



Gamification artifacts and crowdsourcing participation: Examining the mediating role of intrinsic motivations



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ABSTRACT

Participation of individual workers (i.e., solvers) is critical to the viability and success of crowdsourcing platforms. Past literature indicates that gamification artifacts, by intriguing solvers' intrinsic motivations, can encourage solvers' participation in crowdsourcing. Nevertheless, little research has systemically theorized how intrinsic motivations mediate the relationship between gamification artifacts and crowdsourcing participation. Based on the motivational affordance perspective and related literature, this study theorizes gamification artifacts i.e., point rewarding and feedback giving, and identifies four intrinsic motivations (i.e., self-presentation, self-efficacy, social bonds, and playfulness) in the context of crowdsourcing. It then hypothesizes the mediating effects of the four intrinsic motivations on the relationships between the two gamification artifacts and crowdsourcing participation. It tests the model using survey data from 295 solvers in a large crowdsourcing platform. Results show that self-presentation, self-efficacy and playfulness positively mediates the impacts of two gamification artifacts on solvers' participation. Theoretical contributions and practical implications are discussed.

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1. Introduction

Tapping the crowd has been attracting growing attention from scholars and practitioners (Deng, Joshi, & Galliers, 2016; Goh, Pe-Than, & Lee, 2017; Ye & Kankanhalli, 2017). For instance, researchers could tap the crowd of wisdom by crowdsourcing the solutions of scientific problems to experts from different disciplines in research-led crowdsourcing platforms such as the Kaggle and Science Exchange (Le and Panchal 2011). Apart from that, it has been widely noted that business firms can also turn to the crowd for financial resources (i.e., crowdfunding) (Belleflamme, Lambert, & Schwienbacher, 2014), external expertise or labors (i.e., organizational task crowdsourcing) (Boons, Stam, & Barkema, 2015; Ye & Kankanhalli, 2015), as well as market feedbacks towards new products/services (i.e., crowd testing) (Ye & Kankanhalli, 2013). As

the typical and prevalent approach of the business-led crowdsourcing, organizational task crowdsourcing has been widely used in various business contexts (Deng et al. 2016). Organizational task crowdsourcing refers to the act of recruiting a large group of undefined individuals (i.e., solvers) to undertake organizational tasks through Internet-based platforms, which are typically operated by third parties (Howe, 2008). For business firms, they can use task crowdsourcing to gain crowd capital (external experts, labors, as well as specialized skills) (Prpic, Shukla, Kietzmann, & McCarthy, 2015). For individual participants (i.e., crowdsourcing solvers), task crowdsourcing is a way for them to have a freelance job, enhance their skills, make an impact, and gain respect etc. (Boons et al. 2015; Deng et al. 2016; Ye & Kankanhalli, 2017). For the third parties that operate the platforms, task crowdsourcing allows them to gain large profits from the commissions of the transactions (Ye & Kankanhalli, 2017). As a result, numerous task crowdsourcing platforms are being built to satisfy these needs, such as Amazon Mechanical Turk, TopCoder, etc.

Despite the proliferation of such crowdsourcing platforms, a large portion of these platforms suffer from low solver activity (Stewart, Lubensky, & Huerta, 2010). It has been reported that only 10% of the registered solvers participate in task solving in a large

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Chinese task crowdsourcing platform (Sun, Fang, & Kai, 2012). However, solvers' participation is key to the success and sustainability of task crowdsourcing platforms (Boons et al. 2015; Ye & Kankanhalli, 2017). To address this problem, past research suggests that appropriate designs of tasks and incentive mechanisms will enhance solvers' motivations and subsequent participation in crowdsourcing (Goh et al. 2017; Ye & Kankanhalli, 2013). Gamification can be a value adding way to foster and sustain crowdsourcing participation, given its effects on solvers' intrinsic motivations (Goh et al. 2017; Morschheuser, Hamari, & Koivisto, 2016, pp. 4375–4384).

Prior research has identified the value of gamification artifacts on user engagement in various contexts, such as online exercise systems (Hamari & Koivisto, 2015b), e-Health systems (Hamari & Koivisto, 2015a), and organizational task performance context (Landers, Bauer, & Callan, 2017; Sun, Wang, Yin, & Zhang, 2015). In the context of crowdsourcing, some literature has suggested that gamification can encourage solvers' participation through their intrinsic motivations (e.g., Goh et al. 2017; Morschheuser et al. 2016, pp. 4375–4384). However, there is a lack of **systematic and empirical** research of the relationship between gamification artifacts, intrinsic motivation and solvers' participation. Some literature (e.g., Blohm and Leimeister 2013) has not **empirically** tested the mediating effects of intrinsic motivations between gamification and solvers' participation. Other literature (e.g., Goh et al. 2017) has not **systematically theorized** how intrinsic motivations mediate the gamification artifacts and solvers' participation. Without a nuanced understanding of the complexity in such relationships, it may be challenging for crowdsourcing platforms to design effective gamification artifacts that intrigue solvers' intrinsic motivations and foster their participation. Thus, there is a need for research that systematically theorizes and empirically examines the mediating role of intrinsic motivations between gamification artifacts and crowdsourcing participation.

This paper aims to address the knowledge gap by answering the research question: *How do intrinsic motivations mediate the relationships between gamification artifacts and solvers' participation?* To develop our research model, we adopt motivational affordance perspective (Zhang, 2008) as the overarching theory. We review prior literature on gamification to identify two typical gamification artifacts (i.e., point rewarding and feedback giving), and other context related literature to theorize specific relationships between model constructs.

2. Theoretical background

2.1. Gamification artifacts and their effects on solvers' participation

Gamification, defined as the use of game design elements in non-game contexts (Deterding, Dixon, Khaled, & Nacke, 2011), originates from education research as a useful tool to enhance the effectiveness of learning by students (Domínguez et al. 2013). It is regarded as a popular development in design artifacts in the information systems discipline (Hamari, Sjöklint, & Ukkonen, 2016). Unlike incentive mechanisms such as monetary rewards or reputation systems that are used to arouse extrinsic motivations (Hamari et al. 2016), gamification artifacts refer to design elements that attempt to invoke intrinsic motivations of participants and hence affecting their behaviors (Morschheuser et al. 2016, pp. 4375–4384).

In the context of crowdsourcing platforms, gamification can be viewed as an attempt to re-navigate participants' motivations from purely rational gain-seeking to self-purposeful, intrinsically motivated activity (Goh et al. 2017). In other words, design artifacts inspired by gamification afford the intended intrinsic

motivations (Huotari & Hamari, 2012; Jung, Schneider, Valacich, & 2010). Points, leaderboards, badges/achievements, levels, progress, feedback, and storytelling are the most often mentioned gamification artifacts in crowdsourcing literature (Goh et al. 2017; Morschheuser et al. 2016, pp. 4375–4384). Among those, points and feedbacks are two critical and salient game elements for crowdsourcing platforms (Goh et al. 2017). In the crowdsourcing platform examined in the current study, points and feedbacks are salient, while leaderboards, badges, and storytelling functions are not available in this platform. Besides, user level overlaps with points while progress overlaps with feedbacks in the platform. Hence, we specifically focus on points and feedbacks in this study. Points are basic elements of multitude of games and gamified applications. They are typically rewarded for the successful accomplishment of specified activities within the gamified environment, and serve to numerically represent a player's progress (Werbach & Hunter, 2015). In the crowdsourcing platforms, points are rewarded when solvers win the tasks. Point rewarding represents a *capability-related gamification mechanism* which brings reputation and recognition to solvers (Vasilescu, Serebrenik, & Devanbu, 2014). We define *point rewarding* as a gamification mechanism through which the crowdsourcing platform can precisely reward points to solvers according to their behaviors and capabilities. Apart from points, feedbacks for solvers' submissions are provided by crowdsourcing firms regarding the ongoing progresses of the tasks or the quality of their submissions for the focal tasks (Ye & Kankanhalli, 2017). Immediate feedbacks from firms are found to enhance solvers' intention to participate (Ipeirotis & Gabrilovich, 2015). Feedback giving represents a *task-related gamification mechanism* that can encourage solvers' continuous engagement (Liu, Alexandrova, & Nakajima, 2011). We define *feedback giving* as a gamification mechanism through which the crowdsourcing platform allows crowdsourcing firms to evaluate and comment on solvers' submissions. Combining the above together, this study conceptualizes two gamification artifacts as *point rewarding* and *feedback giving*.

Past studies examined how the two typical gamification artifacts (i.e., point rewarding and feedback giving) affect solvers' participation in crowdsourcing through different intrinsic motivations (e.g., Eickhoff, Harris, Vries, & Srinivasan, 2012, pp. 871–880). For instance, Eickhoff et al. (2012, pp. 871–880) found that awarding points to participants in crowdsourcing can enhance their sense of flow and immersion, which further motivates them to produce high-quality results. With regard to the feedback giving, Jung et al. (2010) suggested that providing immediate feedbacks can enhance individuals' intrinsic motivation (i.e., enjoy helping others), and their performance. However, existing research examining the intrinsic motivations that mediate the relationships between the two typical gamification artifacts and solvers' participation are scattered and dispersed (Morschheuser et al. 2016, pp. 4375–4384). No study has systematically and theoretically examined the mediating effects of intrinsic motivations on the relationship between gamification and crowdsourcing participation. In this line of research, scholars have suggested that the motivational affordance perspective (Zhang, 2008) might be a useful theoretical lens to guide the identification and theorization of the intrinsic motivations as it bridges intrinsic motivations with system design artifacts (Deterding et al. 2011).

2.2. Motivational affordance perspective

The Motivational Affordance Perspective (MAP) has been widely adopted by psychologists to analyze the intrinsic motivations of individuals through system designs (Jung et al. 2010). The MAP primarily posits that an information system can support its

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