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The effects of input modality and story-based knowledge on users' game experience

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ABSTRACT

This study examines how input modality (finger touch vs. stylus) and story-based knowledge (eWOM only vs. eWOM + visual game-metaphor-based knowledge) affect assessments of the dynamics of gameplay experience over time: ergonomic and hedonic quality, judgment of appeal, and perceived enjoyment. In the immediate evaluation, we asked two groups with different story knowledge to complete close-ended questionnaires after playing a paid mobile game with different input modalities. After a four-week delay, eighty participants returned and completed the same close-ended and new open-ended questionnaires to measure their impressions of the game and their remembered experiences across the input methods for game interaction. The results show significant main and interaction effects only for the input modality and time in the evaluation of the complete gaming experience, but the results of the univariate analysis show significant differences across story-knowledge groups in the assessment of hedonic quality. Although it was difficult to draw a clear conclusion about which input modality was better, the stylus has good potential as an alternative game controller.

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When people have a wide variety of choices for both free and paid mobile game apps, how do they judge the quality of the apps, and which information sources do they consider? According to the 2015 Essential Facts report by the Entertainment Software Association (ESA), graphics are no longer the top factor that influences customers' buying intentions. Instead, the report shows, "Interesting story/premise" is the top factor, accounting for 22% of the overall influence, followed by "price" (15%), "word-of-mouth" (11%), and "quality of graphics" (7%). As low-cost and powerful distribution channels for third-party apps, Google Play and the Apple App Store have introduced countless mobile apps to their users and have allowed those users to publicly rate and review the apps they install, thereby empowering them to spontaneously serve as both evangelists and critics. Compared to a free version of game apps, most people find it difficult to determine whether to purchase the paid game app on the basis of only electronic word-of-mouth (eWOM) reviews (Cheung & Thadani, 2012).

eWOM communications can function as both an input to consumer decision-making (Chen, Nguyen, Klaus, & Wu, 2015) and an outcome of the purchase process (See-To & Ho, 2014). eWOM plays a key role in creating a virtuous cycle of both mechanisms in that the product or service quality affects customer satisfaction (Erkan & Evans, 2016), and customer satisfaction in turn influences eWOM (See-To & Ho, 2014). Given the highly competitive landscape of mobile game apps, it is important to understand exactly what users are saying in their reviews, and that understanding yields important insights into new business models.

Compared to eWOM, indirect information closely linked with the qualities of goods such as paid game apps could motivate potential users to acquire hands-on experience. An advertising effort for experience goods might not be easily observable, or viewers might not be aware of the indirect messages that advertising intends to convey. Despite those limitations of indirect information, people exposed to any type of indirect game-related information are more likely to engage with the game than those who are not so exposed. In contrast, eWOM offers relatively direct information about products or services. Although previous studies have investigated the effects of the different characteristics of eWOM, such as valence (positivity and negativity: Sweeney, Soutar, & Mazzarol, 2014; Tsao & Hsieh, 2012), presentation form (textual content and numerical star ratings: Mudambi & Schuff, 2010; Vasa, Hoon,

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Mouzakis, & Noguchi, 2012), type (user reviews and third-party reviews: Chen & Xie, 2008), and readability (length and number of reviews: Mudambi & Schuff, 2010; Vasa et al., 2012), little interest has been shown in the associations among eWOM, different game-related story knowledge, and other gameplay-related factors that could lead users to perceive certain quality aspects and dynamics of the gaming experience.

In terms of the complete user experience of story-based mobile games with a single ending, some players stop playing the game but leave it behind on their devices, and others completely remove it from their devices (Ahn & Shin, 2015). If the game is not updated anymore, most players eventually choose the latter option. Therefore, it is necessary to focus on changes in the overall evaluations of game quality and player experience for hedonic game apps whose use rarely continues in everyday life after completing the gameplay. However, the measurement of gaming experience dynamics for such hedonic game apps has received relatively little attention from researchers, compared with studies about consistently used utilitarian software (Diefenbach & Hassenzahl, 2011) and electronic gadgets such as mobile phones (Shin & Shin, 2011) and pointing devices (Karapanos, Martens, & Hassenzahl, 2012). To understand the impression evaluation process in game players' minds, we consider a time-based data analysis of the gaming experience and elicit experience narratives related to two different input modalities.

WOM is a form of person-to-person communication in which one person tells another a story as a structured, coherent retelling of an experience or as a fictional account of an experience (Erkan & Evans, 2016). We analyze how this characteristic of WOM as a form of storytelling manifests in participants' responses in detail in our qualitative data analysis. We are particularly concerned with the question of how the impression of a mobile game that participants played was formed and stored in their memories a month after the initial gameplay. Furthermore, we are interested in how differently participants evaluated and remembered the gaming experiences they had with different input modalities (finger touch vs. stylus).

In this study, we extend the concept of input modality to modality interactivity by providing an interactive motor dimension to the story experience while playing a game. We expect that user engagement with the interaction tools will reflect their engagement with the game content (Shin, Choi, Kim, & Lee, 2016). Thus, with this study we contribute to the literature on computer games that focuses on user experience from the viewpoint of aesthetics, game content, and underling game stories by additionally addressing the issue of input modality in relation to the players' engagement.

To keep track of both internal stories (created from their first-hand experiences) and external stories (delivered by outside sources) in their memories (See-To & Ho, 2014), we asked people to tell stories of their experience with respect to the two major concerns in a delayed evaluation. Of all possible concerns, the most important point here is that two external stories, eWOM and the narrative in the game metaphor, could be reconstructed as the participants' own internal stories as soon as they started playing the game. Therefore, the following research questions have guided our study.

RQ1: What are the effects of input modality and story-based knowledge on the assessment of gameplay experience over time?

RQ2: How do different game users evaluate and remember their gaming experience with different input modalities (finger touch vs. stylus)?

Through those questions, our eventual goal is to explore the effects of narrative game-metaphor-based knowledge in eWOM communications and the effects of the different input modalities on players' overall evaluations of their experiences: the subjective perceptions of the ergonomic quality (EQ) and hedonic quality (HQ) of a mobile game, the judgment of its appeal, and their enjoyment of it. Our secondary goal in this study is to examine the immediate (immediately after initial gameplay) and delayed (a month later) effects of two independent variables on the same overall evaluation of their experience and their final impression of the game itself, along with their remembered experiences between the input methods for game interaction. Taken together, the findings of the present study provide marketers, developers, and designers with both theoretical and practical implications for designing, promoting, evaluating, and improving mobile game apps, thereby effectively managing the complete user experience. Furthermore, this study guides readers in interpreting the quantitative findings of a controlled experiment using links with qualitative findings from open-ended responses.

1. Literature review

1.1. Electronic word-of-mouth

An extremely negative attribute can be perceived as highly informative and diagnostic when many positive attributes are presented (Vázquez-Casielles, Suárez-Álvarez, & Río-Lanza, 2013). According to the findings of Tsao and Hsieh (2012), positive WOM (PWOM) is more frequent than negative WOM (NWOM); PWOM appears roughly three times as often as NWOM. From this viewpoint, NWOM tends to be more informative and diagnostic than PWOM (Vázquez-Casielles et al., 2013), thus weighting the negative aspects of products or services more heavily than the positive aspects. The rare negative information is more likely to alert customers to facts they do not know than the relatively common positive information (Tsao & Hsieh, 2012). Negative attribute information is weighted heavily in product judgment contexts, providing direct support for the effects of rarity and extremity. However, most user-generated reviews on products or services are neither purely positive nor purely negative; arguments about the valence and extremity of eWOM have been disputed thus far. In an effort to reflect those arguments, we take both characteristics of eWOM into account, controlling for and manipulating them in our experiment.

1.2. Ergonomic/hedonic quality, judgment of appeal, and perceived enjoyment

Irrespective of the sufficiency of available product information, the entire process of experiencing a product with certain quality aspects and perceiving different consequences is repeated in everyday life (Diefenbach & Hassenzahl, 2011). Both the intended and perceived quality of a product have two different quality aspects: (1) EQ and (2) HQ. EQ describes a task-oriented quality aspect addressing the underlying human need for security and control, and HQ refers to a non-task-oriented quality aspect (i.e., originality, innovativeness, or interestingness) that addresses the human needs for novelty induced by visual/sound design or interaction techniques. Both quality aspects are independently perceived by users and appear to contribute equally to the overall judgment of a product's appeal (Diefenbach & Hassenzahl, 2011; Shin, 2015). Determining whether a software system can be regarded as appealing relies heavily on users' subjective perceptions of its EQ and HQ (Diefenbach & Hassenzahl, 2011). A cognitive appraisal, with its distinction between perception and evaluation, has behavioral (i.e., increased/decreased usage frequency and learning time) and emotional consequences (i.e., perceived fun/enjoyment and (dis)satisfaction) (Shin, 2016).

In the present study, we offer game designers and developers a

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