WHY PEOPLE STICK TO PLAY SOCIAL NETWORK SITE BASED ENTERTAINMENT APPLICATIONS: DESIGN FACTORS AND FLOW THEORY PERSPECTIVE

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Abstract

Benefiting from the popularity of Social Network Site (SNS), the Social Network Site based Entertainment Applications (SNSEAs) have been reaching a wide range of users. However, research on design factors in the SNSEAs and the outcomes of incorporating these factors into SNSEAs is still scant, especially for the phenomenon of user stickiness in this context. Studies on SNSEAs are believed to have a significant contribution to both the Social Network Site researchers and practitioners. This study is developed to investigate the design factors of SNSEAs and antecedent of user's stickiness through an empirical study. Based on flow theory, perceived playfulness of SNSEAs is identified as the direct antecedent, which is found to be affected by four design factors (i.e., Symbolic Physicality, Inherent Sociability, Multiplay Asynchronicity, and Inter-application Interactivity).

Keywords: Social Network Site based Entertainment Applications, Flow theory, Perceived Playfulness, Symbolic Physicality, Inherent Sociability, Multiplay Asynchronicity, Inter-application Interactivity

1 INTRODUCTION

As a novel Internet application in recent years, Social Network Site (SNS) such as *MySpace* and *Facebook* is increasingly shaping the way people interact with the trend of taking over other IT-enabled communication tools in a superior role. It has been estimated that the SNS passed 300 million unique visitors a month according to ComScore in April 2009, 160% increase from April of 2008. *Facebook* also has 225 million monthly active users. *MySpace* has flat lined at 123 million unique months. SNS can be viewed as natural extension of internet applications that build up relationships among users, such as email, instant messaging (Gjoka et al. 2008). In comparison to these previously well-known communication channels based on Internet, SNS not only facilitates the direct communications among users, but also allows them to post content that revolves around their profiles creating online personas that typically map to their real life personalities.

While SNS is proliferating, one of the most important issues faced by the SNS today is churn. SNS users are switching from one site to another very frequently, due to the curiosity of trying out on different new sites (Rao 2008). In order to stand out in this fierce competition to attain enhanced users' experiences and increased site's appeal, therefore, SNS embarked on rolling out their entertainment applications (EAs) in complement to basic existing functionalities such as leaving messages on one's personal profile. Such EAs have been working out successfully in practices since it has been drawing a great deal of attentions from the users. Increasing numbers of users especially students are logging on to their social network sites such as *Facebook* or *MySpace* accounts to play new forms of EAs designed to run on SNS. The social gaming industry attracted an estimated $98 billion in 2008 and the number has been increased dramatically by 2010. Therefore, EAs are playing a vital role of attracting users for SNS.

Although the phenomenon of growing EAs in SNS has been receiving much attention by users and practitioners, the relevant research on what factors matter to the design of Social Network Site based Entertainment Applications (SNSEAs) is still scant. This paper addresses this gap and aims to explore the design factors of these EAs and look at what makes users keep on sticking to the SNS via playing EAs. Therefore, the research questions are:
- What are the impacts of design factors on perceived playfulness of SNSEAs?
- What is the influence of perceived playfulness on stickiness of SNSEAs?

In addressing the two research questions, four design factors (i.e., Symbolic Physicality, Inherent Sociability, Multiplay Asynchronicity, and Inter-Application Interactivity) are first abstracted according to Rao (2008) and Järvinen (2009). On top of that, based on previous studies of intrinsic motivations in behavior intention and technology usage (Chen et al. 2002; Lin et al. 2005; Moon et al. 2001), perceived playfulness is proposed to be the significant antecedent of user's stickiness to play SNSEAs from the perspective of flow theory. Through an empirical study, the results show that the identified four designed factors have significantly positive relationships with user's perceived playfulness, and then further lead to increase user' stickiness to the SNSEAs.

The paper is organized as follows. After the introduction, section two provides the theoretical background and hypotheses development. Section three describes the research methodology for conducting the empirical study. Since our data collection is still in progress at the time of writing this paper, data analysis and discussion sections will not be included. The next section presents the theoretical and practical implications of this study based on our best knowledge, followed by the conclusion that summarizes the limitations of our paper and future work.

2 THEORETICAL FRAMEWORK AND HYPOTHESES DEVELOPMENT

Csikszentmihalyi (1988) introduced the original concept of flow. He defined it as ''the holistic experience that people feel when they act with total involvement''. When in the flow state, people become absorbed in their activity: their awareness is narrowed to the activity itself; they lose

self-consciousness; and they feel in control of their environment. Such an experience is often recognized by people when engaging in activities such as chess playing, rock climbing, dancing, music composing, and even web surfing (Phang et al. 2009). Flow theory has been implied to explain various phenomenon in IS research areas, like online customer behavior (Koufaris 2002), communication (Trevino et al. 1992), online game (Choi et al. 2004; Hsu et al. 2004), and human-computer interaction (Finneran et al. 2003; Finneran et al. 2005).

A number of researchers studied several intrinsic motivations in IT/IS adoption, one of such intrinsic motivator is known as flow. Playfulness has been substantially investigated in relation to user's intrinsic motivations and deeply rooted in flow theory (Webster et al. 1992; Webster et al. 1993). Lin et al (2005) identified that perceived playfulness contributed to the continued use of web portals, while Wang et al (2009) claimed that perceived playfulness performed as a mediating role of acceptance of hedonic information systems.

Playfulness is characterized as a flow experience by some common elements (Pace 2004), which is interpreted as: a balance between the challenges of an activity and the skills required to meet those challenges; clear goals and feedback; a concentration on the task at hand; a sense of control; a merging of action and awareness; a loss of self-consciousness; a distorted sense of time; an auto-telic experience (Hong et al. 2009; M.Csikszentmihalyi 1975). Flow experience or optimal experience is believed to influence user's behavioral intention in online game communities (Choi et al. 2004; Hsu et al. 2004). Furthermore, Rao's study (2008) revealed that the applications in *Facebook* were considered as "games" by their developers. Furthermore, in online communities of leisure and pleasure, intrinsic factors (eg., perceived playfulness, enjoyment), other than extrinsic factors (perceived usefulness), are the salient motivational factors in behavior intention (Koo 2009). Therefore, flow theory provides an appropriate lens to look at playfulness of SNSEA, and this study focus on intrinsic motive of playfulness of SNSEA.

Playfulness in virtual "third places" has been identified to be determined by three main qualities of the applications: Physicality, Spontaneity, and Sociability (Rao 2008); while Järvinen (2009) figured out five design drivers of application playfulness (i.e., Physicality, Spontaneity, Sociability, Narrativity, and Asynchronicity). At the same time, SNSEAs are used as both individual entertainment and socialization tool. For applications development in SNS, therefore, it is necessary to include practices of game design and practices of interaction design. Based on previous research, especially Rao (2008) and Järvinen (2009), four design factors (i.e., Symbolic Physicality, Inherent Sociability, Multiplay Asynchronicity, and Inter-Application Interactivity) are adopted to impact on the users' perceived playfulness of SNSEAs.

Given the objective of this paper that it is to examine the antecedents of bringing perceived playfulness to SNSEA users based on flow theory, our proposed four independent variables, which are well-testified in vast majority of research relating to game design, were abstracted in a purpose of measuring SNSEA players' feeling, especially perceived playfulness (Stenros et al. 2009; Saarenpaa et al. 2009; Rao 2008; Rouse 2001).

Figure 1 shows the research model for this study, which asserts that the stickiness of SNSEAs play is affected by the user's perceived playfulness of SNSEAs, where the degrees of these four design factors in the SNSEAs appear to be the direct antecedents of perceived playfulness.
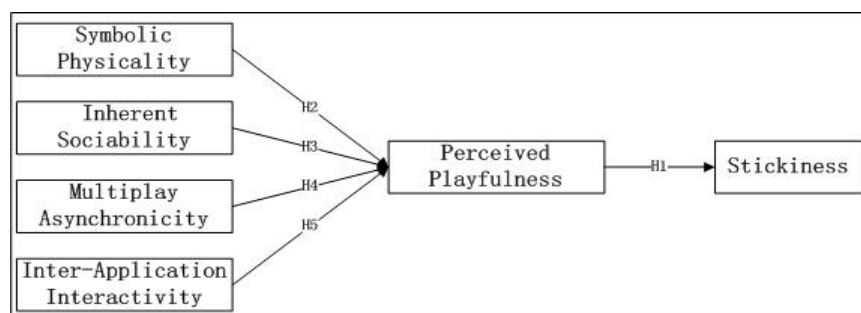

Figure 1: Research Model

2.1 Stickiness

Weibull (1985) argues that media habits are regarded as a sort of media behavior that demonstrates the people's preference to the media choice or content. The meaning of such media habits is in line with users' stickiness to SNSEAs. In several major studies, stickiness is treated as loyalty in the context of online game researches (Chang et al. 2008; Wu et al. 2008), where loyalty is defined as "the degree of willingness to re-play or re-participate". Adapted from concept of stickiness from online game playing (Wu et al. 2008), "stickiness" in our research is defined as "the degree of players' willingness to return to and prolong their duration of each stay in SNSEAs".

2.2 Perceived Playfulness

The amount of efforts people put in the use of computers is affected by both intrinsic and extrinsic motivations from a motivational perspective (Davis et al. 1992). "Intrinsic behavior" is defined as the performance of behavior as a result of pleasure and liking to perform it, regardless of any form of reward upon performance, while "Extrinsic motivation", on the other hand, refers to the performance of a behavior in order to obtain certain rewards or achieve certain goals attached to the performance of the behavior (Chang et al. 2008).

In communities of entertainment technology, the significance of perceived usefulness will decrease in comparison to in problem-solving technology communities (Hsu & Lu 2004). However, extrinsic motivation is affected by perceived usefulness. Hackbath et al. (2003) found that significant impact from system experience on ease of use is no longer significant in the presence of playfulness. As in online games for leisure and pleasure, intrinsic factors, other than extrinsic factors, are the salient motivating factors in behavior intention (Koo 2009).

In the study of *Facebook*, Rao (2008) depicted that the playful actions expressed by SNSEAs such as Facebook Applications could be viewed as representations of characteristics of online playfulness. Therefore, it is believed that perceived playfulness exhibits an important role in the usage or continuance use of SNSEAs. By adapting from Moon and Kim (2001) and Lin et al. (2005), "Perceived playfulness" is defined as "the extent to which the player perceives that his or her attention is focused on the interaction with the specific entertainment application, and is curious during the interaction, and finds the interaction intrinsically enjoyable or interesting". Therefore, the following hypothesis is proposed:

- H1: Perceived Playfulness of SNSEAs is positively related to player's stickiness of SNSEAs.

2.3 Symbolic Physicality

The virtual worlds that users routinely plug in and inhabit today are persistent social and material worlds (Steinkuehler et al. 2006). Steinkuehler and Williams (2006) presents that virtual environments have the potential to function as new third places similar to pubs, coffee shops, and other hangouts by providing the spaces for social interaction and relationships beyond the workplace and home. However, in the context of online game research, Choi and Kim (2004) claimed that social interaction has a positive impact on optimal experience, leading to customer's loyalty of game playing. Meanwhile, the combination of game reality and physical reality presents a novel design for pervasive games (Lankoski et al. 2004).

Real-life activities such as drinking beer, poking, hugging etc, are added into SNS in order to embed physical depth to playful interactions and make the user have a sense of "human warmth" of actual physicality to the non-physical online spaces (Järvinen 2009), In this study, the design factor of SNSEAs, "Symbolic Physicality", is defined as "the extent to which the entertainment applications include real world elements, and afford to reproduce the physical actions or activities". Therefore, we hypothesize that:

- H2: The degree of Symbolic Physicality of SNSEAs is positively related to player's Perceived Playfulness.

2.4   Inherent Sociability

It is important to consider the implicit forms of sociability in single player games on SNS (Stenros et al. 2009). Playfulness is intrinsically connected to social situations (Rao 2008). It is believed that playfulness arising from social situations creates the best conditions for the individuals to communicate in a group, allowing people to "express personal meanings in social structures"(Parker-Ree 1999). SNSEAs provide a framework for alliances, gameplay and motivation, relying on social context, where the individuals know each other (Järvinen 2009). As one of the two functionalities of SNSEAs, the need of socialization in game play is benefiting from the inherent sociability of SNS. To study customer's loyalty of online game players, social interaction is identified be an important antecedent (Choi & Kim 2004; Wu et al, 2009).

In this study, "Inherent Sociability" is defined as "the extent to which the entertainment application facilitates interactions and communications among users, and improves the social context for users". Then, the following hypothesis is developed:
- H3: The degree of Inherent Sociability of SNSEAs is positively related to player's Perceived Playfulness.

2.5   Multiplay Asynchronicity

Saarenpaa et al. (2009) depicts that asynchronous gameplay serviced as a design solution to blend gaming into other daily activities and presents that asynchronous pervasive gameplay could fit well into people's everyday lives. Moreover, Bogost (2004) lists four features of asynchronous multiplay: support multiple players playing in sequence, not in tandem; require some kind of persistent state which all players affect, and in turn affects all players; breaks between players are the organizing principle; and finally, asynchronous play need not be the defining characteristics of a game.

In complementing with the above propositions, Rao (2008) claimed that breaks in the applications provide experiences for users to accommodate real life necessities and game expectations. Deriving from Bogost (2004), this study define "Multiplay Asynchronicity" as "the extent to which the SNSEAs offer a way to connect users in multiplayers spaces without co-presence, and afford them great flexibility in the participation in their daily lives". It is believed that asynchronous multiplay of the game play contributes positively to the perceived ease of use. Research has shown that functionalities that are easy to use will increase user's intrinsic motivations of internet usage (Bruner et al. 2005). Therefore, the following hypothesis is presented:
- H4: The degree of Multiplay Asynchronicity of SNSEAs is positively related to player's Perceived Playfulness.

2.6   Inter-Application Interactivity

For a single Social Network Site (SNS), all the associated entertainment applications (EAs) are sharing the same platform, which is attributed as its unprecedented success (Gjoka, 2008). In the study of game learning, Smith and Mann (2002) presented a model for gameness design, including interactivity as one of the four components. In the literature of gaming, interactivity is described in terms of gameplay. Rouse (2001) defined gameplay as "the degree and nature of the interactivity that the game includes, i.e., how the player is able to interact with the game-world, and how that game-world reacts to the choices the player makes". Game interactivity allows the user to exert some control over the outcomes of the game and possess resource sharing skills (Smith et al. 2002). Interactivity offers the game users sense of control over the game. Online game control is studied as an important factor of online gaming enjoyment (Wu et al. 2008). Considering the definitions of both enjoyment and playfulness of game, it is believed that the relationship between game interactivity and playfulness exists.

In SNSEAs, the shared platform allows users in SNS to control the outcomes of application outcomes, such as sharing virtual currency among different applications, gifting others etc. Based on Smith and Mann (2002), in this research, we abstract this design factors as "Inter-Application Interactivity",

which is defined as "the extent to which the SNSEAs provide users with the freedom to share resources, control the outcomes among different applications". The following hypothesis is proposed:

- H5: The degree of Inter-Application Interactivity of SNSEAs is positively related to player's Perceived Playfulness.

3 METHODOLOGY

3.1 Measurement

Survey research methodology has been adopted for this research. Respondents will be asked to report their agreements with a given statement on a seven-point Likert scale ranging from "strongly disagree" to "strongly agree" with the midpoint anchored as "neither agree nor disagree". As shown in Figure 1, six constructs are included in the research model. The definitions and operationalizations of these constructs were self-developed or based on relevant literature with revisions to fit this research. Two ways were used to assess the validity of items. First, the items were examined by three experts who are familiar with the topic for face validity; second, sorting procedures were performed with four judges to assess their conceptual validity (Moore et al. 1991). The items are described in the following table 1.

3.2 Research and Questionnaire Design

This research is still in progress. As described earlier, the objective of this study is to investigate the influences of design factors on perceived playfulness of SNSEAs and the impact of perceived playfulness on user's stickiness in SNSEAs. The questionnaire of this survey will be distributed online to SNS users via intra-site emails or posts in two famous Chinese social network sites, *renren.com* and *kaixin.com* in April 2010. In order to motivate the subjects, each will be rewarded with virtual currency worthing 2 dollars and an opportunity of winning a 20-dollar-bonus. No particular SNSEAs will be focused on. Beside, a pilot test will be carried out to check the efficiency of the questionnaire and determine if there is a must to revise before the official distribution. Since this study will be conducted in *renren.com* and *kaixin.com*, whose users are mostly Chinese, the questionnaire will be translated into Chinese first and a backward translation method will be made to ensure the consistency between the Chinese and English versions of the questionnaire.

3.3 Analysis Strategy

Partial Last Squares (PLS) for the investigation of measurement and structural models will be conducted by using Smart PLS 2.0 (Ringle et al. 2005) after the data collection phase is completed. According to Anderson and Gerbing (1988), measurement modeling should be carried out as the first step of structural equation modeling. After the data collection, test of measurement model of this research will be carried out first. The strength of the measurement model can be demonstrated by convergent and discriminant validity tests for the reflective constructs (Hair et al. 1998), i.e., items of the same construct being similar and dissimilar from items of other constructs. In order to test whether the four design factors are fully or partially mediated by perceived playfulness, four steps of measurement proposed by Baron and Kenny (1986) will be applied in our analysis stage to fulfill this need. If the coefficients of independents are 0 after incorporate perceived playfulness into our analysis, it exhibits complete mediation. If not, it shows partial mediation.

After the validation of the measure model, structural model analysis will follow. All the proposed hypotheses will be tested using PLS. The testing results will identify the significance of these hypotheses. After all, post-hoc analysis will be perform to check for the presence of common method variance, which is a potential threat to research using surveys that collect responses in a single setting. Harman's (1967) one-factor test will be conducted. According to this test, the potential for common method variance is high if a single factor can account for a majority of covariance (more than 50 percents) in the independent and dependent variables (Harman, 1967; Mattila & Enz 2002).

Construct	Item	Description	Source
Symbolic Physicality	SP1 SP2 SP3 SP4	SNSEAs provide experiences of real-life activities Themes of SNSEAs come from daily lives Conventions of SNSEAs are the same as everyday life Playing SNSEAs requires much game experience (reversed)	Self-developed
Inherent Sociability	IS1 IS2 IS3 IS4	SNSEAs support interaction with friends Player's personal private information can be found in the SNSEAs I feel stay connected with others when playing SNSEAs Playing SNSEAs makes me feel friendly to others	Self-developed
Multiplay Asynchronicity	MA1 MA2 MA3 MA4	SNSEAs allow me to play the game alone It is available to play SNSEAs whenever I have access to Internet I do not have to coordinate with other players in playing SNSEAs SNSEAs allow me to play wherever I have access to Internet	Self-developed
Inter-Application Interactivity	II1 II2 II3 II4	Outcomes of SNSEAs A affects the performance of SNSEAs B There are many methods to exchange outcomes among SNSEAs SNSEAs allow me to gift personal owns to other users There is little interaction among different SNSEAs (reversed)	Self-developed
Perceived Playfulness	PP1 PP2 PP3 PP4 PP5	I am not aware of the time, when playing the SNSESs I am not aware of distracting noise, when playing the SNSEAs I often forget other commitments, when playing the SNSEAs I often feel interested, when playing the SNSEAs I do not feel enjoyable, when playing the SNSEAs (reversed)	Adapted from Lin et al. (2005)
Stickiness	CI1 CI2 CI3 CI4	I would play the SNSEAs every time I visit the SNS I would stay longer in the SNS for playing SNSEAs I would visit the SNS as often as I can for playing SNSEAS I would like to discontinue play the SNSEAs (reversed)	Adapted from Chang et al. (2008), Wu et al. (2008)

Table 1: Items of Construct

4 IMPLICATIONS

4.1 Theoretical Implications

For academic researchers, this study contributes to a theoretical understanding of the factors that attract SNS users to get involved in the SNSEAs. These factors analyzed in this paper differ from previous analysis since most of the previous research focused on Massively Multiplay Online Role-Playing Games (MMORPGs) and Personal Computer (PC) games (Wu et al. 2009; Hsu & Lu 2004). Most of these stickiness factors for such games are concerned with perceived usefulness and perceived ease of use as well as social norms, which put emphasis on the users' perspective. However, our study began from the game design perspectives and focused on the nature of the entertainment applications on the SNS. More importantly, to best of our knowledge, such design factors are first time proposed for looking at the SNSEAs.

4.2 Practical Implications

For SNSEAs designers, the paper suggests that developers should endeavor to fully utilize the advantage of nature of social network site platform (i.e. inherent sociability) that MMORPGs and PC game does not possess. In other words, users at SNS who previously know each other are different from those players at MMORPGs and PC games. Therefore, the themes and functionality of the EAs should be based on the well-established social network built up by SNS within the users. Given the fact that SNS users keep on visiting these sites in an attempt to have more social contacts with his/her friends and to build up their social identity within the SNS community, developers are suggested to focus on increasing the users' social interaction experiences through playing these applications and enriching their stay by providing more symbolic functions such as giving a hug etc. Another

fundamental difference of SNSEAs is its play mode. No requirements of co-presence of multiplayers online should be focused on.

5   CONCLUSION AND LIMITATION

In this paper, we proposed a framework for analyzing the factors luring users to SNS via playing EAs in which users are able to closely feel physical elements (e.g. sound of laughter)and real life business experiences (e.g. dealing in restaurants), which are totally different from traditional PC games and MMORPGs. In differing from other game designs, SNSEAs focus on "sequential play mode" rather than "simultaneous play model", which allows users to play independently from others. Moreover, Inter-Application Interactivity provides rich communications between different EAs within the SNS, such as virtual currency transferring among various applications etc. Based on these four proposed factors, user perceived playfulness is significantly lifted up into a whole new level. In turn, users are lured onto the SNS by the motivation of playing EAs.

In accordance with flow theory, the research outcome shows that users intend to play SNSEAs continuously where they are totally and completely lured. Increasing perceived playfulness through the richness of physical elements, social interaction opportunities, inter-application communications and sequential play mode is the key successful management of SNSEAs. While most past researches only focused on the role of flow experience on MMORPGs and other traditional PC games, our research delved into a new research area by utilizing flow theory as a lens to help researchers and practitioners understand its usefulness in the context of SNSEAs.

However, our study is not without limitations. First, the majority of the targeted users in the sample pool are Chinese whereas our initial questionnaire was conducted in English. Although a backward translation was performed but there are still result bias that cannot be neglected. Second, it is difficult to generalize the findings to other entertainment technologies since this study only focuses on the context of SNSEAs to examine the idiosyncratic antecedents of perceived playfulness. To the future research, we suggest that researchers should delve into how the perceived playfulness was affected by internal factors such as users' belief, personalities and culture factors in order to have a comprehensive understanding of such burgeoning and leading entertainment applications in this technology-based era.

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