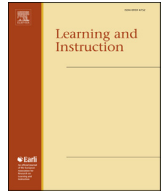




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## Student engagement as a function of environmental complexity in high school classrooms

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## ABSTRACT

The purpose of this study was to investigate the linkage between the quality of the learning environment and the quality of students' experience in seven high school classrooms in six different subject areas. The quality of the learning environment was conceptualized in terms of environmental complexity, or the simultaneous presence of environmental challenge and environmental support. The students ( $N = 108$ ) in each class participated in the Experience Sampling Method (ESM) measuring their engagement and related experiential variables. Concurrently, environmental complexity and its subdimensions were observed and rated from video with a new observational instrument, The Optimal Learning Environments – Observational Log and Assessment (OLE-OLA). Using two-level HLM regression models, ratings from the OLE-OLA were utilized to predict student engagement and experiential variables as measured by the ESM. Results showed that environmental complexity predicted student engagement and sense of classroom self-esteem. Implications for research, theory and practice are discussed.

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### 1. Introduction

Research has shown that student engagement is positively related to academic performance, and that disengagement leads to poor academic performance in a variety of subjects (Kelly, 2008; Sirin & Rogers-Sirin, 2004). In the last several decades, an increasing amount of attention has been directed toward student engagement as a framework for understanding educational concerns such as dropout, at least in part because engagement is presumed to be malleable and highly influenced by the learning environment (Christenson, Reschly, & Wylie, 2012; National Research Council and Institute of Medicine of the National Academies, 2004; Shernoff, 2013). Student engagement is widely considered to be a meta-construct with many levels of bioecological influence (Christenson et al.), but also a factor over which teachers have some control. Although the primary mechanism of this control lies in shaping student's immediate learning

environments, including but not limited to their teachers' own behavior, few studies have comprehensively investigated the influence of the immediate learning environment and related proximal factors on student engagement. In the present study, we examined the extent to which student engagement and experience varied by fluctuations in the quality of the learning environment from moment to moment in public high school classrooms.

Specifically, the quality of the learning environment was conceptualized in terms of *environmental complexity*, or the simultaneous presence of environmental challenge and environmental support. Environmental challenge refers to the challenges, tasks, activities, goals, structures, and expectations intended to guide student action or thinking; they are prescriptions for desired behavior (Csikszentmihalyi, Rathunde, & Whalen, 1993; Hektner & Asakawa, 2001; Newmann, 1992). Environmental support refers to the instrumental, social and emotional resources made available to help students reach environmental challenges (Reeve & Jang, 2006; Zhang, Scardamalia, Reeve, & Messina, 2009).

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### 1.1. Research on student engagement and flow

There is increasing agreement that student engagement can be conceptualized as a multidimensional construct. The view that there are three primary dimensions or subtypes of student engagement—cognitive, emotional, and behavioral—is now widely embraced (Ryu & Lombardi, 2015; See Fredricks, Wang, Schall, Hofkens, & Snug, this issue). *Behavioral engagement* refers to consistency of effort, participation, attendance, homework and other desired academic behaviors. *Cognitive engagement* refers to investment in learning, depth of processing, and/or the use of self-regulated metacognitive strategies. *Emotional engagement* refers to students' affect and emotions in schools, such as interest, boredom, or anxiety.

Scholars argue that student engagement is not only multidimensional, but also highly dynamic, fluctuating, context-dependent, and interactive (e.g., Goldin, Epstein, Schorr, & Warner, 2011). Thus, nuanced and differentiated models are needed to explain the complexities of student engagement in context, including classroom engagement *in situ*. At the same time, models are needed to organize and simplify primary constructs in order to be useful to practitioners. Research on flow and the quality of experience in learning environments has sought to capture and explain some of these complexities; the conceptual model utilized in this study is rooted in flow theory (Shernoff, Abdi, Anderson, & Csikszentmihalyi, 2014). A theoretical cornerstone of positive psychology (Seligman & Csikszentmihalyi, 2000), flow is a state of optimal experience characterized by intense concentration and heightened interest in intrinsically enjoyable activities, as when an artist or scientist summons all of his or her available skills to reach a meaningful challenge.

Rooted in flow theory, *student engagement* is conceptualized in this study as the heightened, simultaneous experience of concentration, interest, and enjoyment (Shernoff, 2013). All three components are not only central to flow experiences, but have also been related to meaningful forms of learning. For example, *concentration* has been related to depth of cognitive processing and academic performance (Corno & Mandinach, 1983). *Interest* directs attention, reflects intrinsic motivation, stimulates the desire to continue engagement in an activity, and is related to school achievement (Schiefele, 2009). *Enjoyment* is related to the demonstration of competencies, creative accomplishment, and school performance (Csikszentmihalyi et al., 1993). Similar to flow, achieving an ideal state of engagement, including both work-like (i.e., concentration) and play-like (e.g., enjoyment) aspects, can be intrinsically meaningful and also serve a preventative function with respect to disengagement and its negative consequences for learning (Shernoff, 2013). In this sense, student engagement based on flow is similar to other constructs in positive psychology believed useful for educational practice, such as optimism or hope (Furlong, Gilman, & Huebner, 2014).

Like many previous studies conceptualizing engagement from the perspective of flow, the present study makes use of the Experience Sampling Method (ESM; see Hektner, Schmidt, & Csikszentmihalyi, 2007; Zirkel, Garcia, & Murphy, 2015), a time- and context-dependent method of measuring subjective experiences at the moment of instruction. In ESM studies, participants complete brief surveys about their immediate environment, thoughts, and feelings several times in succession over the period of time studied, resulting in repeated responses per participant.

ESM and related research has contributed to the view that, as a meta-construct, student engagement is highly related to other aspects of students' overall quality of experience in classrooms. Other experiential dimensions of high school classrooms that have been identified in previous ESM studies, especially those in educational contexts, include: a) *classroom self-esteem*, b) *intrinsic motivation*, c)

*potency*, and d) *academic intensity* (e.g., Csikszentmihalyi et al., 1993; Csikszentmihalyi & Schneider, 2000; Hektner et al., 2007). These major experiential dimension have been related to flow theoretically, and prior research connects them to student engagement in nationally representative samples of high school classrooms (Shernoff, 2010a). *Self-esteem*, including feeling worthy, successful, and in control, has been associated with flow and to the perception of an activity as both work and play (Csikszentmihalyi & Schneider). Previous studies have found that adolescents who pursued activities based on their *intrinsic motivation*, or desiring to do an activity for its own sake, were more likely to go on to develop their talents than less intrinsically motivated adolescents (Csikszentmihalyi et al.). *Potency* (also referred to as *activation*), or feeling active, excited, and creative, has been positively related to productive activities and negatively related to negative moods and affect in samples of adolescents (Csikszentmihalyi and Schneider). *Academic intensity*, or feeling challenged and exerting effort in the face of an activity, has been found to be highly related to engagement in meaningful and relevant challenges in high school classrooms (Shernoff, Csikszentmihalyi, Schneider, & Shernoff, 2003).

### 1.2. Research on the learning environment: towards a conception of environmental complexity

Research suggests that engagement in learning activities arises from the reciprocal interaction between learners and a *learning environment* (Shernoff & Bempechat, 2014; Fraser, 1998). Conceived as a nexus of historical, cultural, and more proximal influences, the immediate learning environment is likely to be among the most salient factors in children's engagement to learn (Bronfenbrenner, 1977). Vygotsky (1978) and others (Brown, Collins, & Duguid, 1989; Zhang et al., 2009) have illustrated that learning is a social and transactional process. The nature of learning is now widely believed to be situated, collaborative, and supported within authentic contexts and learning communities (Brown et al., 1989; Rogoff, 1990; Zhang et al.). If engagement with learning arises from the reciprocal interaction between learners and a learning environment, then teachers' potency to engage students lies in their ability to create, shape, and influence the whole learning environment.

We utilized a conceptual model of the learning environment that is dialectical and centers on a construct called *environmental complexity*, or the simultaneous presence of both environmental challenge and environmental support. The term "environmental" is rooted in research on the learning environment (e.g., Allodi, 2010; Fraser, 1998). "Complexity" refers to simultaneous differentiation and integration of aspects or parts of a dynamic system (Csikszentmihalyi, 1996). The model of environmental complexity is based on previous research (e.g., Csikszentmihalyi & Schneider, 2000; Shernoff, 2013) finding that engaging learning experiences foster heightened concentration and effort in skill-building activities (i.e., academic intensity), as well as spontaneous enjoyment undergirding intrinsic interest and continued motivation (i.e., a positive emotional response). In meaningful forms of engagement, both aspects of experience are frequently reported together, a combination that leads to positive developmental and academic outcomes in the short term (e.g., course grades in in the same semester; Shernoff, 2010b; Shernoff & Schmidt, 2008) and in the longer term (e.g., continuing motivation in the subject, future grades when in college, and positive youth development; Shernoff & Hoogstra, 2001; R. Larson, 2000).

Literature on student motivation to learn, student engagement, flow, learning environments, and classroom climate (e.g., American Psychological Association, 1997; Fraser, 1998; S. Larson, 2011; Reeve, Jang, Carrell, Jeon, & Barch, 2004; Skinner & Belmont, 1993; Urdan & Turner, 2005; Zedan, 2010) collectively suggest

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