The study used a five-point Likert's scale (1-strongly disagree to 5-strongly agree) to measure the items constituting study constructs. The authors used modified version of Ryan et al. (1983) and Thakor (1994) to draw the items for intrinsic motivation. The study borrowed items from Högberg et al. (2019) for gameful experience and Quoquab et al. (2019) for drawing items for sustainable behaviour. The authors carefully revisited the literature of cognitive theories and its applications and Ochsner and Kosslyn (1999) best suited to draw scores for cognitive neuroscience and Fields and Atiku (2015) for cognitive psychology. Lastly, we used the standard questionnaire of Bartel et al. (2015) to draw upon the four player types.

3.2 | Data collection

The study collected the data from Indian consumers. A structured survey questionnaire was used to collect data, which comprised questions adopted from previous literature. Some screening questions were asked like, "are you aware of term neuromarketing and gamification?" to ensure that the correct audience qualifies for the study. The rationale for using India as a market for data collection is because it is a diverse mix of people with different social status and purchasing power. The email id of the participants was received from a marketing research firm. The response to the question was collected on a qualitative parameter and the authors then used a coding mechanism to understand if the understanding of respondents was falling in line with the operational definition of gamification and neuromarketing. It was also important to understand the context in which the respondents understood gamification and neuromaketing as separate constructs and jointly as a concept. A total of 1278 firms were reached, of which 267 responses were received in the first round (April 2022). The second wave of data collection was performed after 4 weeks (May 2022) in the second round to improve the sample size. The prospective respondents were reached by posting on various conferences where there was a track of gamification, game design, serious games, etc. In order to verify the profile of the respondents, the authors shared two emails before and after the data collection process to validate their email addresses by sharing one-time password on their associated/reported email addresses. The responses were received from different parts of the country and with different demographic profile. The final questionnaire was developed using an online form, and clear instructions were reported in the same to avoid confusion. A brief summary of each of the constructs, their operational definition, and the background of the study is also mentioned in order to avoid ambiguity.

While the data collection was done using one platform only, the authors understand the importance of cognitive biases that may influence the findings of the study. Thus, in order to avoid that, a wave analysis proposed by Armstrong and Overton (1997) was performed. The first 40 respondents (from wave 1) and the last 40 respondents (from wave 2) were split into two groups, and a t-test was applied to test if there exists a difference in the responses of the two groups or not. T-test results reveal that there exists no significant difference between the two groups ($p = .18$), thereby confirming the absence of non-response bias in the study.

4 | DATA ANALYSIS AND RESULTS

The study ran confirmatory factor analysis (CFA) to investigate the reliability and validity of the scale. Next, Structural equation modelling (SEM) was used to assess all the proposed hypotheses.

4.1 | Measurement model

The CFA results highlighted in Table 1 suggest that the values of average variance extracted (AVE) for all research constructs were greater than 0.5, and their composite reliability (CR) values were greater than 0.7, suggesting the presence of convergent validity (Hair et al., 2010). The results also show that the square root of AVE for each construct is greater than the correlation coefficients of the corresponding constructs, thereby confirming the discriminant validity (Refer Table 2) of the measurement constructs (Fornell & Larcker, 1981). The correlation between the study constructs was significant and less than 0.90. It can also be seen that the CR values of the constructs are greater than 0.70, therefore establishing the reliability of this study. The variance inflation factors (VIF) for the study variables were calculated to check for multicollinearity. The VIF values ranged from 1.21 to 2.11, which were less than the threshold value of 3, suggesting that all the variables considered in the study were free from any issues related to multicollinearity (Hair et al., 2010). Below Table 1 shows the CFA results.

4.2 | Common method bias

Collecting data relating to independent and dependent variables from the same participants might trigger the occurrence of common method bias (Shankar et al., 2020). As recommended in the literature (Podsakoff, 2003), both statistical and non-statistical techniques were used to assess the presence of common method bias. As a non-statistical measure, clarity of the survey items and the confidentiality of the respondents were ensured, thereby mitigating the probability of common method bias (Podsakoff, 2003). Further, the authors have added an unrelated marker variable in the questionnaire, and the correlation between the marker variable and study constructs was below 0.5, confirming the common method bias. As a statistical measure, to assess the probability of common method bias, the author's perform

Harman's one-factor test (Podsakoff, 2003). According to the analysis, one-factor items explained 18.66% of the variance, which is less than the suggested threshold value of 50%. This demonstrates that the study was free from the risk of common method bias. The below presented Tables 2 and 3 show the discriminate validity and path analysis results respectively.

TABLE 1 Reliability and validity of the measurement scale.

Variables and items	Factor loading	Average variance extracted	Composite reliability
Cognitive neuroscience (CN)		0.52	0.74
CN1	0.75		
CN2	0.72		
CN3	0.68		
CN4	0.73		
Cognitive psychology (CP)		0.55	0.83
CP1	0.66		
CP2	0.79		
CP3	0.88		
CP4	0.61		
Gameful experience (GE)		0.54	0.68
GE1	0.79		
GE2	0.71		
GE3	0.76		
GE4	0.69		
Intrinsic motivation (IM)		0.55	0.83
IM1	0.77		
IM2	0.72		
IM3	0.79		
IM4	0.68		
Sustained behavioral change (SBC)		0.57	0.71
SBC1	0.72		
SBC2	0.75		
SBC3	0.81		
Player type (PT)		0.54	0.79
PT1	0.73		
PT2	0.75		
PT3	0.78		
PT4	0.69		

4.3 | Structural model

The SEM that was utilised to validate the hypotheses. The model explains 39% of the variation in cognitive psychology, 46% of the variance in gameful experience, 53% of the variance in intrinsic motivation, and 51% of the variance in sustained behaviour change. Results presented in Table 3 indicate that, cognitive neuroscience (H1: $\beta = .489$, $p < .001$) is significantly associated with cognitive psychology. Cognitive psychology (H2: $\beta = .503$, $p < .001$) and cognitive neuroscience (H3: $\beta = .488$, $p < .001$) have significant impact on gameful experience. Similarly, gameful experience (H4: $\beta = .532$, $p < .001$) and intrinsic motivation (H6: $\beta = .447$, $p < .001$) have significant impact on sustained behaviour change. Also, it can be seen that gamful experience (H5: $\beta = .472$, $p < .001$) has significant impact on intrinsic motivation. Thus, H1, H2, H3, H4, H5 and H6, are supported. Furthermore, the player type characteristics (Explorer, Socializer, Killer Achiever) (H7a: $\beta = .379$, $p < .001$) controls the sustained behaviour change of the user whereas, player type characteristics (H7b: $\beta = .003$, $p > .05$) do not control the intrinsic motivation of the user. Hence, H7a is supported whereas, H7b is not supported.

TABLE 3 Path analysis results.

Path	β	Hypothesis
Cognitive neuroscience → Cognitive psychology	.489***	Supported
Cognitive psychology → Gameful experience	.503***	Supported
Cognitive neuroscience → Gameful experience	.488***	Supported
Gameful experience → Sustained behavioural change	.532***	Supported
Gameful experience → Intrinsic Motivation	.472***	Supported
Intrinsic motivation → Sustained behavioural change	.447***	Supported

***$p < .001$.

TABLE 2 Discriminate validity.

Variables	CN	CP	GE	IM	SBC	PT
Cognitive neuroscience (CN)	**0.818**					
Cognitive psychology (CP)	0.583	**0.813**				
Gameful experience (GE)	0.392	0.554	**0.826**			
Intrinsic motivation (IM)	0.484	0.648	0.398	**0.829**		
Sustained behavioral Change (SBC)	0.519	0.547	0.411	0.56	**0.848**	
Player type (PT)	0.427	0.561	0.317	0.591	0.474	**0.782**

Note: Bold value indicates the square root of AVE of individual latent construct.

5 | DISCUSSION OF THE FINDINGS

Gamification, that is, the use of game design elements in non-game contexts, is an emerging trend to engage and promote sustainable behavior (Deterding, 2012; Hamari et al., 2014). Gamification should be designed, deployed, and managed appropriately to foster the expected behavior change (Al-Harbi & Alshumaimeri, 2016; Kim et al., 2021). An advanced user-centered approach is proposed to address the problem of gamification design by accounting for players' heterogeneous preferences (Al-Harbi & Alshumaimeri, 2016; Kim et al., 2021). When considering the first hypothesis of (H1) cognitive neuroscience positively impacts the cognitive psychology of the user, which was supported with 0.489 had a higher cognitive psychology trait. The ability to make decisions and plan for communities must be available to everyone regardless of their size and nature (Abdelghaffar & Sameer, 2013; Nicholson, 2015). Although the gameful experience is subjective, it depends on the player's perspective. In spite of this, there are psychological mental states that facilitate playfulness, such as purpose, mastery, autonomy, relatedness, suspense, and others.

Similarly, for the second hypothesis (H2) – that is, cognitive neuroscience positively impacts the cognitive psychology of the user, it had a positive beta value of 0.503. Creating gameful experiences extends beyond games and gamified services. Even though traditional systems were not specifically designed for such purposes, technological advancements have provided ample opportunities to integrate playful and positive experiences into those systems (see, for example, Webster & Martocchio, 1992). Even when they are not playing games, people are more likely to experience game-like experiences (e.g., Granic et al., 2014; Prensky, 2012; Vesa et al., 2017). Games that have become a part of everyday life may help students develop motivational orientations and ways to engage in activities (Granic et al., 2014; Prensky, 2012; Vesa et al., 2017).

When considering the third hypothesis of (H3), cognitive neuroscience positively impacts the gameful experience of the user; it had a beta value of 0.488. Since motivational strategies are more effective when personalized, behavior change interventions based on digital services will become more important. The findings of the fourth hypothesis (H4) of gameful experience of the user positively impacts the sustained behavioral change indicated a positive beta value of 0.532. As part of gamification, motivational aspects of the game world are superimposed on real life. Motivating and engaging people by encouraging specific behaviors has become a popular strategy (Huotari & Hamari, 2017). As it is commonly used in marketing strategies, it is now being incorporated into educational programs to help educators meet their objectives while catering to evolving student needs (Al-Harbi & Alshumaimeri, 2016; Kim et al., 2021). Gamification has been explored as a motivation and engagement tool by several instructors. Gamification does not mean creating games but rather making education more engaging and enjoyable without undermining its credibility (Al-Harbi & Alshumaimeri, 2016; Kim et al., 2021). To achieve better results, gamifying a course should not involve trading intrinsic motivation for extrinsic motivation (Al-Harbi & Alshumaimeri, 2016; Kim et al., 2021).

Similarly, the fifth hypothesis of (H5) gameful experience of the user positively impacts the intrinsic motivation of the user showed a positive beta value of 0.472. Intrinsically motivated individuals are motivated by the fun or challenge entailed rather than by external rewards or pressures (Behl, Jayawardena, Ishizaka, et al., 2022; Behl, Jayawardena, Pereira, et al., 2022; Jayawardena et al., 2021). Intrinsic motivation benefits persistence, performance, and wellbeing by promoting exploration, mastery, and spontaneous interest (Deci et al., 1999; Ryan & Deci, 2000). As a result of SDT, intrinsic motivation is considered an inherent tendency in humans and will flourish if the conditions are right. It has been argued that in order to facilitate intrinsic motivation, conditions must support psychological needs for competence and autonomy (Jayawardena et al., 2023; Jayawardena et al., 2022; Ryan & Deci, 2000). In recent years, gamification research has proliferated, but its motivational mechanisms have only recently been empirically explored (Deterding et al., 2011; Huotari & Hamari, 2017; Nicholson, 2015; Rigby, 2015). It has been suggested that gamification elements, such as points, levels, and leaderboards, can enhance intrinsic motivation and promote performance gains when viewed as informational (Deterding et al., 2011; Huotari & Hamari, 2017; Nicholson, 2015; Rigby, 2015).

When considering the sixth hypothesis of (H6), the intrinsic motivation of the user positively impacts the sustained behavioral change; it showed a positive beta value of 0.379, which is lesser than the other components. Behavioral indicators that are motivated by and indicative of personal interests can be used to personalize health and well-being recommendations (Granic et al., 2014; Prensky, 2012; Vesa et al., 2017). Behavioral and psychological studies show (1) individuals' personal interests are displayed differently in their daily activities, and (2) drawbacks of self-reporting methods, such as forgetfulness and providing socially acceptable answers instead of the truth, may negatively impact recognition accuracy. These two challenges are addressed by inferring personal interests from smartphone location data collected continuously and passively. Motivating people to live an active lifestyle is therefore crucial (Aldenaini et al., 2020). Even though hypothesis H7a of player type characteristics (Explorer, Socializer, Killer Achiever) controls the sustained behaviour change of the user supported, the H7b of player type characteristics (Explorer, Socializer, Killer Achiever) controls the intrinsic motivation of the user was not supported in the study.

6 | THEORETICAL AND PRACTICAL CONTRIBUTIONS

Our study investigated the potential for advancing attentional processes involved in the interaction between users and technology as a basis for future research (Lopez & Tucker, 2019). The assumptions underlying our theoretical model are almost certainly incomplete since mind wandering research is relatively new in the reference discipline (Deterding et al., 2011). In this way, the neuromarketing community can explore the role of gamified e-engagement research (Deterding et al., 2011). Initially, the study derives the relevant constructs from

functional imaging studies. It is possible to translate neurological processes into behavioral processes that have never been identified before by developing the theory from the reference discipline (Huotari & Hamari, 2017).

In addition, neurotechnology applications are increasing in number and variety (Werbach, 2014). Neuromarketing addresses issues such as how consumers react to products, advertisements, special offers, and ways to purchase products and services since it provides new approaches to understanding customer behavior (Werbach, 2014). Marketers can plan marketing activities and launch new products more efficiently with this knowledge. There is still much to learn about neuromarketing, which is a field that is constantly evolving. To explore all of its assets, more time is necessary. The primary motivation for writing this article was this growing trend (Werbach, 2014). In conclusion, neuromarketing has been explained in practice (Khaddage et al., 2014; Marulin et al., 2018).

7 | CONCLUSION, LIMITATION AND FUTURE SCOPE OF THE STUDY

The use of videogames as a teaching tool is constantly developing. There is a growing amount of research advocating the adoption of game-based learning strategies as a result of their increasing use as a result of technological integration in neuromarketing research (Shiv, Alba, Bettman, Mellers, & Mcgraw, 2005; Callegaro et al., 2017). Modern gamification relies heavily on the incorporation of game elements into non-game settings. Most people outside the gaming industry think gamification just means slapping a few points, leaderboards, and badges onto something that is not already entertaining to engage with (Callegaro et al., 2017). The advent of neuromarketing as a research approach has opened the door to exciting new investigations at the intersection of consumer science and neurology (Khaddage et al., 2014; Marulin et al., 2018). Due to the novelty and complexity of the topic, any and all insights gained from previous research are invaluable for advancing the state of the art. This setting inspired the writers to inquire further into the practical experience of neuromarketing experts from around the globe by exploring the user experience (Deterding et al., 2011; Huotari & Hamari, 2017; Nicholson, 2015; Rigby, 2015).

Findings indicated that, marketers are interested in neuromarketing for two main reasons, according to studies: first, they think it can help them save money and improve their marketing plans, and second, they think that cutting-edge research techniques such as brain imaging can help them get more accurate findings (Sandrone, & Carlson, 2001). Despite neuromarketing's many potential benefits to businesses, little academic work has been done on the field so far (Fisher & Smith, 2011). Most studies have examined consumer shifts during and after pandemics without analyzing them from two critical perspectives: neuroscientific theories and psychology theories (Werbach, 2014).

The study of neuroscience in understanding the user experience through gamified elements has helped marketers to gain a better understanding of neuroscientific aspects of customers, whereas the study of gamification has helped them gain a better understanding of their psyches (Huotari & Hamari, 2017). In the field of e-engagement, the interdependence of these two streams of knowledge needs to be explored. By plugging in the cues of gamification and neuromarketing, the study proposes a theoretical framework based on data collected from digital marketing strategists of retail firms. Retail firms can use the framework to design digital marketing strategies for capturing the attention of consumers across different geographic regions (Deterding et al., 2011; Huotari & Hamari, 2017; Nicholson, 2015; Rigby, 2015).

When considering the limitations and the future research agenda, internet-based surveys posed both universal and specific difficulties for the study's authors to consider as they drew conclusions and mapped out their plans for future research (Callegaro et al., 2017). Non-social media users were not included in the sample, and the sampling strategy used was not a random one (Callegaro et al., 2017). The sample may not accurately represent the target population because of inherent selection bias (Callegaro et al., 2017; Deterding et al., 2011; Huotari & Hamari, 2017). A probabilistic sampling method, a high-quality sample frame, and sufficient follow-up time are required for producing generalizable results (Deterding et al., 2011; Huotari & Hamari, 2017). Future researchers would be well to employ appropriate sampling strategies and cross-sectional research designs to lessen the effects of such drawbacks. Further research is needed to fully understand human behavior in response to marketing techniques. The authors intend to conduct research on customer behavior by determining how conscious intentions influence attitudes and final decisions (Khaddage et al., 2014; Marulin et al., 2018). This will be accomplished by juxtaposing qualitative and quantitative data from neuromarketing studies. Human-computer interaction cannot progress without considering internally directed cognition, which poses some of the biggest challenges for researchers, but holds some of the greatest promises for the future (Khaddage et al., 2014; Marulin et al., 2018).

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CONFLICT OF INTEREST STATEMENT

The authors whose names are listed immediately below certify that they have NO affiliations with or involvement in any organization or entity with any financial interest (such as honoraria; educational grants; participation in speakers' bureaus; membership, employment, consultancies, stock ownership, or other equity interest; and expert testimony or patent-licensing arrangements), or non-financial interest (such as personal or professional relationships, affiliations, knowledge or beliefs) in the subject matter or materials discussed in this manuscript.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

ORCID

Abhishek Behl https://orcid.org/0000-0002-5157-0121

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AUTHOR BIOGRAPHIES

Abhishek Behl is an Assistant Professor at Management Development Institute, India in Information Management Department. He is a dual doctorate holder in Information Technology and Management Science. His research has been published in leading journals such as International Journal of Information Management, Industrial Marketing Management; Technological Forecasting and Social Change, Journal of Business Research, International Marketing Review; Internet Research; Journal of Knowledge Management; Computers in Human Behaviour; Journal of Enterprise Information Management; IEEE Transactions in Engineering Management, Annals of Operations Research, Australasian Journal of Information Systems and Journal of Strategic Marketing.

Nirma Sadamali Jayawardena is an Assistant Professor in O P Jindal Global University, India. She completed BSc in Business Management (first-class honours) from NSBM Green University, Sri Lanka and MBA in International Business from University of Colombo, Sri Lanka. She completed her Graduate Diploma of Business Research and PhD in Marketing from Griffith University, Australia. Her research interests include consumer psychology, consumer social cognition, digital video advertising, and experimental research.

Amit Shankar is an Assistant Professor in Marketing at Indian Institute of Management Visakhapatnam, India. His research interests are in the areas of retaining, services marketing, and mobile banking. Amit's research has been published in the International Journal of Hospitality Management, Journal of Business Research, Journal of Marketing Management, Journal of Retailing and Consumer Service, Technovation, Journal of Bank Marketing, Journal of Strategic Marketing, Australasian Marketing Journal, International Journal of Consumer Studies, Journal of Consumer Marketing, Australasian Journal of Information Systems, Journal of Enterprise Information Management, Journal of Global

Information Management, and Marketing Intelligence & Planning, among others.

Manish Gupta is an Assistant Professor at School of Management, Mahindra University. He has taught- at undergraduate, post graduate, and doctoral levels. His teaching areas include HRM, OB, HR analytics, and competency mapping. Apart from teaching, he also has industry experience. His PhD thesis is in the area of 'work engagement'. His current research interests include engagement through gamification and agile HRM. Manish is a recipient of UGC-JRF and NET certificate. He is Article Editor for Sage Open and Editorial Team Member of Journal of Global Information Management, Cogent Business and Management, International Journal of Knowledge Management, Journal of Electronic Commerce in Organizations, and International Journal of Cyber Behavior, Psychology and Learning. He has been a Guest Editor for several journals published by Emerald, Wiley, Sage, Elsevier, etc. ranging from ABDC-A* to C. He has won the Top Peer Reviewer 2019 award by Publons, USA (Web of Science) and also AIMS International Outstanding Young Management Researcher Award 2019. He has also won the ADHR best issue of 2018 award by AHRD, USA. His work has received media coverage in national and international magazines, newspapers, blogs and news channels. He has research papers, textbooks, reference books, book chapters, and teaching cases to his credit. He has convened an international conference and has conducted multiple management development programs.

Le Dang Lang is the Head of the Business Administration Program at Ho Chi Minh City Open University, Vietnam. His research interests include branding, entrepreneurship, strategic management, and consumer behavior. His research has been published in some journals, such as Journal of Business Research, International Marketing Review, International Journal of Physical Distribution & Logistics Management, The International Journal of Logistics Management, Journal of Intellectual Capital, and Management Decision, among others. He has extensive industry experience as a senior marketing practitioner, with one of these most notable achievements being the marketing of Khong Do green tea, which is now the leading brand of bottled green tea in the soft drinks industry in Vietnam. He can be contacted at ledanglanguel@gmail.com or lang.ld@ou.edu.vn.

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