Models for understanding student engagement in digital learning environments

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Digital learning environments are increasingly prevalent in higher education. The flexible and less constrained nature of these environments, means students often need to be more autonomous in managing their own learning. This implies that students are sufficiently self-motivated to successfully engage in autonomous learning. The concept of "student engagement" has shown promise in assisting researchers' and educators' understanding of how students' general involvement in study, and their more specific completion of learning tasks, can lead to beneficial outcomes in digital learning environments. However, student engagement has taken on multiple, diffuse definitions in higher education creating confusion about what engagement is and how best to promote it. In this paper we build on a model of engagement from organisational psychology that offers insight into task-level engagement. Established models in the area of student motivation are integrated to bring clarity to the construct at task-level in digital learning environments.

Keywords: Student engagement, flow, learning technology, digital learning environments.

Introduction

Autonomous learning is increasingly important in digital learning environments in higher education, as these environments often have reduced academic support either in person or via digital presence (Rai & Chunrao, 2016).

One implication of this trend is that students' self-motivation and independence in learning may need to be greater than in traditional learning contexts due to a reduction in contact time with teaching staff and peers. Research in areas such as achievement motivation, while traditionally applied to more conventional face-to-face learning environments, has more recently been applied in digital environments (e.g. de Barba, Kennedy, & Ainley, 2016). A core construct in this research deals with "student engagement". This research shows that models of student engagement have demonstrated some utility in understanding student motivation in learning (Shernoff, 2012), but the literature lacks cohesion, particularly in terms of the granularity of the engagement construct and the context in which it is applied (Kahu, 2011).

Conceptions of student engagement

The concept of student engagement has had a long history in higher education (Shernoff, 2012). In part, this is because student engagement in learning has been shown to lead to broad outcomes such as psychological wellbeing and physiological health (Steele & Fullagar, 2009), as well as to improved concentration and perceived control (Guo & Ro, 2008), cognitive performance (Steele & Fullagar, 2009), and creativity (Ghani, 1995). The term "engagement" is used in a variety of ways in educational contexts but in lay terms refers to students' active involvement or deliberate investment of effort in their educational activities.

From an academic perspective, engagement has been conceptualised as having three dimensions, cognition, behaviour, and affect (Fredricks, Blumenfeld, & Paris, 2004). When a student is cognitively, behaviourally, and emotionally involved in an activity, they may be said to be 'engaged' in that activity. The term "meta-construct" is sometimes applied to engagement, which seeks to describe it as a distinct construct, but comprised of these three key dimensions (Fredricks et al., 2004). The absence of any one of the dimensions limits the degree to which a student is involved in the activity, such as a student who is behaviourally going through the motions of participating in class, but is not cognitively or emotionally invested in that activity. When a person is engaged, they are behaviourally involved, show high levels of cognitive awareness, and are emotionally invested in the activity and relational connections centered around that activity (Kahn, 1990).

A degree of confusion exists in the academic literature when education researchers discuss *levels of engagement*. Consistency is lacking in the use of terms such as *deeper-shallower* and *higher-lower* across multiple contexts. At a macro level student engagement may relate to students' behaviour and attitudes towards an institution or course (Kuh, 2009). A 'deeper' (meso) level may examine students' attitudes and behaviours toward study patterns, persistence, and effort within a course or a subject (Biggs, 2012). At a task (micro) level, students' engagement behaviours might be observed within a particular learning activity. This scale or 'granularity' of the learning environment (macro-meso-micro) is often then overlapped with the intensity of the engaged experience itself, which is also defined in terms such as *higher* and *deeper*. For example, the psychological state of "flow" is considered to be one of the 'deeper' levels of engagement (Csikszentmihalyi, 1990).

A considerable body of research on engagement has been produced in organisational psychology, which also reveals similar confusion between levels of engagement situated in varying contexts (Shuck, 2011). Kahn (1990) attempted to clarify the construct by differentiating between employees' temporally enduring stances (e.g. job involvement, organisational commitment), and those 'moments' when people are physically, cognitively, and emotionally *present* during a particular task. These moments or *episodes* of 'deep' engagement are thought to foster positive psychological states (Csikszentmihalyi, 1990), and enhanced performance outcomes (Rich, LePine, & Crawford, 2010). Understanding these episodes of deep task-based involvement, absorption and engagement is highly relevant to educators and educational designers whose goal is to build digital learning tasks that not only capture students' attention, but also elicit from them the fullest investment of their cognitive, behavioural, and emotional resources – that is, to deeply engage them in a digital learning task.

The importance of engagement in digital learning environments

A longstanding area of interest in engagement research has been *within-person engagement* at a *task-level* within digital learning environments. Concepts that are regularly referred to in this literature include flow, interactivity, involvement, and intrinsic motivation. As one facet of motivation, engagement is particularly important to educational technology researchers, practitioners, designers and developers, as it is fundamental to individual students' relationship with the learning design of learning tasks within digital learning environments. As Rebolledo-Mendez et al. (2011, p.155) noted, "...matching the delivery of learning material to students' motivation (or de-motivation) should improve their experience and, arguably, also their learning."

Within-person engagement is an essential construct for educational technology researchers to understand, as it captures those moments of a student's absorption and concentration with a digital learning task. Moreover, if we are able to better understand within-person engagement, and the conditions under which it occurs, we can potentially design digital learning tasks, and support mechanisms around these tasks, to foster engagement.

A number of educational technology researchers have considered how different types of engagement impact on students' learning processes and outcomes (Kennedy, 2004; Chan & Ahern, 1999; Lepper & Cordova, 1992; Schwier & Misanchuk, 1993; Sims, 2000). These researchers have used a range of terms to refer to 'engagement' in digital learning environments (e.g. flow, interactivity, intrinsic motivation) and there has been little integration between these various models. Moreover, there is surprisingly little empirical research establishing the links between within-person engagement and tangible learning outcomes in digital learning environments (see Shernoff, 2012). In this paper we discuss how various models of *within-person engagement* can be meaningfully and usefully integrated. Drawing on work from organisational psychology, we introduce the term "episodic engagement", to refer to the deep levels of absorption and involvement that can be exhibited when students interact effectively with digital learning tasks.

Models of within-person engagement

As indicated above, a number or research areas have contributed to our understanding of engagement generally, and students' engagement with digital learning tasks. These include research on episodic engagement, flow, intrinsic motivation and situational interest.

Based in ethnographic studies of employee motivation, Kahn (1990) labelled within-person states of engagement *episodic engagement* due to its transient and discontinuous temporal nature, as individuals moved into and out of *episodes* of engagement on a moment-to-moment basis. Episodic engagement is described as a brief period of time when an individual becomes energised or enlivened, simultaneously employing their cognitive, physical (behavioural), and affective resources to fully inhabit a role in which they perform their part in an authentic expression of their values, beliefs, thoughts, and feelings (Kahn, 1990). These brief periods are often highly productive and intrinsically motivating for the individual (Kahn, 1990).

Flow theory (Csikszentmihalyi, 1990) describes a psychological state of optimal human experience. This theory is closely aligned with the positive psychology movement and has a strong emphasis on promoting psychological health and wellbeing (Seligman & Csikszentmihalyi, 2000). Flow experiences are found to be deeply rewarding, with individuals describing increased intrinsic motivation to engage in an activity (Nakamura & Csikszentmihalyi, 2002), heightened awareness, focus, happiness, productivity, and creativity (Csikszentmihalyi & LeFevre, 1989). Altered perception of time passing is often reported, with people describing several hours going by as if just minutes had passed (Steele & Fullagar, 2009). Educational researchers (Bakker, 2005; Shernoff et al., 2003) have demonstrated the need for a significant task-based *challenge* to be balanced with an individual's requisite *skills,* in order for the flow state to occur in learning activities.

Intrinsic motivation describes the doing of an activity or behaviour for its own sake because it is inherently enjoyable, interesting, or rewarding (Gottfried, Fleming, & Gottfried, 1994). The doing of such an activity fulfils psychological needs of competence, relatedness, and autonomy (Ryan, 2012), and results in feelings of satisfaction, efficacy, and autonomy (Blumenfeld, Kempler, & Krajcik, 2006). Learning environments that promote competence, relatedness, and autonomy are more likely to support intrinsic motivation in learning. Intrinsic motivation represents the processes that drives student behaviours (Yazzie-Mintz & McCormick, 2012) and explains *why* a student behaves in a particular way in learning.

Situational interest has been shown to improve attention, foster persistence, improve learning, and lead to enjoyment in learning tasks (Ainley, Hidi, & Berndorff, 2002). Comprised of affective and cognitive components (Hidi & Harackiewicz, 2000) situational interest promotes positive emotions that are associated with doing an activity (Hidi & Renninger, 2006), and cognition through enhanced perceptions of value and meaning in the content (Hidi & Harackiewicz, 2000). The process through which situational interest develops is important to consider as it plays a significant role in the motivational processes that drive a student toward action in their learning. Like intrinsic motivation, situational interest may play a crucial role in the initiation of engagement in a learning task (de Barba, Ainley, & Kennedy, 2015).

Integrating 'engagement' models

These four approaches to student engagement (episodic engagement, flow, intrinsic motivation, and situational interest) share much in common in terms of understanding students' motivation in learning yet, as can be seen from the descriptions above, they are not synonymous (Yazzie-Mintz & McCormick, 2012). All have shown engagement to be an inherently rewarding connection between a student and learning activity, that promotes attentiveness and involvement in learning activities, and results in beneficial outcomes for the learner. They differ in that intrinsic motivation and situational interest seem to explain *why* students engage in a task, while engagement and flow are more concerned with *what* is happening for the individual during the engaged state, and the nature of the interaction between the student and the task.

Cleary and Zimmerman (2001) differentiated motivation and engagement as intention and action. Engagement implies that the *motivation to act* has been realised and transformed into tangible action. Situational interest describes how interest develops in an individual and also appears to be a factor that necessarily precedes engagement. Engagement is the *what* or *how,* more so than the *why*. It is the active outworking of intrinsic motivation and situational interest, the shifting of the motivated individual *into an active state* (Russel, Ainley, & Frydenberg, 2005).

Flow and episodic engagement describe a similar phenomenon: a psychological state that involves cognitive, behavioural, and affective dimensions. This state is described as a positive experience of absorption, dedication, and vigour in an intrinsically rewarding and energising task; when a person loses track of time, has lowered selfconsciousness and self-awareness, and shows enhanced task performance. Flow and episodic engagement may very well describe the same phenomena, but the underpinning rationale of the two constructs is distinct, as are the outcomes upon which they focus. Flow theory describes moments of peak performance in a task or activity, and looks toward holistic psychological and physiological outcomes for individuals. The broader holistic outcomes (student wellbeing) promoted by a positive psychology approach to flow are important for students in higher education (Steel & Fullagar, 2009), but there may also be utility in a stronger focus on specific performance related outcomes that are a feature of work engagement studies. Episodic engagement highlights the process through which individuals actively engage, but unlike flow, emphasises performance related outcomes. The underlying assumptions of these two perspectives differ in that the point of flow theory is to foster the flow state for its own sake in order to live a happy, fulfilling, and holistic life (Csikszentmihalyi, 1990), where episodic engagement is more interested in tangible performance-related outcomes (Kahn, 1990). In the organisational behaviour literature, productivity gains and intrinsic reward for the employee are considered to be worthwhile outcomes as they have direct and indirect benefits for both individuals and organisations.

These four highly inter-related constructs (see Figure 1) all play a significant role in shaping why and how students in higher education engage in digital learning environments where traditional motivational support is reduced or absent.
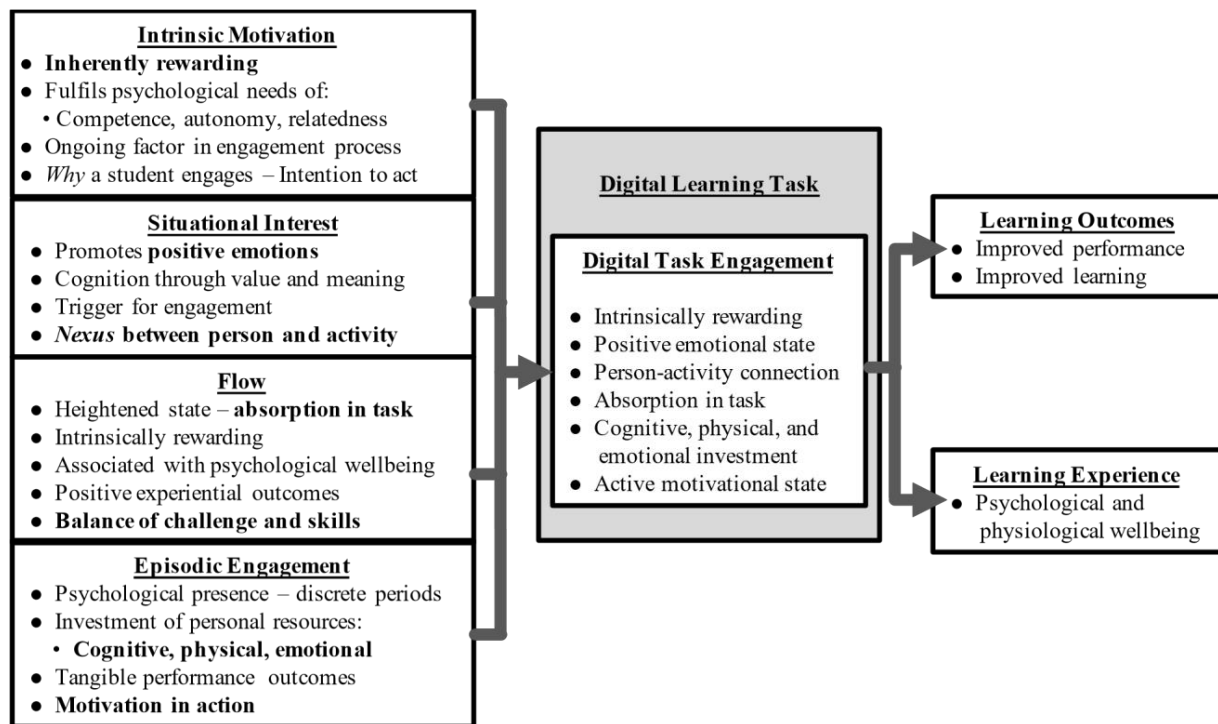
Figure 1: Digital task engagement

The notion of "digital task engagement" may be a unifying construct that is useful in guiding research into, and the design and development of digital learning environments. Digital task engagement refers to a particularly energised or heightened psychological state of engagement while completing a digital learning task. It is the active realisation of the motivating factors that drive a student to be fully present and fully invested – cognitively, behaviourally, and emotionally – in a digital learning task. High levels of digital task engagement may result in both tangible learning outcomes (conceptual change) and improved learning experience (psychological wellbeing). The momentary nature of episodic engagement, as described by Kahn (1990), makes this construct an appropriate tool for investigating the experiences of students as they undertake a digital learning task.

A core challenge for educational technologists is to determine ways to support and facilitate students' ongoing engagement in digital learning tasks. Research of digital task engagement has the potential to improve our understanding of students' learning processes at a task level, and the ways in which students' interact – cognitively, behaviourally, and emotionally – with learning technologies to improve both their

learning outcomes and their learning experiences. An improved understanding of factors that promote or inhibit students' engagement in digital learning tasks may not only inform theory, but will also hopefully assist in improving the design and development of digital learning environments, and ultimately teaching and learning practice with digital technologies.

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