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Distinguishing Game Engagement from Task Engagement in the Gamification of e-Commerce Platforms: An Empirical Study of Shopping Festival Games

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ABSTRACT

Although gamification has been widely used in e-commerce platforms, research on gamification in marketing is still scarce compared to practice, and the impact of gamification on purchase intention remains to be clarified. Therefore, based on affordance theory and engagement theory, this paper establishes a theoretical model to explain the pathway of gamification's effects. Specifically, this study takes the e-commerce shopping festival game as an example, distinguishes the game part and task part, explores the relationship between them, and identifies the different mechanisms of the two parts' engagement on purchase intention. A survey was conducted, and 234 valid questionnaires were collected. Results showed that game part affordance positively affects game part engagement which could increase task engagement. Second, game part engagement and task part engagement impact purchase intention differently. Task part engagement has a direct impact on purchase intention, while game part engagement influences purchase intention through game intention. Finally, the contribution of theory and practice is discussed.

Keywords: Game affordance, e-commerce, game part engagement, task part engagement, purchase intention.

INTRODUCTION

Gamification is using game elements in non-game contexts (Deterding, 2011), a process that supports users' overall value creation to enhance service with gameful experiences (Huotari & Hamari, 2012). In recent years, gamification has been widely used in education, health, marketing and other fields (Hamari et al., 2014). According to the latest 'Global Game Market Report' released by Newzoo, nearly 3.38 billion people are expected to play games in 2023. The mobile game market reached $ 92.6 billion, with the Asia-Pacific region leading the global market with $ 85.8 billion. The Net generation who grew up in the internet environment is more eager to have fun, challenge and socialize, often regarding playing games as the top priority in the action list.

Various e-commerce platforms have noticed the trend of gamification, and aware of the attractiveness of gaming products to users, they have begun to try implanting all kinds of gamification elements into their platforms to achieve the goal of increasing user stickiness (Koivisto & Hamari, 2019). Gartner, a well-known market research institution, predicted that gamified information systems and services will become an essential approach for marketing and user retention. However, gamification has been regarded by many enterprises as a mere element of the points system and has yet to be deeply understood and well applied. As reported by Gartner, more than 80% of gamification systems are doomed to failure due to a lack of understanding of gamification design.

In the transformation of research focus from information systems utilitarian value to hedonic value, the study of gamification has aroused widespread concern in academia (Deterding, 2011). Academia has yet to reach a unified understanding of gamification. However, there is a common perception that gamification should be combined with system design and user experience to engage and change user behavior. Current research on gamification has focused on education (Lee & Hammer, 2011), health (Hamari & Koivisto, 2013), work (Suh et al., 2017), marketing management (Huotari & Hamari, 2017; Xi & Hamari, 2019). In the field of gamified marketing, Deterding (2011) argued that when gamification is implemented in online marketing, the goal is to achieve value creation and enhance user loyalty by building positive consumer relationships, which in turn positively affects consumer purchasing behavior (Deterding, 2011). Hamari (2017) found that including a badge game element encouraged the college student population to trade more (Hamari, 2017), and badge elements can drive impulse buying. A gamification field experiment demonstrated that gamification has a significant impact on shopping activity in terms of boosting sales and increasing shop browsing, and that this impact of gamification is sustained.

Previous studies in the marketing field on gamification have several research gaps. Firstly, despite mounting evidence advocating

the effectiveness of gamification, it is still unclear what underlying mechanisms drive users to make purchase decisions as expected. Second, most previous literature treats gamification design as a whole. However, gamification design can be divided into two distinct parts: the game part which involves a game for users to play, and the task part which requires consumers to do tasks to get credit for the game part, such as a task that ask the consumer to browse the online shops for 15 second to get credit (Liu et al., 2017). Less attention has been paid to the distinct characteristics of these two parts and their relationship. Third, these two distinct parts will affect consumers' purchase behaviors differently. However, it is unclear about the mechanism of how these two parts impact purchase intention. To summarize, our study aims to answer two research questions:

RQ1: From the perspective of game affordance, why do users play games on e-commerce platforms, and further, what drives users to buy?
RQ2: What is the relationship between the game part and the task part, and how do these two parts generate influence on purchase intention?

To address these research questions, we take shopping festival games as examples. Considering the model of the shopping festival game in e-commerce and the correlation between each part of the game and shopping, we discuss the game part and the task part separately, and demonstrate the influence of the engagement of the two parts of the game on the overall use of the game and the purchase intention.

LITERATURE REVIEW

Gamification

Gamification was first introduced in 2002 by British engineer Nick Pelling, who applied gamification design to the field of commercial electronic devices. Gamification is generally defined as the application of game design elements to non-game context (Deterding, 2011), most scholars have accepted this definition, but it is relatively broad. Other scholars have supplemented and developed the definition of gamification, which has been put forward in different research perspectives and backgrounds. Gamification is the integration of game design elements and the target system, while maintaining the target system's instrumental function in the information system perspective (Liu et al., 2017). In service marketing, gamification is the integration of brand applications and game design elements to increase customer value and create more purchases and loyalty (Hofacker et al., 2016), is a service process that enhances the user's game experience to support the user's overall value creation (Huotari & Hamari, 2012). Since the DICE Summit 2010, gamification has become popular and gradually penetrated all fields, such as health, education, work, marketing, and has been used to good effect to enable behavior change and intervention (Yang & Gottlieb, 2023). An empirical study of the application of gamification in health and exercise found that people's willingness to ride increased when they were able to share and display gamified badges to others (Sheffler et al., 2020); Well-designed gamification can stimulate structural competitiveness for engagement and achievement growth (Amo et al., 2020), also enable to increase knowledge sharing (Holzer et al., 2020); A gamified IS in the workplace engages users and promotes their continued system use (Suh et al., 2017).

The application of gamification in e-commerce platforms is mainly through specific gamification elements. The typical game elements are points, badges, and leaderboards, also known as PBL, which form a "funware loop" (Zichermann & Linder, 2010). Many scholars have put forward opinions on how to classify gamification elements, and in the early days, scholars used the classification method in the field of game theory to classify gamification elements in non-game contexts. Hunicke et al. (2004) proposed the MDA framework, one of the widely used frameworks in the game industry, to classify and explain game design elements from three dimensions: mechanism, dynamics and aesthetics (Hunicke et al., 2004). Werbach (2012) proposed the DMC system according to the role in the gamification framework, the gamification elements are divided into three categories: dynamics, mechanism and component (Werbach et al., 2012). In this study, according to Koivisto and combined with the characteristics of shopping festival games in e-commerce platforms, we classify the gamification elements into achievement, social, immersion three categories (Koivisto & Hamari, 2019).

Gamification leverages people's desires for competition, achievement, status, self-expression, altruism, and closure (Taskiran & Yilmaz, 2015). People believe gamification is helpful because the game's design elements are integrated into the non-game context, so the user feels the game experience (Deterding, 2011). Gamification can invoke emotional and cognitive reactions like flow experience and aesthetic experience (Suh et al., 2017). In marketing, gamification has been found to have a significant impact on consumer shopping participation (Ho et al., 2023), which can improve the experience value and drive users into marketing activities (Sigala, 2015). In the online shopping context, gamification can serve as a stimulating factor affecting individual shopping intentions and produce positive shopping emotions and shopping behaviors (Ho et al., 2023; Xu et al., 2020), bringing more transactions and impulse buying (Hamari, 2017). Considering the form of gamification in e-commerce platforms, exploring the relationship between games and shopping is a challenge. In this regard, this paper takes shopping festival games as an example of gamification and supplements the literature by distinguishing the game part from the task part.

Affordance Theory

Affordance theory originated in the field of ecology. The affordances of the environment are what it offers the animal and what

it provides or furnishes (Gibson, 1978). Affordance refers to both perceived and actual properties of the thing, primarily those fundamental properties that determine just how the thing could possibly be used, and Norman believed that perceived affordance plays a more significant role (Norman, 1988). Therefore, affordance is formed by the relationship between users and technical characteristics (Dong & Wang, 2018). The affordance is not the nature of the object (Lankton et al., 2015) but the possibility of action brought about by the attributes of the object or object (Markus & Silver, 2008). In brief, affordance indicates the possibility of behavior. When perceived, affordance allows actors to take actions that may satisfy specific needs (Ping, 2008).

Previous studies have applied affordance in various fields to understand the interaction between the individual and the surrounding environment (Shi et al., 2022). In gamification systems, affordance refers to the elements and mechanics that structure games and aid in inducing gameful experiences (Koivisto & Hamari, 2019). The implementations of gamification varied between studies depending on what game-like motivational affordances had been implemented (Koivisto & Hamari, 2019). Affordance can better help to understand users' psychological state and behavior in social business activities, especially for understanding their participation.

A literature review identified three gamification affordances commonly implemented in an IS that use game elements: achievement, social, and immersion (Koivisto & Hamari, 2019; Yee, 2006). Achievement affordance enables users to perceive what the gamified IS allows them to receive rewards as a payoff when they complete predesigned tasks (Hamari et al., 2014). Gamification elements like points, grades, badges and rewards can provide players with achievement affordance (Zagal et al., 2005). Social affordance can provide users with a stronger feeling of connectedness and belonging due to high-frequency communication and reciprocity (Francisco-Aparicio et al., 2013; Xi & Hamari, 2019), including social networking features, cooperation and teams. Immersion affordance is primarily making the player immersed in the self-directed inquisitive activity, and induces higher psychological investment in autonomous thinking, avatar, character, narration may allow players to feel this type of affordance (Kim et al., 2015; Koivisto & Hamari, 2019). These three affordances make up what shopping festival games in e-commerce platforms can offer players, so in this study, we measure game part affordance in terms of these three dimensions.

Engagement Theory

Engagement is a psychological state that was first used in psychology. It refers to adaptability or compatibility between two or more things. Later, engagement began to be used to express an emotional involvement, participation, connection or even attachment. Appelbaum (2001) proposed that customers' engagement in marketing was composed of rational loyalty and emotional attachment, and put forward corresponding theoretical guidance for marketing practice (Appelbaum & Alec, 2001). Extensive research on engagement has gradually become the focus of marketing research, and has been extended to develop emerging concepts like "consumer engagement" and "customer engagement".

Customer engagement is the degree of relationship between customers and service organizations in terms of cognition and emotion, is a multi-dimensional concept of cognition, emotion and behavior (Brodie et al., 2011). Hollebeek (2011) also defined customer brand engagement from a comprehensive perspective as customers' brand-related cognitive, situational-dependent mental states and behavioral activities to some extent in the interaction with the brand. Ashley (2015) pointed out that in the Internet platform, marketing practitioners carry out content marketing through customer engagement (Ashley & Tuten, 2015). Referring to Hollebeek's definition of consumer engagement and integrating the relevant theories of the e-commerce platform (Hollebeek, 2011), consumer engagement from the perspective of the e-commerce platform is defined as follows: E-commerce platform users voluntarily and actively participate in platform activities, and the intensity of interaction between users and between users and platforms in the process of participation. This research divides consumer engagement into game part engagement and task part engagement. Game part engagement refers to the user's voluntary and active participation in the game part of the platform game; task part engagement refers to the interaction intensity of the user's voluntary and active participation in the task part of the platform game.

The dimension of Customer engagement is divided into single-dimensional and multi-dimensional perspectives. With the deepening research, consumer engagement is and more specific through multi-dimensional perspectives. Hollebeek (2011) believes that customer engagement is a brand-related and motivation-driven psychological state formed by consumers in interacting with the enterprise. It is divided into three levels: immersion, enthusiasm and activation, which correspond to customer cognition, emotion and behavior in interacting with the brand (Hollebeek, 2011). Brodie et al. (2011) consider customer engagement as a multi-dimensional concept encompassing cognitive, affective, and behavioral dimensions, and is a psychological state related to focus objects and situations generated by customers through interaction with focus objects and co-creation of customer experience (Brodie et al., 2011). Vivek (2009) proposed that customer engagement reflects the intensity of participation and connection between individuals and organizations from three dimensions: conscious participation, enthusiasm and social interaction, which correspond to cognition, emotion and behavior respectively (Vivek, 2009).

In previous studies, the division of customer engagement is still based on three-dimensional customer engagement as the

mainstream research. This division method is mature and convenient for empirical research. Based on the literature review and the research background of gamification e-commerce platforms, our study comprehensively refers to Cheung et al' s dimension of customer engagement, dividing it into three aspects: Vigor, Absorption and Dedication (Cheung et al., 2011).

REASERCH MODEL AND HYPOTHESE DEVELOPMENT

Figure 1 exhibits our research framework, and the hypotheses are formulated as follows.

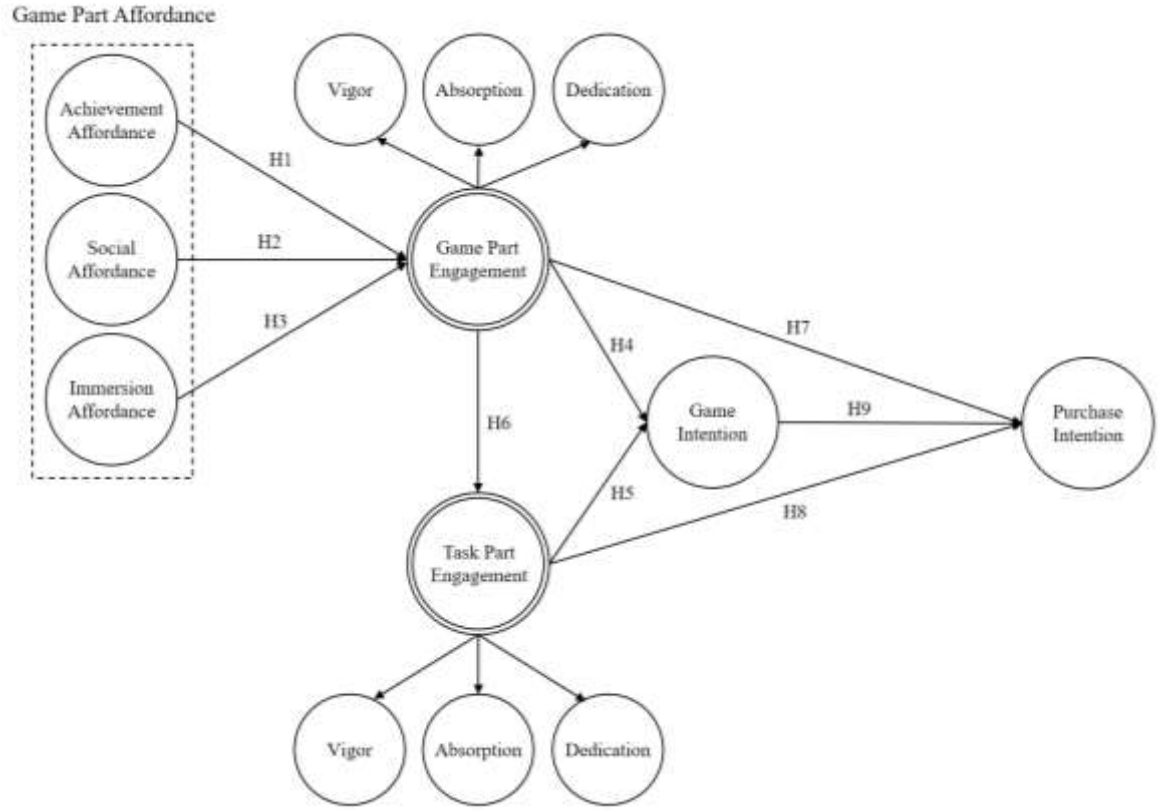


Figure 1: Research Model

Game Part Affordance, Game Part Engagement and Task Part Engagement

Successfully conveying affordances induced by game elements is necessary for designing an engaging IS. In the context of virtual interactive services, the interaction between customers and elements has a positive effect on customer engagement. Interaction in online virtual communities will positively affect customer engagement, and the impact of this interaction on customer engagement also appears in online game scenarios (Cheung et al., 2015). Previous studies have shown that interactivity can significantly affect customers' immersion and presence, which is an important part of customer engagement. An extensive literature review identified three affordances (achievement, social, immersion) in shopping festival games and speculated that they might increase customer engagement.

In psychology, people naturally tend to solve challenges and develop personal skills. The achievement game elements clearly show their achievements, set user goals and bring timely feedback. Users expect to improve and perform better in the game, so using achievement elements can improve users ' motivation and engagement (Bormann & Greitemeyer, 2015). In the context of this study, users can get prizes by playing shopping festival games, such as getting points and coupons that can be used in shopping, and they can feel the functional value of the game and improve customer engagement. Therefore, we put forward the hypothesis:

H1: Achievement affordance positively affects game part engagement.

Cooperation, social networks and other elements in games that bring social affordance will enhance the users' inner pleasure by bringing a sense of immersive experience (Deterding, 2014). Competition can create an entertaining atmosphere by stimulating users' specific task commitments so that users tend to use social game elements to interact with other users (Conaway & Garay, 2014). In the shopping festival game, players maintain or build new relationships with other players by conveying social affordance, in which the sense of pleasure leads to game part engagement. Therefore, we put forward the hypothesis:

H2: Social affordance positively affects game part engagement.

Users interact with immersive gamification elements such as virtual images, role-playing mechanisms, and narratives, which can generate immersion affordance. In this process, it can arouse users' curiosity, make them experience a higher sense of freedom and fluency (Hamari & Koivisto, 2014), and lead users to participate more. In shopping festival games, the immersion brought about by the game's storyline and plot can increase player engagement. Therefore, we put forward the hypothesis:

H3: Immersion affordance positively affects game part engagement.

Game Part Engagement, Task Part Engagement and Game Intention

In this study, customer engagement refers to users voluntarily and actively participating in shopping festival games and the intensity of interaction (Hollebeek, 2011). Customer engagement plays a vital role in marketing research and is considered an important driving force for consumer behavior research. Hollebeek (2014) considered that customer brand engagement will increase usage intention (Hollebeek et al., 2014). Brodie et al. (2011) believed that user participation and involvement result from the customer engagement process (Brodie et al., 2011). Based on the study by Liu, Santhanam et al. (2017), this study divides customer engagement into game and task part engagement in shopping festival games. The degree of engagement affects users' emotional and cognitive investment in shopping festival games, so it can change the propensity to play. Therefore, we put forward the hypothesis:

H4: Game part engagement positively affects game intention.
H5: Task part engagement positively affects game intention.

The affect transfer model pointed out that the psychological reactions caused by the media will affect the advertising attitude in the same direction (Cantor et al., 1974). The game and task parts together form the shopping festival game on the e-commerce platform. In this context, the sense of participation gained in the game part will be transferred to the task part because of its relevance. Therefore, we put forward the hypothesis:

H6: Game part engagement positively affects task part engagement.

Game Part Engagement, Task Part Engagement and Purchase Intention

Previous studies have shown that customer engagement will lead to purchasing results, both customer purchase intention and purchase behavior. Several studies have proved that customer engagement can effectively promote purchase behavior. In online games, customers' psychological and behavioral engagement will promote customers' money spent on online games (Cheung et al., 2015). When engaging in shopping festival games, players can better understand the reward rules as well as the product information, thus making them more closely related to the products. Therefore, we put forward the hypothesis:

H7: Game part engagement positively affects purchase intention.
H8: Task part engagement positively affects purchase intention.

Game Intention and Purchase Intention

Gamification services can trigger psychological reactions, thereby stimulating specific behavioral outcomes. These results include attitudes, engagement, and buying or repurchasing behavior from a marketing perspective. Some scholars suggest using gamification to influence users' purchase decisions. In shopping festival games, the purchase behavior will be affected by the game challenges. These gamification designs encourage users to make purchases (Hildebrand et al., 2014). Feng et al. (2020) pointed out that consumers with game experience are more willing to buy (Feng et al., 2020). Previous studies have shown a positive correlation between game use and marketing results. We contend that users who play shopping festival games on e-commerce platforms are more likely to make purchases. Therefore, we put forward the hypothesis:

H9: Game intention positively affects purchase intention.

RESEARCH METHODOLOGY

Instrument Development

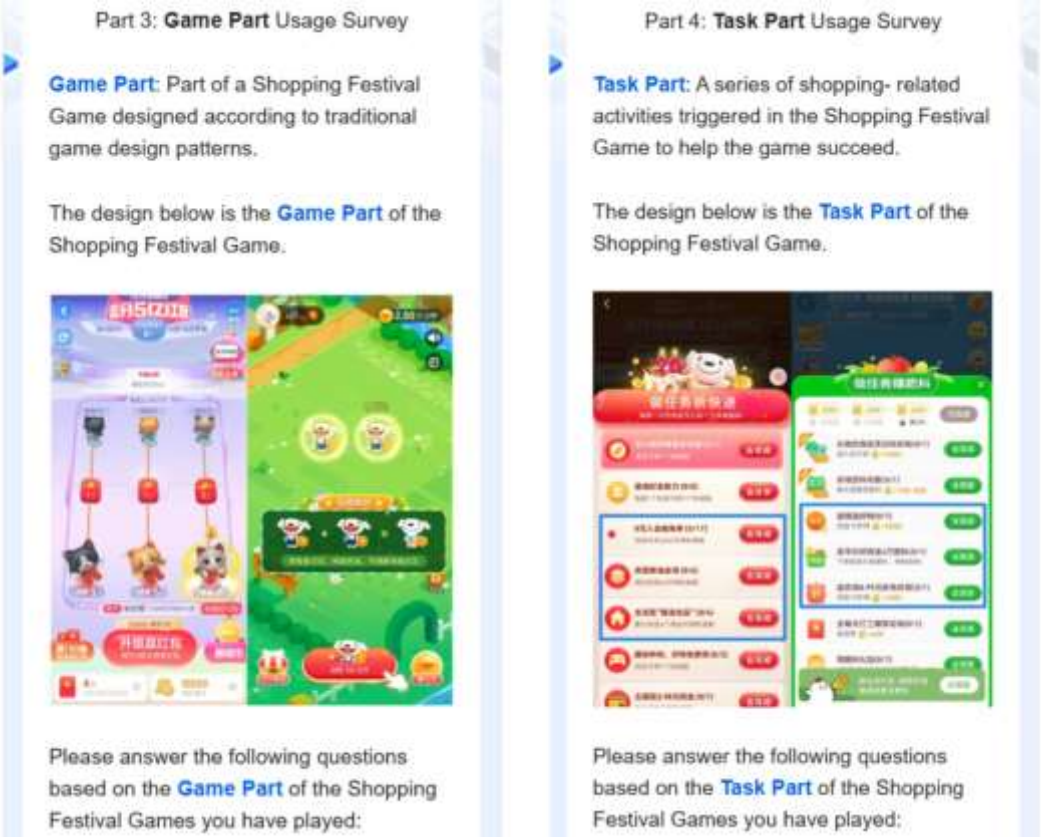
We adapted measurements of constructs from the existing research to ensure validity and reliability. All the constructs were measured using a 5-point Likert scale (with 1 = strongly disagree to 5 = strongly agree). Table 1 presents the measurement items and literature sources. The measure of game part affordance was divided into three dimensions: achievement affordance (ACH), social affordance (SOC) and immersion affordance (IMM), which were derived from existing scales for measuring game part affordance (Lee et al., 2021; Suh et al., 2017). We adapted an existing scale to measure game part engagement (GE) and task

part engagement (TE) from Cheung, and took engagement as a second-order variable measured by absorption (A), vigor (V) and dedication (D) (Cheung et al., 2011). The measure of game intention (GI) and purchase intention (PI) was adapted according to Grewal (Grewal et al., 1998). To promote respondents ' understanding of gamification, a design example of a game on the e-commerce platform during the shopping festival was presented at the beginning of the survey as shown in Figure 2. The measurements were translated from English to Chinese and then back to English using anti-translation techniques. And ensure the consistency of meaning.

Table 1: Constructs and Measures

Constructs	Dimension	Measures	References
Game Part Affordance	Achievement Affordance	Playing game part on the e-commerce platform during the shopping festival offers me the possibility to: 1. obtain rewards as achievements of my participation. 2. achieve good performance and receive rewards. 3. obtain more rewards if I try harder.	Suh, A., et al. (2017)
	Social Affordance	Playing game part on the e-commerce platform during the shopping festival offers me the possibility to: 1. communicate with other players in the game part. 2. become part of a guild in the game part. 3. team up with other players in the game part. 4. keep in touch with other players in the game part.	Lee, Z. W. Y., et al. (2021)
	Immersion Affordance	Playing game part on the e-commerce platform during the shopping festival offers me the possibility to: 1. put myself into the game part role. 2. immerse myself in the game part. 3. explore the world in the game part. 4. create the appearance and background of my character in the game part.	
Game Part Engagement	Vigor	1. I can continue playing the game part in shopping festival games for very long periods at a time. 2. I feel strong and vigorous when I am playing the game part in shopping festival game. 3. I devote a lot of energy to the game part in shopping festival game.	Cheung et al. (2011)
	Absorption	1. I am rarely distracted when playing the game part in shopping festival game. 2. My mind is focused when playing the game part in shopping festival game. 3. I pay a lot of attention to the game part in shopping festival game.	
	Dedication	1. I am enthusiastic in the game part in shopping festival game. 2. I am excited when playing the game part in shopping festival game. 3. I am interested in the game part in shopping festival game.	
Task Part Engagement	Vigor	1. I can continue doing task part in shopping festival game for very long periods at a time. 2. I feel strong and vigorous when I am doing task part in shopping festival game. 3. I devote a lot of energy to the task part in shopping festival game.	Cheung et al. (2011)
	Absorption	1. I am rarely distracted when doing task part in shopping festival game. 2. My mind is focused when doing task part in shopping festival game. 3. I pay a lot of attention to the task part in shopping festival game.	
	Dedication	1. I am enthusiastic in the task part in shopping festival game. 2. I am excited when doing task part in shopping festival game. 3. I am interested in the task part in shopping festival game.	
Game Intention	/	During the shopping festival: 1. I would play game in e-commerce platform. 2. I would consider playing game in e-commerce platform. 3. The probability that I would play game in e-commerce platform is high.	Grewal et al. (1998)
Purchase Intention	/	During the shopping festival, after completing the shopping task in the game: 1. I would purchase in this e-commerce platform. 2. I would consider buying in this e-commerce platform. 3. The probability that I would consider buying in this e-commerce platform is high.	Grewal et al. (1998)

Source: This study.



Source: This study.

Figure 2: Questionnaire Design

Data Collection

This research mainly focuses on the impact of shopping festival games on consumers' purchase intention on e-commerce platforms. China's major gamification e-commerce platforms, such as Taobao, Tmall and Jingdong, are investigated as the main platforms. This study takes consumers participating in shopping festival games on the shopping platform as the research subjects. The screening question in the survey ensures that our respondents have had the experience of playing games on the e-commerce platform during the shopping festival. "Questionnaire star" online platform was used to design and disseminate our questionnaires. We distributed questionnaires through Douban, Sina Weibo, WeChat, QQ and other social platforms, shortly after the '618 Shopping Festival' in 2023. A total of 265 questionnaires were collected and 234 valid questionnaires were obtained after screening. Table 2 shows the demographics of the valid respondents.

Table 2: Demographics

Variables	Category	Frequency	Percentage (%)
Gender	Male	80	34.2
	Female	154	65.8
Age(years)	<20	46	19.7
	21-30	174	74.4
	31-40	8	3.4
	41-65	6	2.6
Education	Senior	33	14.1
	Undergraduate	131	56.0
	Postgraduate	70	29.9
Monthly platform consumption	<200 yuan	37	15.8
	200-500 yuan	112	47.9
	500-1000 yuan	61	26.1
	> 1000 yuan	24	10.3

Source: This study.

DATA ANALYSIS RESULTS

Measurement Model Analysis

To examine the measurement model following criteria suggested by previous studies, we used SmartPLS 3.0 to evaluate its reliability and validity (Hair et al., 2011). Table 3 and Table 4 shows the Cronbach's Alpha (CA), Composite Reliability (CR), Average Variance Extracted (AVE) and Factor Loading. The results showed that all constructs' CA value (ranging from 0.736 to 0.892) and CR value (ranging from 0.85 to 0.933) were greater than 0.7. The AVE value (ranging from 0.654 to 0.823) of all constructs was above 0.5, demonstrating satisfactory reliability and convergent validity.

Table 3: The First-Order Reflect Reliability and Convergent Validity

Constructs	CA	CR	AVE	Factor Loading
Achievement Affordance (ACH)	0.736	0.85	0.654	0.792 0.828 0.805
Social Affordance (SOC)	0.837	0.891	0.672	0.824 0.755 0.838 0.858
Immersion Affordance (IMM)	0.862	0.906	0.708	0.881 0.856 0.857 0.767
Game Part Absorption (GA)	0.865	0.918	0.788	0.913 0.889 0.861
Game Part Dedication (GD)	0.889	0.931	0.818	0.916 0.892 0.906
Game Part Vigor (GV)	0.836	0.902	0.754	0.909 0.864 0.829
Task Part Absorption (TA)	0.892	0.933	0.823	0.919 0.907 0.895
Task Part Dedication (TD)	0.889	0.931	0.819	0.906 0.910 0.898
Task Part Vigor (TV)	0.851	0.91	0.771	0.910 0.878 0.846
Game Intention (GI)	0.852	0.91	0.771	0.890 0.860 0.885
Purchase Intention (PI)	0.826	0.896	0.742	0.873 0.841 0.869

Source: This study.

Table 4: The Second-Order Reflect Construct Reliability and Convergent Validity

Constructs	CA	CR	AVE	Factor Loading
Game Part Engagement	**0.927**	**0.925**	**0.805**	
Game Part Absorption				0.908
Game Part Dedication				0.869
Game Part Vigor				0.914
Task Part Engagement	**0.953**	**0.929**	**0.814**	

Task Part Absorption				0.911
Task Part Dedication				0.902
Task Part Vigor				0.894

Source: This study.

The results of factor loadings and cross-loadings analysis show that the loading of all measurement items on their theoretical latent variables is greater than 0.7 in Table 5, which also shows good convergent validity.

Table 5: Loadings and Cross Loadings

	ACH	SOC	IMM	GA	GD	GV	TA	TD	TV	GI	PI
ACH1	**0.774**	0.176	0.174	0.243	0.301	0.231	0.155	0.129	0.163	0.284	0.335
ACH2	**0.822**	0.173	0.229	0.263	0.295	0.322	0.22	0.18	0.213	0.331	0.32
ACH3	**0.828**	0.192	0.21	0.261	0.237	0.256	0.28	0.206	0.29	0.312	0.329
SOC1	0.098	**0.833**	0.54	0.288	0.356	0.293	0.398	0.401	0.391	0.274	0.287
SOC2	0.206	**0.748**	0.43	0.248	0.301	0.316	0.297	0.315	0.305	0.276	0.323
SOC3	0.224	**0.831**	0.41	0.31	0.314	0.293	0.299	0.326	0.325	0.288	0.323
SOC4	0.21	**0.862**	0.529	0.355	0.394	0.388	0.423	0.458	0.455	0.343	0.377
IMM1	0.178	0.501	**0.881**	0.473	0.507	0.497	0.442	0.437	0.455	0.369	0.349
IMM2	0.179	0.481	**0.854**	0.519	0.519	0.548	0.442	0.426	0.485	0.375	0.344
IMM3	0.264	0.461	**0.858**	0.464	0.531	0.463	0.457	0.417	0.466	0.402	0.367
IMM4	0.242	0.547	**0.769**	0.388	0.462	0.401	0.354	0.415	0.403	0.305	0.394
G-A1	0.256	0.328	0.503	**0.913**	0.667	0.602	0.597	0.536	0.507	0.44	0.312
G-A2	0.317	0.369	0.512	**0.889**	0.697	0.602	0.601	0.539	0.511	0.482	0.345
G-A3	0.27	0.287	0.451	**0.862**	0.655	0.613	0.583	0.498	0.577	0.43	0.382
G-D1	0.3	0.388	0.544	0.714	**0.916**	0.618	0.564	0.588	0.501	0.491	0.364
G-D2	0.288	0.375	0.517	0.697	**0.892**	0.604	0.568	0.602	0.508	0.537	0.41
G-D3	0.339	0.377	0.568	0.647	**0.906**	0.63	0.534	0.569	0.526	0.507	0.376
G-V1	0.25	0.361	0.54	0.625	0.623	**0.91**	0.499	0.489	0.567	0.465	0.333
G-V2	0.313	0.421	0.573	0.585	0.634	**0.864**	0.516	0.505	0.56	0.466	0.406
G-V3	0.315	0.243	0.36	0.564	0.514	**0.829**	0.408	0.35	0.447	0.353	0.281
T-A1	0.223	0.384	0.477	0.654	0.595	0.512	**0.919**	0.775	0.76	0.495	0.453
T-A2	0.265	0.419	0.444	0.614	0.569	0.491	**0.907**	0.812	0.761	0.517	0.499
T-A3	0.256	0.391	0.456	0.552	0.505	0.49	**0.895**	0.753	0.809	0.486	0.498
T-D1	0.143	0.443	0.462	0.545	0.601	0.482	0.811	**0.906**	0.76	0.5	0.471
T-D2	0.25	0.415	0.456	0.547	0.577	0.496	0.797	**0.91**	0.766	0.531	0.5
T-D3	0.189	0.404	0.448	0.51	0.58	0.431	0.726	**0.898**	0.765	0.549	0.465
T-V1	0.271	0.394	0.525	0.539	0.512	0.567	0.777	0.742	**0.91**	0.514	0.502
T-V2	0.179	0.414	0.487	0.521	0.532	0.549	0.736	0.776	**0.878**	0.51	0.498
T-V3	0.284	0.398	0.404	0.516	0.444	0.48	0.745	0.704	**0.846**	0.469	0.478
GI1	0.316	0.341	0.428	0.468	0.515	0.458	0.572	0.625	0.599	**0.89**	0.62
GI2	0.407	0.303	0.35	0.458	0.52	0.421	0.453	0.46	0.428	**0.86**	0.592
GI3	0.289	0.309	0.359	0.41	0.454	0.426	0.417	0.435	0.456	**0.885**	0.619
PI1	0.403	0.418	0.451	0.395	0.404	0.349	0.528	0.499	0.532	0.587	**0.873**
PI2	0.388	0.29	0.299	0.305	0.315	0.285	0.379	0.383	0.397	0.59	**0.841**
PI3	0.258	0.325	0.356	0.306	0.372	0.379	0.466	0.481	0.515	0.619	**0.869**

Source: This study.

According to Table 6, the square roots of AVE values of each construct were larger than their correlations with other constructs,

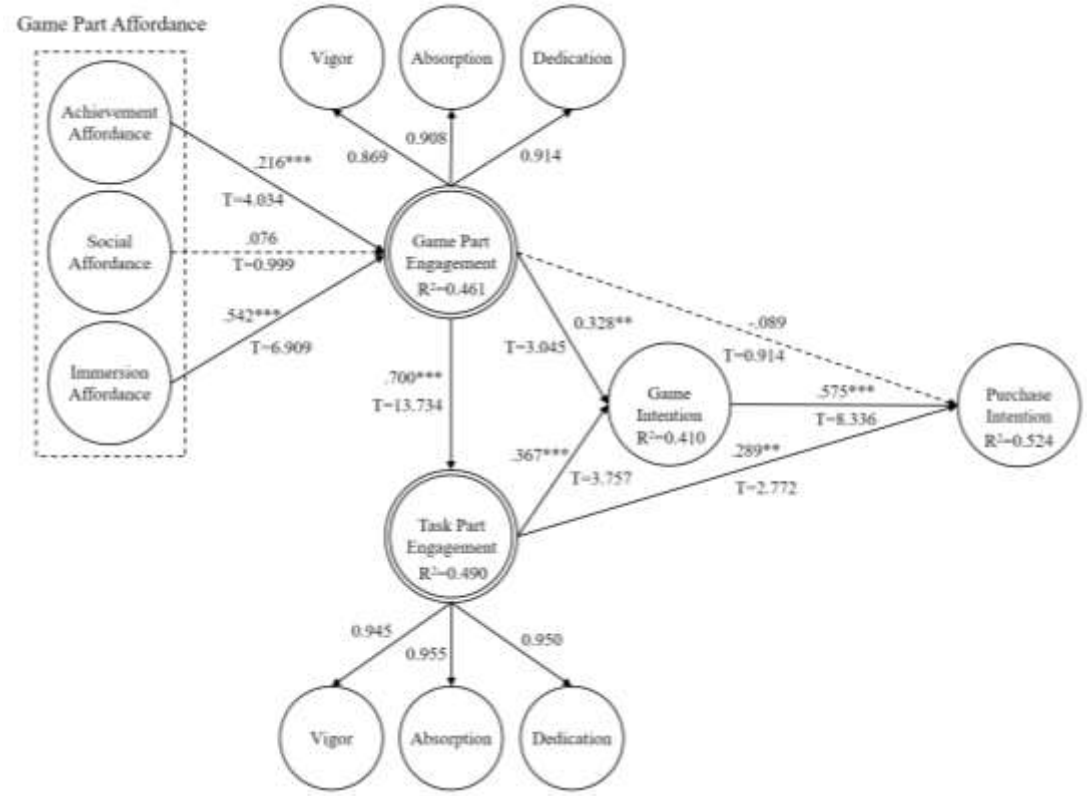
confirming the discriminant validity.

Table 6: Discriminant Validity

	REW	SOC	IMM	GA	GD	GV	TA	TD	TV	GI	PI
REW	**0.809**										
SOC	0.225	**0.82**									
IMM	0.253	0.585	**0.842**								
GA	0.316	0.37	0.551	**0.888**							
GD	0.345	0.42	0.6	0.758	**0.905**						
GV	0.336	0.397	0.571	0.682	0.682	**0.868**					
TA	0.269	0.437	0.506	0.669	0.614	0.548	**0.907**				
TD	0.212	0.463	0.503	0.591	0.648	0.519	0.86	**0.905**			
TV	0.273	0.456	0.539	0.598	0.566	0.607	0.857	0.844	**0.878**		
GI	0.383	0.362	0.433	0.508	0.565	0.496	0.551	0.582	0.567	**0.878**	
PI	0.405	0.401	0.429	0.39	0.423	0.393	0.533	0.529	0.561	0.695	**0.861**

Source: This study.

Structural Model Analysis



Source: This study.

Figure 3: Results of Hypotheses Testing

With an adequate measurement model, we utilized smartPLS3.0 to examine the structural model. The results are shown in Figure 3. The model explained 46.1 % of the variance of game part engagement, in which achievement affordance ($\beta = 0.216$, $T = 4.034$, $p < 0.001$) and immersion affordance ($\beta = 0.542$, $T = 6.909$, $p < 0.001$) significantly affected the variance of game part engagement, supporting H1 and H3. However, there was no significant effect between social affordance and game part engagement ($\beta = 0.076$, $T = 0.999$, $p > 0.05$), thus rejecting H2. Regarding the relationship between the two parts of the shopping festival game, game part engagement has a positive effect on task part engagement ($\beta = 0.700$, $T = 13.734$, $p < 0.001$), explaining 49.0% of the variance of task part engagement, suggesting that H4 was supported.

In addition, the analysis results show the impact of customer engagement on customer behavior, specifically as follows: (1) The model explained 41% of the difference in game intention, both game part engagement ($\beta = 0.328$, $T = 3.045$, $p < 0.01$) and task part engagement ($\beta = 0.367$, $T = 3.757$, $p < 0.001$) can significantly predict game intention, both H5 and H6 are confirmed. (2) Furthermore, the model explained 52.4% of the variance of purchase intention, task part engagement had a direct and significant impact on purchase intention ($\beta = 0.542$, $T = 6.909$, $p < 0.001$), while game part engagement had no significant impact on purchase intention ($\beta = 0.076$, $T = 0.999$, $p > 0.05$), H8 was supported and H7 was not supported. (3) In addition, the results show the positive impact of game intention on purchase intention ($\beta = 0.575$, $T = 8.336$, $p < 0.001$), supporting H9.

DISCUSSIONS AND IMPLICATIONS

Discussions

Guided by affordance theory and engagement theory, this study built a model by taking shopping festival games as an example, solving two main problems in gamification:

The first one is why users play games on e-commerce platforms, and what drives users to buy. The results show that game part affordance positively influences game part engagement which could increase task part engagement. Both task part engagement and game part engagement could impact purchase intention. Specifically, among the three dimensions of game part affordance investigated in this study, immersion affordance and achievement affordance will positively affect game part engagement. Compared with achievement affordance ($\beta = 0.216$), immersion affordance ($\beta = 0.542$) will stimulate greater game part engagement. Surprisingly, the relationship between social affordance and game part engagement is not significant, this result exceeded our expected assumption. One possible reason could be that people buy online to avoid the social interaction necessary to buy in physical shops (Ozen & Engizek, 2014). Another possible reason could be that a shopping festival game is a kind of promotional game, players tend to pursue a utilitarian goal of financial reward rather than satisfy a need for sociability, utilitarian value has the greatest weight of influence on game intention (Yu & Huang, 2022). Players are more engaged because of the sense of achievement and immersion in the shopping festival game, and the willingness to socialize in it is not high. The possible reasons suggested above could explain the non-significant relationship between social affordance and game part engagement.

The second one is what is the relationship between game part engagement and task part engagement, and their differences in influencing mechanisms. Data analysis shows that game part engagement (mean=3.65) is slightly higher than task part engagement (mean=3.39), suggesting that players are more willing to participate in the game part of the game, and game part engagement positively affects task part engagement, reflecting the relationship between the two parts. The significance between the variables reflects the influence mechanism between game part engagement and task part engagement on purchase intention is different. The former indirectly enhances purchase intention through the influence of game intention, while the latter can not only affect purchase intention through game intention, but also have a direct impact on purchase intention. The result that game part engagement did not have a direct effect on purchase intention was unexpected. The explanation for this result and the difference in the mechanism of the influence of game and task part engagement could be as follows. In promotional games such as shopping festival games, task part usually includes browsing products; the game part is similar to traditional games and is primarily related to fun, and its engagement is directly affected by game part affordance. Compared with the game part, the task part can have a more direct and significant impact on purchase intention because it strongly correlates with shopping. It provides an empirical foundation for the research on the specific gamification mechanism. The mechanism of the role of games is actually to help players transform from being interested in hedonic game part to task part with strong shopping relevance. The game part with high attraction to the users generates high user engagement, enhances the engagement in the task part with low engagement, and then influences the purchasing intention due to the strong shopping relevance of the task part.

Theoretical Implications

First, this study enhances the richness of the gamification research model by considering the impact of gamification on psychological and behavioral outcomes. A review paper of empirical research on gamification mobile apps found that few empirical studies incorporated both psychological and behavioral outcomes into the same model for measurement (Sheffler et al., 2020). This study simultaneously incorporates engagement and purchase intention into the model. Further, most previous studies treat game as a whole (Garcia-Jurado et al., 2019; Rohan et al., 2021; Zhou et al., 2022). Our study classifies game into game part and task part based on the different attributes of gamification. We distinguished the engagement into game part engagement and task part engagement and discussed their relationship. Our results contribute to the theoretical understanding on the impact of gamification design.

Second, previous studies discuss the impact of game engagement as a whole (Garcia-Jurado et al., 2019; Ho et al., 2023; Suh et al., 2017), the role of different parts of the game in the purchase intention is unknown. Unlike previous studies, we explore the different impacts of two parts of the game on consumers' purchase intention. We respond to the call that gamification helps to accomplish the system's target task (Liu et al., 2017) and follow the view that the technology (e.g., gamification) applied to the system and the task should be congruent and relevant (Goodhue & Thompson, 1995). By doing so, we discovered the difference and connection between the two parts of the game in terms of their mechanisms, making a step forward in the research phase of gamification influence mechanisms. It is found that task part engagement in the gamification has a direct effect on the purchase

intention, while game part engagement plays an indirect role through task part engagement and does not play a direct role, which innovatively clarifies the mechanism of the gamification and provides novel insights into the interpretation of user behaviour in games.

Practical Implications

By separating game and task part parts, our research reveals the influence mechanism of shopping festival games on purchase intention in e-commerce platforms, making the following contributions to the design and application of gamification in shopping platforms.

First of all, our findings provide empirical evidence for the effectiveness of shopping festival game part in promoting purchase intentions. According to our findings, what caught our attention was that in the game part of the shopping festival games, achievement and immersion affordances can greatly impact game part engagement, with immersion affordance having a higher degree of influence than achievement affordance, whereas social affordance does not have an active impact. Players are less willing to make friends in the shopping festival game, this result has to do with the attributes of users who adopt online shopping methods and want to avoid socialization. When designing shopping festival games, paying more attention to the design of multiple rewards and adding immersion elements in the game part is significant. Nevertheless, the social element is an important and unmissable part of the practical design. We remain convinced that social affordance can influence the final purchase from other paths of self-satisfaction than utilitarian and hedonic experiences.

Secondly, our findings help designers to understand which part of what design should be used to increase purchase intention. Based on the results of the data analysis, the game part does not directly affect the purchase intention but affects it through the task part. Therefore, for the shopping festival game on the e-commerce platform, it is necessary to pay attention to both the relationship between task part and game part and the relationship between task part and product purchase intention. Given the direct enhancement effect of task participation on purchase intention, the actual design of e-commerce shopping games should focus on the task part while not neglecting the game part that has an impact on engagement in the task part. For example, in the game part, we suggest setting up more interesting and task-relevant gameplay to increase the conversion rate of game engagement to task engagement. In the task part, we propose a personalized approach to recommending shops and products to the user, catering to consumer preferences to improve game participation and transaction conversion rates.

Limitations and Future Research

There are several limitations. Firstly, this paper selected three dimensions of achievement, social and immersion to measure the game part affordance, but there are other dimensions such as competition, self-expression. Future research can consider exploring more dimensions of game affordances. Secondly, task part engagement may vary due to task voluntariness, task value. The purchase intention may also be affected by variables such as perceived relevance. Therefore, future research can introduce moderating variables and enrich research models. Finally, this study used a survey to measure the subjective thoughts of the respondents. In this process, there may be problems caused by the subjects' inertia in filling in, following the mainstream views, and self-cognition errors, which may have an impact on the authenticity of the data to a certain extent. In the future, research can be carried out by doing experiments or analyzing objective data.

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