Full length article

Flow in context: Development and validation of the flow experience instrument for social networking

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ABSTRACT

Flow theory is a popular theoretical framework for understanding the underpinnings of the prolonged use of information systems. While there has been an increasing interest in examining flow experience during nearly four decades, the concept of flow still suffers from various limitations concerning its use as a measurable construct in empirical research. To address these limitations, the present study developed a 26-item instrument for examining flow experience in the domain of social networking services. A cross-sectional survey was administered to 804 Facebook users. The development and validation process consisted of exploratory and confirmatory factor analyses, second-order factor analysis, and examination of instrument validity and reliability. The developed instrument represents six components of flow experience: skill, machine interaction, social interaction, playfulness, concentration and enjoyment. The developed instrument possesses good model fit and high validity and reliability. This paper discusses the uses and limitations of the instrument in the examination of users' experiences of social networking services, and suggests avenues for future research on the topic with a special focus on research on user-centric innovations in online service.

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1. Introduction

People sometimes report performing certain activities just for the sake of intrinsic enjoyment. Prior literature has termed such a state as being in flow. The flow experience is defined as "*the state in which people are so involved in an activity that nothing else seems to matter; the experience itself is so enjoyable that people will do it even at great cost, for the sheer sake of doing it*" (Csikszentmihalyi, 1990:4). The outcome of flow experience provides such intrinsic enjoyment that people are ready to perform the same actions repeatedly. This is a familiar psychological state for individuals performing sports activities (Marsh & Jackson, 1999) and playing games (Kiili, 2006; Magyaródi, Nagy, Soltész, Mózes, & Oláh, 2013). According to the flow theory, a flow experience possesses a variety of dimensions including balance of skills and challenges, clear goals, instant feedback, focused attention, perceived control, combination of action and awareness, time distortion, loss of self-

consciousness, and autotelic experience (Csikszentmihalyi, 1990).

In the past two decades, conceptualization around flow experience has undergone extensive research. Different types of research methodologies have been practiced around flow experience including experimental, qualitative, and quantitative and experience sampling (Delle Fave, Massimini, & Bassi, 2011; Guo & Poole, 2009). In addition, researchers have investigated the role of flow experience in diversified fields of operation. This includes computer-mediated communications (Webster, Trevino, & Ryan, 1993), human–computer interaction (Hoffman & Novak, 1996; Novak, Hoffman, & Yung, 2000; Schaik & Ling, 2003, 2007), mobile instant messaging (Zhou & Lu, 2011), online shopping (Guo & Poole, 2009; Koufaris, 2002); online banking (Lee, Kang, & McKnight, 2007), online games (Chou & Ting, 2003; Hsu & Lu, 2004; Lee & Tsai, 2010), social networking services (SNS) (Chang & Zhu, 2012; Qi & Fu, 2011; Wu & Wang, 2011; Zhou, Li, & Liu, 2010), sports activities (Jackson, Kimiecik, Ford, & Marsh, 1998; Jackson & Marsh, 1996; Jackson, Martin, & Eklund, 2008) and web navigation (Schaik & Ling, 2003). Furthermore, prior flow experience literature has recommended flow theory as an appropriate theoretical framework for understanding user behaviors in

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online environments (Chang & Zhu, 2012; Huang, 2003; Novak et al., 2000).

Although flow theory has been well researched and utilized during the last four decades, it has several limitations. Ambiguity still prevails in both the conceptualization and operationalization of the flow concept. In particular, we have located three main limitations based on our review that hamper the use of the construct in examining user behavior in the context of contemporary social networking services, described as follows.

First, the existing literature provides empirical research with incomplete conceptualizations of flow (Finneran & Zhang, 2002; Guo & Poole, 2009). Csikszentmihalyi (1990) gave three preconditions for entering into flow experience, namely balance of skill and challenge, clear goals, and instant feedback. It should be noted that dimensions refer to components of flow experience. In comparison, preconditions refer to the prerequisites or requirements for entering into flow. Earlier studies are either missing one or more of the preconditions as suggested by the original flow model proposed by Csikszentmihalyi (1990). Similarly, most of the prior work has missed one or more of the dimensions of the flow experience (Guo & Poole, 2009), with only a few empirical studies having considered all dimensions of flow experience according to the original model (e.g., Chan & Ahern, 1999; Chan & Repman, 1999; Chen, 2006; Chen & Nilan, 1999).

Second, confusion persists regarding the dimensionality of the flow experience. For example, some studies portray flow as unidimensional (Hoffman & Novak, 1996; Novak et al., 2000), while others consider it a multi-dimensional concept (Ghani, Supnick, & Rooney, 1991; Hsu & Lu, 2004; Huang, 2003; Lu, Zhou, & Wang, 2009).

Third, the psychometric properties of the flow construct are unknown. Most of the studies have reported only the Cronbach's alpha as a measure of internal reliability (e.g. Guo & Poole, 2009; Magyaródi et al., 2013; Wesbster, 1989), while convergent and discriminant validity and other forms of instrument reliability are rarely examined.

These limitations have negative implications for the flow experience research. Due to the conceptual level confusion in flow theory, researchers tend to select the most often used flow measures (Kwak, Choi, & Lee, 2014). By following the mainstream, it is likely that researchers choose flow measures that represent incomplete dimensions as flow experience, adding bias to the research. Incompleteness of the measures used to estimate flow experience might confuse further development of the phenomenon itself. To address these limitations, the present study proposes a comprehensive instrument for measuring a multi-dimensional viewpoint of flow experience in SNS. We drew on the existing literature to develop a psychometrically valid instrument to investigate flow experience in the SNS context. In addition, we validated the instrument through an empirical study of 804 adolescent Facebook users. We also performed a number of statistical analyses to ensure the validity and reliability of the established instrument, and discuss its implications for future research and practice.

2. Background for research

2.1. Flow experience instrument

Despite the overwhelming use and popularity of the flow theory, only a few attempts have been made to develop an instrument for examining flow experience in the context of information systems use. Among the few to address this issue are Csikszentmihalyi and Csikszentmihalyi (1988), who developed the "flow questionnaire", the first instrument for measuring user flow experience of

diverse voluntary activities such as rock climbing and dancing. It consists of open and closed ended questions. Also, Wesbster (1989) developed an 11-item Intensity of Flow Scale (IFS) based on Csikszentmihalyi's (1975) checklist for measuring flow by users' understanding of the phenomenon of playfulness in computer usage. This was followed by active empirical research aimed at developing a flow instrument for the domain of sports and physical activity (Jackson & Eklund, 2002; Jackson et al., 1998; Jackson & Marsh, 1996; Jackson et al., 2008; Jackson & Roberts, 1992). Recently, Magyaródi et al. (2013) developed a 20-item instrument based on the existing instruments: the Flow State Questionnaire of the Positive Psychology Lab (PPL-FSQ).

Apart from developing new instruments, numerous attempts have been made to validate and adapt the existing instruments. The flow questionnaire by Csikszentmihalyi and Csikszentmihalyi (1988) has been extended and validated in different languages including English, Italian, Portuguese, French and Spanish (Delle Fave et al., 2011). Davis and Wiedenbeck (2001) modified the IFS into a 9-item instrument for understanding users' flow experience in the context of web navigation; this version had high internal consistency compared with the original IFS. Schaik and Ling (2003, 2007) used it to examine users' flow experience of various forms of human interaction in the contexts of online shopping and websites. Schaik and Ling (2012a, 2012b) investigated web navigation fields using the original instrument developed by Jackson and Marsh (1996) in physical activity and its adapted version in the domain of information systems by Guo and Poole (2009). Kiili (2006) also adapted the Jackson and Marsh (1966) instrument for the educational gaming domain by reducing the 36-item instrument to 23 items. Guo and Poole (2009) made a similar attempt by developing a 30-item instrument based on the instruments of Jackson and Marsh (1996) and Agarwal and Karahanna (2000).

The aforementioned flow experience instruments suffer from various limitations. First, most of these instruments are now decades old (Davis & Wiedenbeck, 2001; Jackson & Marsh, 1996; Wesbster, 1989). User preferences change with the ever-changing technology, which creates the need to update the existing instruments in the context of the emerging technologies. Second, most of the developed instruments have unknown psychometric properties, as the studies only reported the Cronbach's alpha values (see Table 1). Third, most of the existing instrument development and validation was based on small samples consisting of university students. Fourth, to the best of our knowledge, there is no specific instrument for measuring users' flow experience of SNS.

To address these gaps in the development and validation of flow experience instruments, the present study developed and validated a 26-item flow experience instrument for SNS using a large sample of Facebook users. Kaur, Dhir, Chen, and Rajala (2016) utilized the same instrument to investigate the online regret experience while in flow during SNS usage. Additionally, this developed instrument will also bring clarity to the overall flow experience concept. For example, as mentioned previously, so far studies have mirrored the existing research by considering the components most often used for examining flow experience. Such research practices hinder unbiased development of the flow experience concept. In comparison, the current research investigated the relevance of a large number of constructs for the purpose of measuring users' flow experience while using SNS.

2.2. Flow experience and SNS

The widespread popularity of SNS has motivated researchers to investigate flow experience in a variety of social software settings. Hoffman and Novak (2009) suggested that SNS are potential platforms for investigating flow experience considering the large