UNDERSTANDING HOW AND WHEN GAMIFICATION LEADS TO ONLINE SHOPPING: A NUDGE PERSPECTIVE

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ABSTRACT

The gamification design of e-commerce integrates game and shopping tasks to promote consumers' purchase behaviors. However, it often works inefficiently given the low conversion rate from game participants to product buyers. To better understand the relationship between gamification and purchase behaviors, this study identified two types of engagement, namely game part engagement and task part engagement, and highlighted the mediating role of task part engagement from a nudge perspective. An online survey with 234 consumers was carried out to validate the proposed hypotheses. The results suggested that the relationship between game part engagement and purchase intention was fully mediated by task part engagement, and this relationship was strengthened by task voluntariness. Further, game part engagement was found to be determined by two gamification affordances, e.g., achievement affordance and immersion affordance. This study advances theoretical understanding of the effectiveness of gamification design in e-commerce context by distinguishing task part engagement from game part engagement and theorizing the potential mediating and moderating mechanisms.

Keywords: Gamification Design; Nudge Theory; Customer Engagement; Task Voluntariness; Purchase Intention

1. Introduction

Gamification means integrating game components into scenarios unrelated to games (Deterding, 2011). Nowadays, gamification has become a popular strategy to enhance customer involvement by incorporating elements of amusement and enjoyment into existing information systems (Shi et al., 2022). The applications of gamification span across various domains, including healthcare (Alahäivälä and Oinas-Kukkonen, 2016), education (Lee and Hammer, 2011; Rohan et al., 2021; Taşkın and Kılıç Çakmak, 2023), exercises (Bojd et al., 2022), work (Justin and Joy, 2023), commerce (Tobon et al., 2020; Chen et al., 2026), and other fields (Bista et al., 2014).

The application of gamification design in the e-commerce context has become extremely popular (Koivisto and Hamari, 2019). For instance, Taobao and JD.com, two of the most renowned online shopping platforms in China, incorporate gamification into their platforms to promote sales. These games utilize engaging gameplay mechanics to incentivize consumers to form teams and compete against each other. Points crucial to winning the game are often earned by completing designated shopping-related tasks, such as browsing specific brand online stores, which can

Cite: Wang, N., Peng, Y., & Sun, Y. (2026). Understanding how and when gamification leads to online shopping: A nudge perspective. *Journal of Electronic Commerce Research*, 27(4), 351-372.
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further foster shopping behavior. The representative applications using this type of gamification design include “Baba farm”, “Second Life” in Taobao, “Dongdong farm”, and “Wangwang Manor”. Specifically, taking the most typical gamification design shopping carnival as an example, during Taobao’s 618 Shopping Carnival in 2023, the "Super Meow Games" was introduced, where players upgraded their virtual cats using "Meow Coins" to compete in a leveling competition. To accrue more "Meow Coins" to win the game, players engaged in shopping related tasks like browsing designated online stores featured in the game. However, according to the ‘Marketing Gamification Insights Report’ of 2022, despite a high game engagement rate of 66% (users playing games/total users) on the platforms, the transaction conversion rate (users making consumption/total users) stands at a mere 3%. These statistics highlight the effectiveness of gamified marketing on e-commerce platforms, indicating high consumer engagement but relatively low purchase conversion rates. This raises a critical question regarding whether and how gamification design effectively drives consumers’ purchasing behavior.

Prior studies have tried to explore the underlying mechanism of how gamification works (Yu and Huang, 2022; Che et al., 2023). For example, based on value theory, previous studies argue that gamification fosters functional, hedonic, and social value, thereby driving purchase behaviors (Jia and Yu, 2024; Bouzaabia et al., 2024). Additionally, research suggests that perceived social interactions and emotional experiences are the underlying mechanisms that influence sales through gamification (Hamari, 2013; Xu et al., 2020). Moreover, “benefit” has been identified as an intermediate explanatory factor in explaining how gamification affects purchase (Che et al., 2023).

Among these studies, the majority conceptualize gamification as a unified concept with an emphasis on the game part, which fails to recognize gamification as the integration of both games and tasks. Actually, the gamification design in the e-commerce context includes two parts, the game part where consumers initially engage in playing the game and the task part where consumers subsequently perform shopping-related tasks such as browsing online shops. Consumers’ engagement in game part does not necessarily lead to their engagement in task part, which is critical for their purchase behaviors. Therefore, a better understanding of the mechanism behind gamification design calls for separating the gamification design into two parts, namely the game part and the task part. Such a distinction enables an exploration of the “black box” between gamification design and consumers’ purchase behaviors, and enriches the theoretical understanding of how gamification design can trigger consumers game part engagement, task part engagement, and finally purchase behaviors. Further, recognizing the low transaction conversion rate caused by the potential gaps between game part engagement and task part engagement, it is interesting to investigate the boundary conditions under which game part engagement can be effectively transformed into task engagement.

Thus, we separate game engagement into two parts, namely game part engagement and task part engagement. By highlighting the overlooked mediating role of task part engagement, we categorize the entire stage of gamification’s impact on purchase intention into four stages, which are stage 1 of being attracted by gamification design, stage 2 of engaging in the game part, stage 3 of engaging in the task part and stage 4 of purchasing the product as shown in Figure 1. Thus, the research questions this study aims to address can be interpreted as:

(1) What is the impact of gamification design on game part engagement?

(2) What is the mediating role of task part engagement in the relationship between game part engagement and purchase intention?

(3) What are the boundary conditions under which game engagement can be effectively transformed into task engagement?

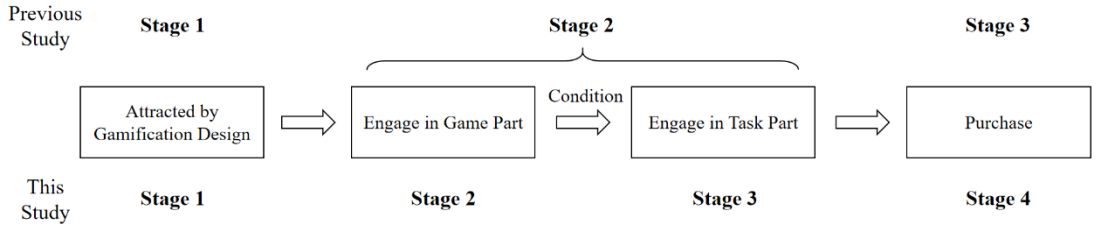

Figure 1. Consumer behavior processes triggered by gamification design

Nudge theory, which posits that certain design choices can guide human behavior in a desired direction (Thaler and Sunstein, 2009), was used to explain how gamification design boosts the transition from engagement in the game part to the engagement in the task part and finally to purchase intention, as well as the boundary conditions under which this series of transitions occur.

This study enhances the theoretical understanding of gamification design in e-commerce in three aspects. First, unlike previous studies that focus on the game part of the gamification design, this study distinguishes game part engagement from task part engagement and theorizes the mediating role of task part engagement between game part engagement and purchase intention. Second, recognizing the gap between game part engagement and task part engagement, this study explores the boundary conditions supporting the transition between the two states by highlighting the moderating role of task voluntariness. Third, this study elucidates the key gamification affordances that can trigger consumers' engagement in the game part. Practically, the findings can guide e-commerce platform designers in effectively leveraging gamification to boost sales.

2. Literature review

2.1. Gamification in e-commerce

Gamification generally refers to an approach of engaging users through applying game elements and design principles to non-game contexts (Deterding et al., 2011). It leverages individuals' natural inclinations to evoke emotional and cognitive responses (Taskiran and Yilmaz, 2015). This, in turn, enhances behavioral motivation and intentions, ultimately guiding their actions towards a specific, intended outcome (Gatautis et al., 2016). Given its effectiveness, gamification is becoming increasingly popular and is now widely applied in various fields.

In the e-commerce context, gamification has been regarded as a powerful instrument to enrich users' experience by rewarding their efforts with additional incentives (Behl et al., 2020). Gamification has demonstrated greater efficacy and is a beneficial approach in the longer term than traditional financial incentives (Seaborn and Fels, 2015). A field experiment conducted by Ho et al. (2023) revealed that gamification designs like badges and leaderboards significantly boost consumer browsing and consumption, exhibiting a lasting impact compared to monetary incentives. Previous studies have consistently validated gamification's marketing benefits. Deterding et al. (2011) emphasized that incorporating gamification into online marketing strategies aims to foster positive consumer relationships. Zhang et al. (2021) discovered that the integration of badge elements stimulates impulse purchasing. Hamari and Koivisto (2013) further demonstrated that engagement in gamification design leads to increased platform usage, driving transactions for superior products and services. Some research has found that gamification design enhanced perceived value and increased purchase and repurchase intention (Bouzaabia et al., 2024; Shi et al., 2022; Yu and Huang, 2022). The playfulness and sensorial appeal of gamification also enhance customers' positive experiences (Vega et al., 2023). Che et al. (2023) argued that gamification can trigger consumption behavior through enhancing personal and social integration benefits. Huseynov (2020) and Sigala (2015) also emphasized that gamification elevates value perception and enhances customer engagement in e-commerce activities. In addition, gamification design also positively influences users' willingness to engage with e-commerce platforms and the acceptance of product recommendations on these platforms (Jia and Yu, 2024; Bayir and Akel, 2023).

Although these studies have confirmed gamification as an effective approach to boosting consumer engagement and sales (see Table 1), there are still theoretical issues that remain unaddressed. First, most of prior studies tend to consider the perception of gamification in a holistic manner and emphasize game elements, while neglect the nature of gamification that reflects the integration of both game and task. A critical gap here is that mere acquisition of game value does not directly lead to purchase behavior and there exists an intermediate link between "game engagement" and "purchase" that prior work has overlooked, namely the task part. These tasks (e.g., completing product-browsing tasks in exchange for in-game rewards) serve as a bridge to more directly influence purchasing, as they connect playful engagement to concrete shopping-related actions.

The task part commonly encompasses activities like browsing tasks, while the game part incorporates gamification elements and game-like mechanisms (Zichermann and Linder, 2010). If the task part is poorly designed, it may fail to guide consumers' purchase behavior effectively. This could potentially explain why high engagement in games does not translate into a high purchase rate. Therefore, overlooking the task part design would result in an incomplete understanding of its impact on purchase intention when discussing the overall effect of gamification design. Second, previous studies have primarily focused on the direct link between gamification and user behavior (e.g., purchase intentions) but have not investigated the critical conditions under which game part engagement can be effectively translated into task part engagement, a gap that limits understanding of when gamification truly drives meaningful e-commerce outcomes.

To address the first research gap, this study differs from previous research by distinguishing game part engagement from task part engagement and exploring their connections. To fill the second research gap, based on nudge theory (which emphasizes subtle contextual cues that guide behavior without coercion), we propose task voluntariness as the boundary condition that nudges the transition from game part engagement to task part engagement by reducing users' perceived pressure to switch between game part and shopping tasks, thereby fostering a smoother psychological shift toward the core e-commerce goal.

Table 1. The Empirical Studies on Gamification in E-commerce

Source	Method	Gamification features	Outcome variables	Mechanism	Distinguishing Game & Task
(Ho *et al.*, 2022)	Field Experiment	● Badge ● Leaderboard	Short-term effect, Long-term effect	● Self-determination ● Social comparison	No
(Hamari, 2013)	Field Experiment	● Badge	Utilitarian service	● Social comparison ● Clear goals	No
(Yu and Huang, 2022)	Survey		Purchase intention	● Value Theory	No
(Shi *et al.*, 2022)	Interview, Survey	● Achievement ● Identity ● Competition ● Self-expression	Purchase intention	● Value Theory	No
(Xu *et al.*, 2020)	Survey	● Autonomy ● Rewards ● Absorption ● Competition	Online purchase intention	● Enjoyment	No
(Che *et al.*, 2023)	Survey	● Goals ● Personalization ● Interaction	Purchase intention	● Personal integration benefits ● Social integration benefits	No
(Zhang *et al.*, 2021)	Survey	● Reward giving ● Badges Upgrading	Impulse buying	● Perceived enjoyment ● Social interaction	No
(Jia and Yu, 2024)	Survey	● Achievement affordance ● Interaction affordance ● Self-expression affordance ● Cooperation affordance	Recommendation acceptance	● Perceived value theory	No
(Bouzaabia *et al.*, 2024)	Survey	● Gamification	Repurchase intention	● Utilitarian value ● Customer experience ● Hedonic value	No
(Bayir and Akel, 2023)	Survey	● Gamification of Mobile App	Behavioral Intention to Use	● TAM	No
(Vega *et al.*, 2023)	Experiment	● Commercial websites gamification	● Website Traffic ● Intention to recommend/buy	● Perceived challenge ● Perceived Competence	No
This study	**Survey**	● **Achievement affordance** ● **Social affordance** ● **Immersion affordance**	**Purchase Intention**	● **Nudge theory**	**Yes**

2.2. Affordance theory and gamification affordances

The fundamental principle of affordance theory lies in establishing a systematic connection between the characteristics of technology and the experiences of its users (Van Vugt et al., 2006). Affordance is defined as the various behavioral possibilities offered by specific features within a given environment (Gibson, 2014). It exists independently of the behavior subject, yet it is closely related to the perception of the subject. Norman (1998) later proposed that affordance encompasses the tangible and perceived characteristics of an object, with a primary focus on those that influence its usability. Affordance more accurately describes the potential for action that is intrinsically embedded within an object's characteristics (Markus and Silver, 2008) than does the nature of it (Lankton et al., 2015). Affordance is perceived as a more accurate way to characterize the outcomes of the interaction between users and technical attributes (Chen et al., 2022; Dong and Wang, 2018; Lu et al., 2022). Considering monetization as the expected result of gamification in e-commerce context (Wen et al., 2014), it is crucial to pinpoint the most sought-after gamification affordance among consumers to assess if gamified e-commerce can satisfy their expectations and yield the anticipated outcomes. Consistent with these studies, our research defines gamification affordance as the fulfillment of consumers' needs through their interactions with gamification design in e-commerce.

As the affordance of technology design enables individuals to perform actions that potentially satisfy specific needs, previous studies primarily delve into various types of perceived affordances of technology and explore how these affordances impact use behavior (Ping, 2008). The dimensionality of affordance varies across different research contexts (Koivisto and Hamari, 2019; Hamari, 2013). Ping (2008) classified affordance into five categories in the research context of information and communication technology, including autonomy affordance, achievement affordance and emotional affordance, etc. Suh et al. (2017) identified five types of gamification affordance in the workplace. Hamari et al. (2014) bridged the gap between gamification and affordances by summarizing previous studies into ten categories, such as points, leaderboards, and achievements/badges. The specific affordance category is shown in Table 2. They proposed a framework on how affordances influence psychological outcomes, ultimately influencing behavior (Hamari et al., 2014).

Table 2. Affordances in Previous Research Papers

Source	Domain	Affordances
(Koivisto & Hamari, 2019)	Review	● Achievement/progression ● Social ● Immersion ● Non-digital elements ● Miscellaneous
(Hamari, 2013)	E-commerce	● Badges ● Achievements ● Medals ● Trophies
(Ping, 2008)	Information and communication technology (ICT)	● Autonomy and the self ● Competence and achievement ● Relatedness ● Leadership and followership ● Affect and emotion
(Suh, 2017)	Workplace	● Rewards ● Status ● Competition ● Self-expression
(Hamari et al., 2014)	Information system	● Points ● Leaderboards ● Achievement/Badges ● Levels ● Story/Theme ● Clear goals ● Feedback ● Rewards ● Progress ● Challenge

Based on the extensive research on gamification, researchers have identified that the top 10 frequently utilized elements are predominantly associated with three affordances that are achievement affordance, social affordance and immersion affordance, these three collectively contribute approximately 55% of the total variation (Yee, 2006). Numerous prior studies have utilized these three gamification affordances (Yee, 2006; Snodgrass et al., 2013), we also adopted them in e-commerce field as shown in Table 3. Because perceived affordances can heighten consumer engagement for inducing a state of sustained attention (Hamari, 2013; Huotari and Hamari, 2012), we further contend that these three affordances can promote consumer engagement.

Table 3. The Three Dimensions of Affordance

Gamification elements	Affordances	Definition in this study
Advancement, Mechanics, Competition	Achievement affordance	The extent to which consumers perceive that the game part rewards them for finishing pre-designed tasks.
Socializing, Relationship, Teamwork	Social affordance	The degree to which the frequent communication and reciprocal interactions in game part can offer consumers a heightened sense of closeness and belonging.
Discovery, Role-Playing, Customization, Escapism	Immersion affordance	To immerse the player in self-directed exploratory activities, thereby promoting greater psychological investment in autonomous thinking.

Specifically, gamification design utilizes engaging gameplay mechanics to incentivize consumers (who can obtain rewards by winning the games) to form teams and compete against one another, an approach that directly aligns with the social affordance dimension (where frequent communication and joint competition in the game part can offer consumers a heightened sense of closeness and belonging). Additionally, to enhance consumers' experience of immersion affordance, platforms enable consumers to take on roles to better immerse themselves in the game, as illustrated in Figure 3. Overall, based on the key elements of gamification design in the e-commerce context (e.g., obtain rewards by winning the games, team collaboration and competition to win the games, role-playing to be immersed in the game), these three dimensions of affordance form a well-fitted framework that captures the core value of gamification for driving user engagement as shown in Table 3.

2.3. Consumer Engagement

Engagement, initially employed in psychological research, is commonly used in the e-commerce context as consumer engagement (Vivek et al., 2012). Consumer engagement has long been a subject of examination in the business field, and current research on consumer engagement can be divided into two viewpoints. Some researchers view engagement as a single-dimension concept and focus on either psychological or behavioral perspective (Asante et al., 2023; Bowden, 2009; Brodie et al., 2011; van Doorn et al., 2010). Other researchers widely treat it as a construct with multiple dimensions by combining both psychological and behavioral perspectives (Hollebeek et al., 2014; Cheung et al., 2011; Vivek, 2009). Specifically, Cheung et al. (2011) proposed engagement as a multidimensional concept encompassing positive and rewarding mental states, including vigor, dedication, and absorption, which serve as the representation of the physical, emotional and cognitive aspects. Consistent with most previous studies, we adopt the multi-dimensional perspective and define engagement as three states of consumers' involvement in gamification design. The emotional aspect pertains to the sub-dimension of dedication, the cognitive aspect corresponds to absorption, and the physical engagement refers to consumers' involvement, corresponding to vigor (Cheung et al., 2011).

Based on the three-dimensional engagement framework (vigor, dedication, absorption) (Cheung et al., 2011) and tied to the four-stage consumer behavior process triggered by e-commerce gamification (Figure 1), game part engagement is defined as consumers' three dimensional engagement (vigor, dedication, absorption) in the game part of e-commerce gamification design. It occurs in Stage 2 of the behavior process (after being attracted by gamification design). Meanwhile, task part engagement is defined as consumers' three-dimensional engagement in the task part linked to e-commerce goals (e.g., browsing tasks), which takes place in Stage 3 of the behavior process (after engaging in the game part).

These two concepts are sequential and complementary sub-constructs under overall gamification engagement in the e-commerce context. First, game part engagement (Stage 2) usually precedes task part Engagement (Stage 3) that consumers first engage with the game part to feel attracted, then move to the task part. Besides, they together drive

the final purchase intention (Stage 4). Without game part engagement, consumers may lack motivation to start, and without task part engagement, they may not connect gamification to shopping behavior.

The core distinctions between game part engagement and task part engagement lie in three aspects. First, in terms of involvement focus, game part engagement centers on game-specific design (e.g., for fun) while task part engagement focuses on task-specific design (e.g., for shopping related goals). Second, regarding behavior stage timing, game part engagement occurs in Stage 2 while task part engagement occurs in Stage 3. Third, in terms of link to e-commerce goals, game part engagement has an indirect link (boosting participation in the game part) while task part engagement has a direct link (connecting to products or shopping tasks).

Regarding the impact of engagement, previous studies have highlighted its capacity to foster positive perceptions that motivate loyalty (Liu et al., 2019) or active usage (Webster and Ahuja, 2006). Reitz (2012) emphasized that consumer engagement positively affects continuance use intention, further driving consumption behaviors. Numerous studies found that consumer engagement positively impacts users' purchasing behavior (Barhemmati and Ahmad, 2015; Huang et al., 2017). In this study, according to the nature of gamification, we identify two types of engagement (i.e., game part engagement and task part engagement) based on the two parts of gamification. We further contend that gamification affordance firstly impacts engagement in the game part, which in turn affects engagement in the task part and purchase intention by drawing on the nudge theory.

2.4. Nudge theory and task voluntariness

Nudge theory was derived from behavioral economics, aiming to explain how individuals' choices, behaviors, and economic motivations can be influenced through subtle nudges. Nudge is defined as a drive that systematically modifies individuals' behavior without imposing any restrictions on the available choices (Thaler and Sunstein, 2009, p.15). It has been widely used as an intervention that directs people's choices without restricting freedom of choice in various fields related to human conduct, such as gamification (Petrykina et al., 2021).

The mechanisms of nudging can be explained by dual process theory (Wason and Evans, 1974), which suggests that two cognitive processes are responsible for information processing. The first cognitive system is called the automatic system, which is marked by a lack of control and awareness. The second one is often known as the reflective system, characterized by controlled, deliberate, measured, analytical, and introspective processes. The automatic system is frequently the primary factor influencing behavior as it demands less effort in comparison to the reflective system. Nudge theory leverages the automatic system to steer individuals towards making better choices.

Gamification is usually employed in information systems design to guide people towards the desired behaviors in e-commerce, e.g., system use, payment, and purchase. By offering rewards and incentives, gamification can foster a favorable environment by gently guiding users towards desired behaviors (AlMarshedi et al., 2017). Within this study, gamification design in e-commerce could be regarded as a design intervention. The automatic system modifies individuals' conduct in a foreseeable way by exploiting people's natural instincts to engage users in the game part and further nudges the reflective system to facilitate the act of buying by the task part. The task part provides points for the game part and contains shopping-related information such as products and shops on its page. Hence, the task part can be regarded as the nudge to connect the gamification design and consumer purchase behavior. Further, nudge is a non-coercive behavioral guidance that is likely to be more effective in changing behavior when the level of autonomy felt by the player in it is higher. Task voluntariness can measure the extent of this gentle guidance, the definition of it is the extent to which participants regard the task as being non-mandatory to perform in this study (Venkatesh and Davis, 2000). Thus, task voluntariness is proposed as a crucial boundary condition for the transfer from game part engagement to task part engagement.

3. Research model and hypothesis development

The model was developed following the gamification affordances – psychological outcomes – behavioral outcomes framework (Hamari et al., 2014). As shown in Figure 2, three gamification affordances were proposed to influence game part engagement, which in turn affect task part engagement and purchase intention. Task voluntariness was proposed to moderate the relationship between game part engagement and task part engagement.

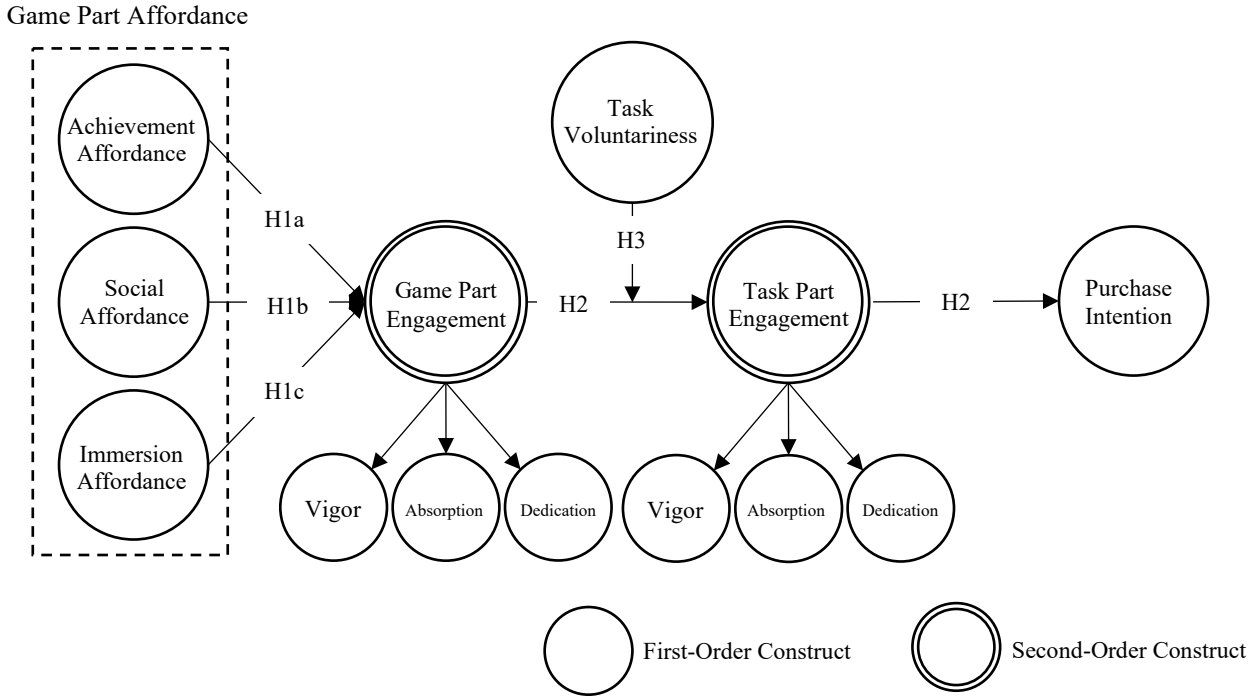

Figure 2. Research Model

3.1 The effect of game affordance

Game part affordance is generated by game elements and mechanisms to induce a better consumer experience (Koivisto and Hamari, 2019). Effectively transmitting affordances provided by game features is crucial in creating an interesting information system, and perceived affordance is also an important part of assessing and improving engagement in information systems (McGregor and Little, 1998). Some studies have demonstrated that interactivity substantially impacts consumers' immersion and sense of presence, which are crucial components of customer engagement (Yim et al., 2017). Pleasant interaction will significantly enhance customer engagement in online virtual communities (Ul Islam and Rahman, 2017), and this finding also applies to online gaming situations (Cheung et al., 2015). A study similarly noted that the increase of gamified customer benefit will result in the increase of behavioral engagement (Jang et al., 2018).

Achievement affordance pertains to the degree to which consumers think the game part allows them to obtain rewards for successfully performing predetermined activities (Hamari et al., 2014). Game part achievement affordance in gamification is usually provided as an achievement system of badges or rewards. Self-determination theory posits that individuals possess an innate psychological need for competence (Ryan and Deci, 2000), and they are naturally inclined to tackle challenges and enhance their individual abilities (Suh et al., 2022). These rewards aim to be tokens of recognition for specific achievements and motivate people to engage in them (Rohan et al., 2021). So, we make the hypothesis:

H1a. Achievement affordance is positively associated with game part engagement.

Social affordance pertains to the degree to which the frequent communication and reciprocal interactions in the game part can offer consumers a heightened sense of closeness and belonging (Xi and Hamari, 2019). Gamification elements like teams, peer-rating, cooperation and competition provide consumers with a stronger sense of connection and belonging. Relatedness is acknowledged as a psychological need that develops over time by the self-determination theory (Ryan and Deci, 2000), and it encompasses the basic human needs for social interaction, support, and communal feeling (Choy and Schlagwein, 2016). Perceived social affordance enables users to derive satisfaction from socializing and develop close relationships with others (Koivisto and Hamari, 2019), leading to increased well-being and motivation (Rohan et al., 2021). So, we suggest that social affordance has the potential to enhance motivation by facilitating consumers in establishing social connections with others. When customers participate in gamified e-commerce activities, their decision-making is influenced not only by marketing persuasion but also by the sense of co-participation with peers (Yang, 2022). We make the hypothesis:

H1b. Social affordance is positively associated with game part engagement.

The main function of immersion affordance is to fully increase engagement in a self-directed and curious activity, further inducing greater psychological investment in autonomous thought (Hsu and Chen, 2018). Gamification elements like avatar, character, and narration serve to enhance user engagement through stimulating and captivating self-directed activity (Xi and Hamari, 2019). This fulfills the desire for autonomy, which is particularly important for maintaining optimal individual effectiveness and well-being (Ryan and Deci, 2000), hence enhancing motivation (Peng et al., 2012). Compared with holistic game tasks, immersion-based gamification exerts a more significant impact on consumers' perceived value in modular game tasks (Jia and Yu, 2025). Drawing on flow theory, the immersive experience provided by affordances leads individuals to feel deeply absorbed, as if they are genuinely part of the ongoing situation (Su et al., 2016), which engenders heightened enjoyment, ultimately leading to users' continuous usage intention (Agarwal and Karahanna, 2000). We assume that when consumers perceive immersion affordance, they are more prone to experiencing a heightened sense of autonomy and involvement. So, we make the hypothesis:

H1c. Immersion affordance is positively associated with game part engagement.

3.2 The mediating role of task part engagement

According to Figure 1 which depicts consumer behavior processes triggered by gamification design in e-commerce context, the gamification design on the e-commerce platform comprises two different parts: the game part and the task part. However, they can be related in that completing the task can provide the required points or energy for the game part. According to the Priming Effect, consumers associate two things with the same or similar patterns and activate the same emotions (Petty et al., 2007).

In this context, the sense of vigor, absorption, and dedication acquired during the game part will inspire the same feelings in the task part due to their relevance. Therefore, game part engagement can affect task part engagement. Further, the task part is designed to require consumers to shop or browse the recommended products or shops to complete it, which is an important pre-stage for product purchase. When a consumer is doing a task, it is likely to spark an interest in the products presented, especially those that are highly relevant to them, further generating purchasing behavior (Pavlou and Stewart, 2000; C. H. Lee et al., 2021). Thus, if consumers are engaged in the task part, they have a high tendency to purchase. Put it another way, if the game part engagement cannot activate consumers to engage in the task part, it cannot induce consumers' purchase behavior. Thus, the task part plays a nudge role between the game part and the product purchase stage.

Gamification design can be explained by nudge theory. Nudges usually include a variety of subtle interventions that demand minimal effort (Vonbergen et al., 2016). Specifically, since people have a natural tendency to play, consumers' engagement in the game part is facilitated by an automatic system, while purchase or consumption is led by a reflective system (Wason and Evans, 1974). The automatic system determines consumers' game engagement, but this leads to behavior inconsistent with the long-term goals, that is, it may not lead to purchasing behavior. The task part is closely correlated to both the game part and merchandise purchases, as it provides rewards for the game part and there are product-related contents, and it plays a role in facilitating the transition from game part engagement to purchase. Due to imperfect human decision-making capabilities, users are gently nudged to make the desired choice (French, 2011). We therefore propose the following hypothesis:

H2. Task part engagement mediates the relationship between game part engagement and purchase intention.

3.3 The moderating role of task voluntariness

Voluntariness denotes the degree of an individual's willing and active engagement in an action (Tsai et al., 2017), a concept frequently encountered in information systems research. Based on this definition, task voluntariness in this paper is defined as the degree of an individual's perceived willingness and active engagement specifically in the task part of the gamification design. Nudge is gentle guidance to change people's behavior, indicating the importance of voluntariness in behavior change. In a study of information systems acceptance, the relationship was found to be stronger among users who chose to use the system voluntarily compared to those who were required to use it (Hartwick and Barki, 1994). From another perspective, people develop coping strategies for the appropriateness (e.g., manipulativeness) of persuasive tactics based on the persuasion knowledge model, a strong manipulative perceptions will trigger an inhibitory effect because of mind reversal (Friestad and Wright, 1994), mandatory tasks may result in a weakening further behavioral intention.

Liu et al. (2017) postulate that voluntariness appears to positively influence participation and behavior due to intrinsic motivation (Liu et al., 2017). In e-commerce games, if the task part engagement is perceived as too mandatory for the player, they will be more likely to sense the marketing intent involved, and the effectiveness of the nudge will be greatly curtailed, thus inhibiting the process of conversion of engagement from the game part to the task part. Conversely, the impact of game part engagement will be more substantial on task part engagement when players feel more voluntary. We therefore propose:

H3. Task voluntariness moderates the relationship between game part engagement and task part engagement such that this relationship will be stronger when task voluntariness is high compared to when it is low.

4. Research design

4.1. Instrument development

The measures for all constructs were adapted from previous studies. Specifically, the items used to measure achievement affordance (ACH) were adapted from Suh et al. (2017), and the items used to measure social (SOC) and immersion affordance (IMM) were adapted from Lee et al. (2021). Game part engagement (GE) and task part engagement (TE) were conceptualized as second-order constructs consisting of three dimensions, namely absorption, vigor, and dedication, according to Cheung et al. (2011). The items measuring purchase intention (PI) were sourced from Grewal et al. (1998), and the items of task voluntariness (V) were derived from Venkatesh and Davis (2000). The items for all the constructs were shown in Appendix A. To keep the English and Chinese versions of the survey aligned, back-translation was used. All constructs were assessed using five-point Likert scales, ranging from 1 (strongly disagree) to 5 (strongly agree).

The study was situated in the shopping carnival game, the most typical type of e-commerce gamification design. Thus, an introduction to the shopping carnival is presented at the beginning of the questionnaire. To enhance the participants' comprehension of gamification, we then describe the scenario of the gamification design, which involves both the game part design and the task part design, as depicted in Figure 3.

Game Part Task Part

The figure above shows the game part and the task part of "Super Meow Games":

1. The game part involves a game for consumers to play. In the game part of "Super Meow Games", players need to upgrade their cats with "Meow Coins" to compete with randomly matched opponents in a "tug-of-war" and will be rewarded if they win the competition.

2. The task part requires consumers to complete tasks. In the task part of "Super Meow Games", players can earn "Meow Coins" for the game part. As shown in the image above, players can earn up to 50,000 "Meow Coins" by browsing the Haier official flagship shop for 15 seconds.

Figure 3. Gamification designs in e-commerce

Overall, the questionnaire is structured into three parts. Part one presents a screening question was posed to identify the target group: "Have you ever played games in e-commerce shopping carnivals?". The second part provides a brief description of the shopping carnival game, clarifying the specific meanings of the game and task parts to facilitate a deeper understanding and completion of the questionnaire. Part three involves questions related to the model.

4.2. Data collection

The survey was conducted through a professional questionnaire survey platform wjx.cn. Users who have participated in shopping carnival games on e-commerce platforms are eligible to participate in the survey. We distributed questionnaires through China's prominent social platforms, such as WeChat, QQ, and Sina Weibo. The data collection was timed shortly after the '618 Shopping Carnival' of 2023. A Total of 256 questionnaires were collected for this study. In the data cleaning, the invalid questionnaires with short answering time were rejected to guarantee the quality of the collected responses. Finally, 234 valid questionnaires were used in data analysis. Among

the respondents, 65.8% were female, 74.4% were aged 21 to 30, 19.7% were under 20, and 6% were over 30; 56.0% were undergraduates, 29.9% were graduate students, and the remaining 14.1% were high school students. Furthermore, 74.0% of respondents reported monthly spending on the platform between 200 and 1000 yuan, while 16% spent less than 200 yuan, and all of them had prior experience of playing shopping carnival games.

5. Data analysis and results

One prevalent method of structural equation modeling is partial least squares, which performs better than covariance-based SEM in handling small sample sizes and second-order constructs. Specifically, SmartPLS 4.0 was used to analyze both the measurement model and structural model following a two-phase approach (Hair et al., 2011).

5.1. Common Method Bias and Multicollinearity Analysis

As the data were obtained from a single source, we conducted a common method bias analysis. Harman's single factor test was used to statistically control for the problem of common method bias (Podsakoff and Organ, 1986). The factor analysis revealed that the first component accounted for 38.987 percent of the total variance, indicating the absence of a discernible issue with common method bias in this study. Further, the multicollinearity analysis suggested that all VIFs fall between 1.000 and 1.557, below the suggested threshold of 3.3 (Kock, 2015), confirming that multicollinearity was not a concern.

5.2. Measurement model

Measurement model test includes the evaluation of the reliability and validity of the constructs. First, reliability can be assessed by checking the values of Cronbach's alpha (CA), composite reliability (CR), and average variance extracted (AVE). As shown in Table 4, the values of CA and CR for all the constructs were above the recommended threshold of 0.7, and the values of AVE for all the constructs were above the recommended threshold of 0.5 (Churchill, 1979), indicating that all the constructs have good reliabilities (Fornell and Larcker, 1981).

Table 4. Reliability

Constructs	CA	CR	AVE
ACH	0.736	0.850	0.654
SOC	0.837	0.891	0.672
IMM	0.862	0.906	0.708
GA	0.865	0.918	0.788
GD	0.889	0.931	0.818
GV	0.836	0.902	0.754
TA	0.892	0.933	0.823
TD	0.889	0.931	0.819
TV	0.851	0.910	0.771
PI	0.851	0.910	0.771
V	0.826	0.896	0.741

Note: ACH = Achievement Affordance, SOC = Social Affordance, IMM = Immersion Affordance, GA = Game Part Absorption, GD = Game Part Dedication, GV = Game Part Vigor, TA = Task Part Absorption, TD = Task Part Dedication, TV = Task Part Vigor, PI = Purchase Intention, V = Task Voluntariness.

Second, the validity of the constructs, including both convergent and discriminant validity, can be evaluated by examining the loadings and cross-loadings of the items. Specifically, the convergent validity can be ensured when the item loadings on the respective constructs are adequately high (e.g., above 0.7). As shown in Appendix B, the item loadings on the corresponding constructs varied between 0.755 and 0.919, demonstrating strong convergent validity of the constructs (Gefen and Straub, 2005). Discriminant validity can be assessed by checking whether the item loadings on the respective constructs are greater than the loadings on other constructs. The results in Appendix B also confirmed the discriminant validity of the constructs. Discriminant validity also can be assessed by comparing the square roots of the Average Variance Extracted (AVE) with the correlations between the constructs. As summarized in Table 5, the AVE's square roots values exceeded the correlations with other constructs, which provides further evidence supporting the discriminant validity (Fornell and Larcker, 1981).

The second-order constructs were analyzed following Liang et al.'s (2007) approach. All the items of the first-order constructs were included as the items of the second-order constructs. The relationship between the first-order constructs and the second-order constructs was regarded as reflective. The results showed that the loadings of all the first-order constructs on the second-order constructs were higher than 0.7, and the related t-values were significant (see Table 6).

Table 5. Correlation of Constructs

	Mean	SD	ACH	SOC	IMM	GA	GD	GV	TA	TD	TV	PI	V
ACH	4.194	0.586	**0.809**										
SOC	3.831	0.816	0.225	**0.820**									
IMM	3.664	0.883	0.253	0.585	**0.842**								
GA	3.597	0.940	0.316	0.370	0.551	**0.888**							
GD	3.746	0.922	0.345	0.420	0.600	0.758	**0.905**						
GV	3.662	0.915	0.336	0.397	0.571	0.682	0.682	**0.868**					
TA	3.392	1.054	0.269	0.437	0.506	0.669	0.614	0.548	**0.907**				
TD	3.382	1.077	0.212	0.463	0.503	0.591	0.648	0.519	0.860	**0.905**			
TV	3.388	1.020	0.273	0.456	0.539	0.598	0.566	0.607	0.857	0.844	**0.878**		
PI	3.932	0.801	0.406	0.405	0.433	0.392	0.425	0.394	0.537	0.532	0.564	**0.861**	
V	3.654	0.905	0.408	0.325	0.375	0.409	0.452	0.396	0.541	0.540	0.557	0.495	**0.842**

Note: ACH = Achievement Affordance, SOC = Social Affordance, IMM = Immersion Affordance, GA = Game Part Absorption, GD = Game Part Dedication, GV = Game Part Vigor, TA = Task Part Absorption, TD = Task Part Dedication, TV = Task Part Vigor, PI = Purchase Intention, V = Task Voluntariness.

Table 6. Loadings of First-Order Constructs

Second-Order Constructs	First-Order Constructs	Loading	t-value
Game Part Engagement	GA	0.908	4.723
	GD	0.914	5.041
	GV	0.869	3.089
Task Part Engagement	TA	0.955	10.255
	TD	0.950	9.244
	TV	0.945	8.395

Note: GA = Game Part Absorption, GD = Game Part Dedication, GV = Game Part Vigor, TA = Task Part Absorption, TD = Task Part Dedication, TV = Task Part Vigor

5.3. Structural model

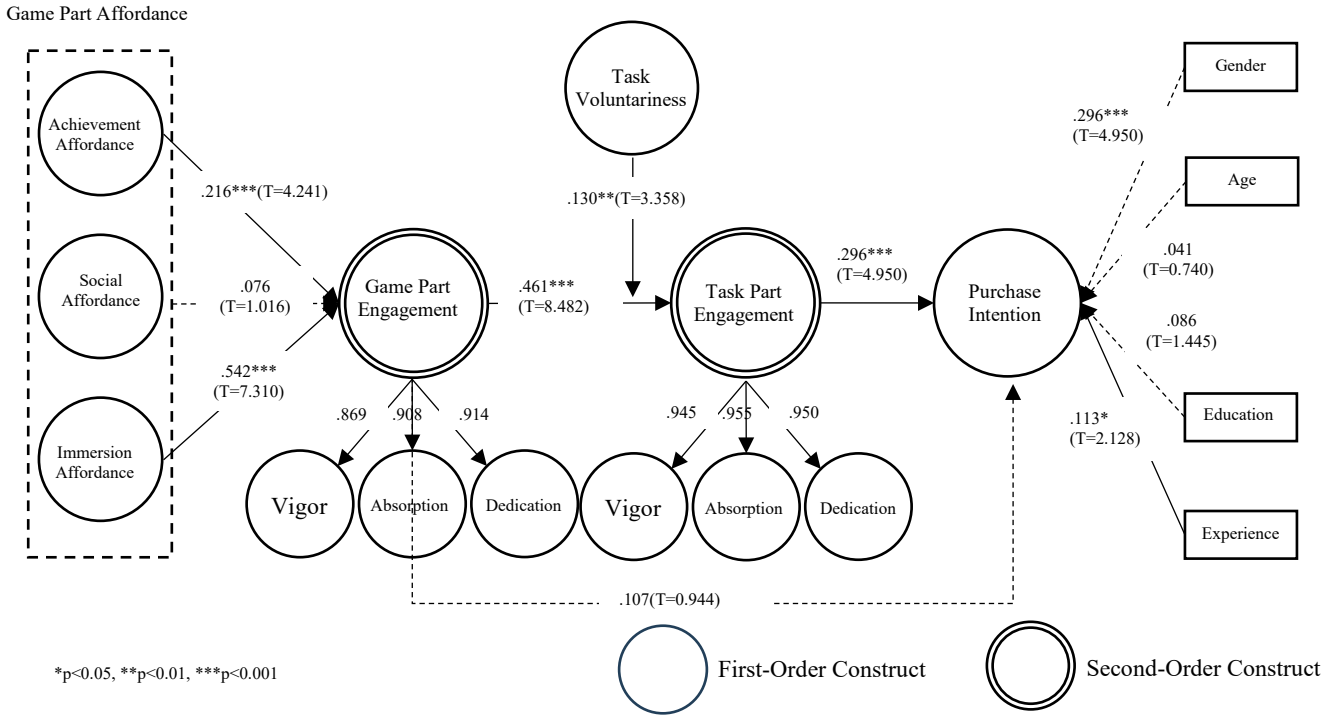

Figure 4. Results of Structure Model Analysis

Figure 4 illustrates the results of the structural model analysis. In the model, game and task part engagement serve as second-order variables, each composed of three first-order variables (vigor, absorption and dedication). Specifically, this model can account for 46.1% of R-square for game part engagement, 59.1% for task part engagement, and 36.7% for purchase intention, demonstrating good model explanatory power.

The results showed that achievement affordance ($\beta = 0.216$, $t = 4.241$, $p < 0.001$) and immersion affordance ($\beta = 0.542$, $t = 7.310$, $p < 0.001$) had positive impacts on game part engagement, while social affordance did not ($\beta = 0.076$, $t = 1.016$, $p > 0.05$), lending support to H1a and H1c but not for H1b. Further, game part engagement was found to positively affect task part engagement ($\beta = 0.461$, $t = 8.482$, $p < 0.001$) which further positively influenced purchase intention ($\beta = 0.296$, $t = 4.950$, $p < 0.001$). The mediation effect of task part engagement was further tested using the causal step approach (Baron and Kenny, 1986) shown in Table 7. In the first step, game part engagement was found to positively impact purchase intention ($\beta = 0.452$, $t = 6.611$, $p < 0.001$). In the second step, the relationship between game part engagement and task part engagement was found to be significant ($\beta = 0.700$, $t = 13.432$, $p < 0.001$). In the third step, when controlling the effect of task part engagement on purchase, no significant association between game part engagement and purchase ($\beta = 0.098$, $t = 0.817$, $p > 0.05$) was observed, suggesting that task part engagement fully mediated the relationship between game part engagement and purchase intention, supporting H2.

Table 7. Mediation Effect Analysis

Independent Variable	Mediator	Dependent Variable	Coefficient in regressions				Mediating
			IV→DV	IV→M	IV+M→DV		
					IV	M	
GE	TE	PI	0.452***	0.700***	0.098	0.505***	Full

We also used PROCESS to further evaluate the power size of the mediation effect. In Table 8, the confidence interval (95%) for the indirect effect did not include 0 while the confidence interval for the direct effect included 0, confirming the fully mediating effect. The ratio of the indirect effect to the total effect was 77.46%, indicating that the impact of game part engagement on purchase intention mainly relied on the indirect effect through task part engagement.

Table 8. Mediation Effect Analysis Using PROCESS

	Effect	BootSE	95%LLCI	95%ULCI	Effect Ratio
Indirect Effect	0.352	0.083	0.194	0.520	77.46%
Direct Effect	0.103	0.107	-0.102	0.319	22.54%
Total Effect	0.455	0.069	0.319	0.593	100.00%

As to the moderating effect test, the results indicated that task voluntariness positively moderated the relationship between game part engagement and task part engagement ($\beta = 0.130$, $t = 3.358$, $p < 0.01$). The bootstrapping effect using PROCESS (see Table 9) further indicated that game part engagement exerted a stronger impact on task part engagement when task voluntariness was high ($\beta = 0.820$, $t = 11.184$, $p < 0.001$) than when task voluntariness was low ($\beta = 0.515$, $t = 7.214$, $p < 0.001$), as demonstrated in Figure 5, supporting H3.The results of the hypothesis testing are shown in Table 10. Among the five hypotheses proposed in this paper, four were supported, while Hypothesis H1b (social affordance on game part engagement) was not supported.

Table 9. Moderation Effect Analysis

		Effect	SE	T	95% LLCI	95% ULCI
Task Voluntariness	M-1SD	0.515	0.071	7.214***	0.374	0.655
	M	0.667	0.058	11.578***	0.554	0.781
	M+1SD	0.820	0.073	11.184***	0.676	0.965

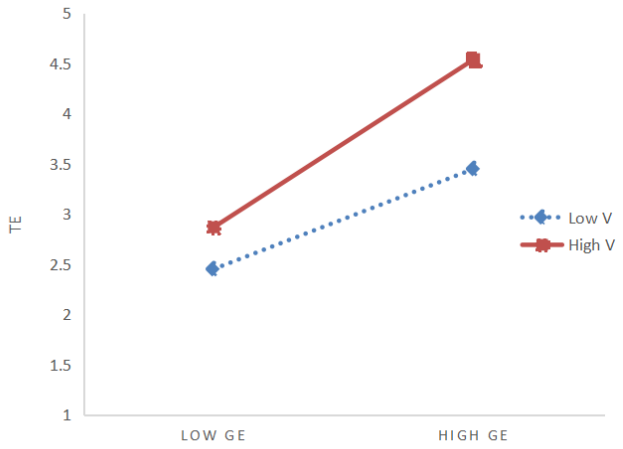

Figure 5. The Moderating Effect of Task Voluntariness
Note: GE = Game part engagement, TE = Task part engagement, V = Task voluntariness.

Table 10. Hypothetical test results

Hypothesis	Path	Support?
H1a	Achievement Affordance→Game part engagement	√
H1b	Social Affordance→Game part engagement	×
H1c	Immersion Affordance→Game part engagement	√
H2	Game part engagement→Task part engagement→Purchase Intention	√
H3	Game part engagement*Task voluntariness→Task part engagement	√

6. Discussions and implications

6.1. Key findings

This research explored the mechanisms by which gamification design impacts consumer purchase behaviors. The primary findings can be listed as follows.

First, this study finds that game part affordance drives customers to engage in the game part of the gamification design. Based on the results, two dimensions of gamification affordance, which include achievement affordance and

immersion affordance, significantly affect game part engagement, consistent with prior studies (Lee et al., 2021). However, social affordance doesn't have significant relationship with game part engagement. One plausible explanation is that compared to other dimensions of affordance, social affordance is relatively less influential than other affordance dimensions in the present research context. Specifically, in the shopping game context which stresses on playfulness and having fun, immersion affordance may have a stronger impact on game part engagement and subsequently suppress the impact of social affordance. We conducted a two-step post-hoc analysis to test this possibility. In the first step, we took social affordance as the only antecedent of game part engagement and found that this relationship was positive and significant. In the second step, we included immersion affordance as another predictor of game part engagement, and the results showed that the impact of immersion affordance was significant while the impact of social affordance becomes insignificant, confirming our expectations.

Second, the findings indicate that task part engagement fully mediates the effect of game part engagement on purchase intention. Consistent with our propositions, our study finds that engagement in task part plays a vital role in nudging the game and consumer purchase behavior, suggesting that game part engagement cannot necessarily lead to consumption without converting into engagement in the task part. Thus, the path from gamification to consumers' purchase intention can be described as four stages: gamification affordance first impacts game part engagement, which further enhances task engagement, and then task part engagement leads to purchase behavior in the end.

Additionally, task voluntariness is found to moderate the engagement transferring process from the game part to the task part, which suggests that effective engagement transferring process from the game part and the task part can occur when task is not perceived to be mandatory. This finding is consistent with that advocated by nudge theory, which emphasizes a gently guiding rather than coercive measures (Thaler and Sunstein, 2009).

6.2. Theoretical implications

First, this paper opens the black box of gamification design in the e-commerce context by differentiating between engagement in game part from engagement in task part. It is found that the shift from playing games to purchase behavior requires the role of task part nudge. These two parts have rarely been investigated independently in prior research, as scholars tended to view them as a unified entity (Shi et al., 2022; Che et al., 2023; Garcia-Jurado et al., 2019). Thus, we make a contribution to emerging field of gamification design in e-commerce context by emphasizing the important role of task part design.

Second, this study theorizes the mediating role of task part engagement to articulate the interrelationship between game part engagement and task part engagement. Following the first contribution, our study makes a contribution by emphasizing the important role of task part design and proposing a new mechanism. Specifically, emphasizing the mediating role of engagement in game part can explain why high engagement in game but low purchase rate. Based on our results, gamification design can generate a high level of game part engagement with achievement and immersion affordances. However, if the game part engagement could not cause a high level of task part engagement, it would not lead to a high purchase intention.

Third, this study identifies the boundary condition under which task part engagement mediates the relationship between game part engagement and purchase intention by highlighting the moderating role of task voluntariness. Specifically, our study reveals that game part engagement can be transferred into task part engagement only when task voluntariness is high. Prior studies rarely empirically tested the impact of varying degrees of perceived task voluntariness in gamification. Our study provides a first step to discuss when the mediating effect of task part engagement happens, which contributes to a deep comprehension of the fundamental mechanism to explain how gamification design impacts purchase intention.

6.3. Practical implications

First, the results indicate a substantial association between engagement and affordance in relation to achievement and immersion. Managers and designers of gamification e-commerce platforms should recognize the significance of achievement and immersion affordance in engaging consumers and focus on the design of achievement and immersion elements. For example, to help consumers gain more self-identity, achievement rewards can be set for small milestones to incentivize consumers to stay committed to the game. Setting up immersive elements, such as a compelling storyline and customizable characters, is also helpful.

Second, this study reveals the important role of the task part engagement as a link between the game part engagement and purchase. Effectively transferring the engagement fostered in game part to the task part is one of the core issues that gamification designers should consider. Therefore, the design of the task part can't be ignored. For example, we suggest to enrich the diversity and selectivity of tasks and increase the richness of task rewards as a way to promote task part engagement.

Third, task voluntariness is found to be a boundary condition influencing the engagement transferring process from the game part to the task part. We suggest that designers should carefully design the task page to increase the perceived voluntariness of tasks and at the same time reduce the feeling of being forced to complete them. For example,

provide more optional tasks and combine shopping-related tasks with other tasks to reduce the perceived task mandatory for the player. In this way, the positive effect generated in the game part can be directly transferred into the task part, which further impacts purchase intention.

6.4. Limitation future research

First, the research was carried out in China and addressed the gamification design on e-commerce platforms during shopping carnivals. Therefore, whether or not the research findings can be generalized to other research contexts or in other countries needs to be further verified. Further research may extend the model to different scenarios and compare the results across cultures to make the findings more broadly applicable. Further, the findings are based on 234 valid samples, future studies can extend the number and representativeness of the sample to enhance the generalizability of the findings.

Second, although the paper is devoted to explain the "low conversion rate" issues, the paper only focuses on the purchase intention as the dependent variable based on self-reported data. Future empirical research may investigate the impact of gamification design on actual purchase by using objective data.

Third, the data in this study is cross-sectional data, longitudinal data can be collected in the future to better detect the causal relationships. Regarding future research to address this issue, we suggest collecting objective enterprise data (which tracks user behaviors across the four stages of our framework), which would resolve part of the data limitation. Overall, by combining with subjective questionnaire questions to capture the latent variables in our research model, enriching the more complete understanding of the whole process.

Last, as users' initial social motivations for participating in games can be different, which will impact the game part engagement and task part engagement. However, this paper did not disentangle two heterogeneous social participation motivations that drive voluntary engagement from intrinsic interest, and passive game part participation solely to assist friends. Further studies can distinguish these two types of users and explore the moderating role of users' type on the impact of social affordance on game part engagement and task part engagement.

7. Conclusion

Gamification has emerged on e-commerce platforms and is exhibiting a rising trend. We take the e-commerce shopping carnival game as a typical example of how gamification is applied in e-commerce to collect the data. By differentiating engagement of the game part from engagement of the task part, this study empirically tested how and when gamification design impacts purchase intention based on nudge theory. This research advances the theoretical framework for gamification design in the e-commerce context and provides practical guidance for practitioners.

Acknowledgement

This work is supported by the project of Humanities and Social Sciences Research of the Ministry of Education (Project No. 25YJA630081) and the Major Projects of Ministry of Education Humanities and Social Sciences Key Research Base (Project No. 22JJD870002).

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Appendix

Constructs and Items

Dimension	Items	References
Achievement Affordance (ACH)	Playing game part on the e-commerce platform during the shopping carnival offers me the possibility to: ACH1: Obtain rewards as achievements of my participation. ACH2: Achieve good performance and receive rewards. ACH3: Obtain more rewards if I try harder.	(Suh *et al.*, 2017)
Social Affordance (SOC)	Playing game part on the e-commerce platform during the shopping carnival offers me the possibility to: SOC1: Communicate with other players in the game part. SOC2: Become part of a guild in the game part. SOC3: Team up with other players in the game part. SOC4: Keep in touch with other players in the game part.	(Lee *et al.*, 2021)
Immersion Affordance (IMM)	Playing game part on the e-commerce platform during the shopping carnival offers me the possibility to: IMM1: Put myself into the game part role. IMM2: Immerse myself in the game part. IMM3: Explore the world in the game part. IMM4: Create the appearance and background of my character in the game part.	
Game Part Engagement		
Vigor (GV)	GV1: I can continue playing the game part in shopping carnival games for very long periods at a time. GV2: I feel strong and vigorous when I am playing the game part in shopping carnival game. GV3: I devote a lot of energy to the game part in shopping carnival game.	(Cheung *et al.*, 2011)
Absorption (GA)	GA1: I am rarely distracted when playing the game part in shopping carnival game. GA2: My mind is focused when playing the game part in shopping carnival game. GA3: I pay a lot of attention to the game part in shopping carnival game.	
Dedication (GD)	GD1: I am enthusiastic in the game part in shopping carnival game. GD2: I am excited when playing the game part in shopping carnival game. GD3: I am interested in the game part in shopping carnival game.	
Task Part Engagement		
Vigor (TV)	TV1: I can continue doing task part in shopping carnival game for very long periods at a time. TV2: I feel strong and vigorous when I am doing task part in shopping carnival game. TV3: I devote a lot of energy to the task part in shopping carnival game.	(Cheung *et al.*, 2011)
Absorption (TA)	TA1: I am rarely distracted when doing task part in shopping carnival game. TA2: My mind is focused when doing task part in shopping carnival game. TA3: I pay a lot of attention to the task part in shopping carnival game.	
Dedication (TD)	TD1: I am enthusiastic in the task part in shopping carnival game. TD2: I am excited when doing task part in shopping carnival game. TD3: I am interested in the task part in shopping carnival game.	
Purchase Intention (PI)	During the shopping carnival, after completing the shopping task in the game: PI1: I would purchase in this e-commerce platform. PI2: I would consider buying in this e-commerce platform. PI3: The probability that I would consider buying in this e-commerce platform is high.	(Grewal *et al.*, 1998)
Task Voluntariness (V)	V1: My participation in the task part in shopping carnival game is voluntary. V2: I am not required to participate in the task part in shopping carnival game. V3: Although it might be helpful, participating in the task part in shopping carnival game is certainly not compulsory.	(Venkatesh and Davis, 2000)