Modelling students' flow experiences in an online learning environment

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ABSTRACT

This paper aims to clarify and characterize the role of flow in student's behavioural processes in virtual learning environments. To this end, an integral model of flow in e-learning environments is proposed and tested. The empirical part of the research was based on both qualitative and quantitative techniques. The former consisted of seven in-depth interviews carried out with experts in e-learning environments and two different groups. The latter consisted of an online survey resulting in a sample of 2574 valid questionnaires. The theoretical model was tested and validated using the standard methodological procedure based on exploratory and confirmatory analyses. The results indicate that time distortions and focused attention are the most important direct antecedents of flow. The challenges posed by the environment were revealed as the main indirect conditioner of the experience, but other factors, such as personalization (a new variable not considered in previous flow studies in the e-learning context), were also found to be significant. In short, this papers sheds light on the processes of online browsing and, thus, on a more suitable design for an e-learning environment. Furthermore, two direct positive consequences of the flow experience are proved: positive affect (such as feeling happy, satisfied and cheerful) and student learning. In sum, it can be concluded that institutions are better off providing students with e-learning environments conducive to getting them into a flow state.

Introduction

In an attempt to understand online behaviour, researchers have often resorted to approximations that are commonly used in the analysis of behaviour in conventional media, but they have also considered new aspects that are largely applicable to virtual environments. Of particular relevance is the concept of flow for its contribution towards explaining online experiences (Novak, Hoffman, & Yung, 2000). Csikszentmihalyi (1975, p.36) introduced the flow concept, which he defined as "the holistic experience that people feel when they act with total involvement". When in the flow state, people are absorbed in an activity, the focus of their awareness is narrowed, they become less self-conscious, and they feel in control of their environment. Studies have reported flow experiences in numerous activities, including rock climbing, dancing, chess, reading, etc. (Csikszentmihalyi, 1990). The literature on online flow (for an in-depth analysis of the flow concept in online environments, see Esteban-Millat, Martínez-López, Luna, & Rodríguez-Ardura, 2013) suggests that facilitating optimal online navigation, which is characteristic of a state of flow, can, for example, lengthen users' online sessions (Hsu, Chang, & Chen, 2012; Koufaris, 2002) and increase learning performance and positive affect (Chen, Wigand, & Nilan, 2000; Kiili, 2005; Pearce, 2005).

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Most research into flow during internet use has employed the flow concept to generally address online navigation phenomena; however, this has not been an obstacle for several authors to recommend its study in specific areas or environments. This would help to clarify ambiguities in the literature regarding the conceptualization and operationalization of the concept of flow.

Virtual learning environments are an area of special interest, selected as a result of their growing importance in the provision of services developed by higher education institutions. During navigation through an online learning environment, students may experience feelings of flow (e.g. Choi, Kim, & Kim, 2007; Joo, Lim, & Kim, 2012; Pearce, 2005; Shin, 2006). This is considered desirable (Pearce, 2005) insofar as it constitutes an optimal experience during which students realize that the challenges faced are in balance with their skills (Csikszentmihalyi, 1990). Perceived challenges are linked to the opportunities for action with which a user is presented in the medium, while perceived skills are related to the user's ability to overcome such challenges (Hoffman & Novak, 1996). While in flow, students also engage and focus on the activity being performed and enjoy the action in and of itself, losing awareness of any other environmental stimulus that is not related to what they are doing (Csikszentmihalyi, 1990). However, few researchers have analysed the concept of flow in this particular context; a selection of the most relevant studies of flow in online learning environments, based on an extensive review of the literature on the subject, is presented in Appendix A.

This research aims to advance in the knowledge of online student experiences through the study of flow states. The paper is structured as follows. First, we offer an overview of the study of flow in virtual learning environments. We then propose a comprehensive model of flow in e-learning environments. The set of relations put forward in the proposed model are empirically tested. An exploratory factor analysis (EFA) is applied to assess the constructs considered in the flow model. The results of this analysis are validated again with a confirmatory factor analysis (CFA) using structural equations methodology (SEM). Then, to test the full structural model (i.e. hypotheses testing), we also used SEM. Finally, the most important theoretical conclusions and practical implications are discussed.

Theoretical model and research hypotheses

Introduction to the conceptual model

Despite the efforts made in recent years to study the flow state in an online learning environment (e.g. Choi et al., 2007; Liu, Liao, & Pratt, 2009; Ryoo, Jung, Yoo, & Hwang, 2008), most of the findings are inconclusive and there is a lack of specific research based on various aspects of a student's conduct.

We model the flow phenomenon in a higher education learning environment by identifying the factors that determine its appearance and the main consequences thereof, and characterize the navigation process within this context.

The theoretical structure presented includes the variables, identified from the literature review, that are likely to be related to flow in these environments. In this regard, it should be noted that we have taken the view of flow as a unidimensional concept (Kiili, 2005; Novak et al., 2000), which advocates that any flow-related element is an antecedent or consequence of the flow state itself. This model also includes a new variable as a determinant of flow, the personalization of learning, which has not been hitherto considered in any other research into online flow. Furthermore, new relationships are included between the variables related to flow.

The full model-based representation is composed of a total of 12 variables/constructs. Their graphical representation is shown in Fig. 1.

Theoretical analysis of the relationship among variables

Direct antecedents of flow

Time distortion has been incorporated into many of the different approaches to the study of flow (e.g. Chen et al., 2000; Delle Fave & Massimini, 1988; Srivastava, Shukla, & Sharma, 2010) because it was considered a key factor in explaining this state regardless of the medium in which it occurs. This concept, which has been largely analysed from the viewpoint of cognitive psychology, refers to the phenomenon of individuals losing their sense of time, which they perceive as passing at an unnatural rate. When an individual is deeply involved in an activity, as is the case when they are in a flow state, time no longer matters to them.
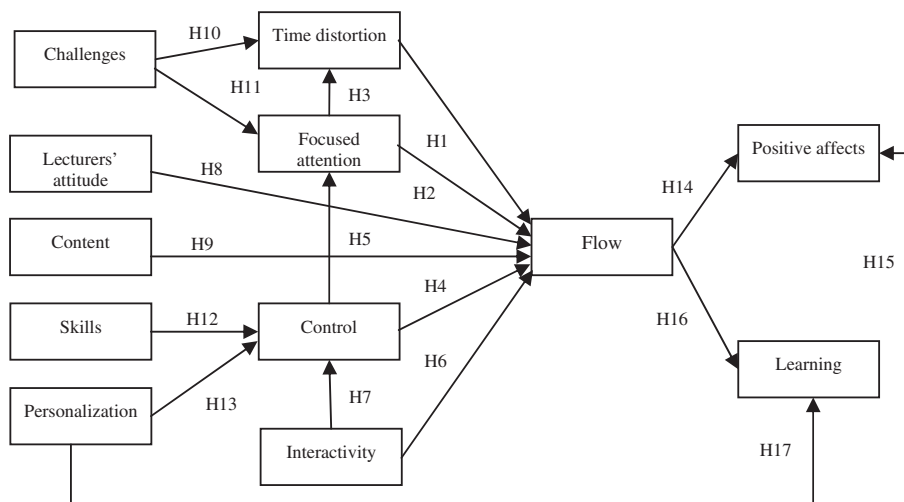

Fig. 1. Conceptual model.