



# Analyzing the effects of emotion management on time and self-management in computer-based learning



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## ABSTRACT

*Emotional learning* involves the acquisition of skills to recognize and manage emotions, develop care and concern for others, make responsible decisions, establish positive relationships, and handle challenging situations effectively. *Time* is an important variable in learning context and especially in the analysis of teaching-learning processes that take place in collaborative learning, whereas *time management* is crucial for effective learning. The aim of this work has been to analyze the effects of emotion management on time and self-management in e-learning and identify *the competencies in time and self-management that are mostly influenced when students strive to achieve effective learning*. To this end, we run an experiment with a class of high school students, which showed that increasing their ability to manage emotions better and more effectively enhances their competency to manage the time allocated to the learning practice more productively, and consequently their learning performance in terms of behavioral engagement and achievement and partly, in terms of cognitive engagement and self-regulation. Teacher affective feedback was proved to be a crucial factor to enhance cognitive engagement.

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## 1. Introduction

Learning is the process of acquiring knowledge, skills, values and attitudes, through study, education or experience. This process produces a change in the behavior of a person from the result of experience by the association between a stimulus and its corresponding response. Nowadays, from a socio-constructivist view, learning depends on the context and the social negotiation and interaction with others. Moreover, computer-based learning has become a usual way of learning since the expansion of internet and the enormous facilities it offers in online and blended learning. Under this frame, computer-based learning environments have to foster learning that is self-regulated, constructive, context-sensitive and often collaborative.

Many studies have focused on the consequences of emotion management on computer-based learning. Brave and Nass (2002) show that a great variety of emotions play important role in every computer-related situation. Negative emotions require

mental or behavioral adjustment, whereas positive emotions urge students to explore the computer-based environment and direct the actions that they take in it. Vuorela and Nummenmaa (2004) also argue that emotion regulation is important to effective functioning in web-based learning environments, whereas effective emotion regulation can enhance social interactions in a virtual environment (Gross & John, 2003; Tu & Mclsaac, 2002). More recently, a detailed review of emotion regulation in Intelligent Tutoring Systems showed that emotion management during computer-based learning may produce more optimistic emotions as well as better learning gain (Malekzadeh, Mustafa, & Lahsasna, 2015).

According to Bach and Forés (2007), this has significant implications for teaching and learning. Therefore, teacher expectations have a significant impact on student outcomes, which shows why these expectations need to be positive as well as realistic. Teachers should provide the necessary time, space and support to students in order to make them reflect on the learning strategies that were used and on the way these strategies have influenced students' learning. If students' experiences have been negative, teacher should follow a scaffolding approach that moves students progressively to attenuate the impact that those negative experiences

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have had in their motivation to learning (Belland, Kim, & Hannafin, 2013). In general, a learning environment should provide the means to identify and nurture personal interests and intrinsic motivation of students. Emotions have a diagnostic value for teachers, because they reveal underlying cognitions, commitments and concerns. Teachers who are aware of what motivates their students and are sensitive to their emotions may use this information in a useful way to improve their learning process. Moreover, teachers' own behavior, teaching practices and evaluation may trigger specific emotions in students, which in turn affect the quality of learning that takes place (Boekaerts, 2010). Fortunately, emotional regulation can reduce the negative responses and serves as a containment mechanism (Niven, Totterdell, & Holman, 2009). Several strategies have been developed to regulate emotions (Moyal, Henik, & Anholt, 2014).

Taking all the above into account, we use the term “emotional management” to include the methods and tools to handle two very important tasks in affective learning: emotion awareness and emotional feedback (Feidakis, Caballé, Daradoumis, Gañán, & Conesa, 2014). Moreover, we use the term “time management” – which really means ‘self-management’ since we manage ourselves to make the most of time – as a key element for student learning development (Garrison, 1997). Time and self-management competencies are key factors for improving students' self-regulating learning and thus for enhancing learning performance in web-based courses (Cobb, 2003). That goes back to Bandura (1982) social learning theory where self-efficacy is considered a key element for learning success. Self-management is the main factor for students' self-efficacy, stimulation of motivation and insurance of balanced social life (Ivanova, 2011). Self-efficacy arises from the gradual acquisition of complex cognitive and behavioral skills (Bandura, 1982) whereas other researchers, such as Locke, Frederick, Lee, and Bobko (1984), found that the magnitude of self-efficacy was positively related to goal setting. Moreover, a key skill in self-management is self-regulation which concerns the ability of a student to organize, manage and address several elements of their learning for themselves (Zimmerman, 2008). As a consequence, among the competencies that affect students' performance, this research mainly considers these four competencies: behavioral and cognitive engagement, self-regulation, and achievement orientation.

In fact, students' performance is enhanced when motivation is translated into behavioral, emotional, and cognitive engagement (Fredricks, Blumenfeld, & Paris, 2004; Reeve, 2013). In a school context, positive behavioral engagement means actively participating in academic activities according to classroom norms; positive emotional engagement means exhibiting interest and happiness during academic activities; positive cognitive engagement means actively deploying strategies to understand content, solve problems, or otherwise use information (Fredricks et al., 2004).

Moreover, motivation, engagement, and self-regulation are the primary determinants of students' learning outcomes, and whether or not they will persist through challenging tasks (Harris, Graham, Mason, & Sadler, 2002). In particular, self-regulation is essential to the learning process and is recognized as an important predictor of student academic achievement (Jarvela & Jarvenoja, 2011). Finally, the achievement goal theory, which is developed within a social-cognitive framework, proposes that students' motivation and achievement-related behaviors can be understood by considering the reasons or purposes they adopt while engaged in academic work (Ames, 1992). As such, achievement orientation focuses on how students think about themselves, their tasks, their performance, and their well-being (Ryan & Deci, 2000).

From all the above, we see that the concepts of emotion

management as well as time and self-management are crucial for increasing learning performance. However, the relationship between emotion management and time and self-management in computer-based learning has not been sufficiently investigated yet by the research community.

The aim of this work is to analyze the effects of emotional management on time management in computer-based learning and identify which are the competencies in time and self-management that are mostly influenced when students strive to achieve effective learning. To achieve this, we focus our work on competencies that affect students' learning and development, such as behavioral and cognitive engagement, self-regulation, and achievement orientation.

In order to achieve this goal, Section 2 sets the base of our work by carrying out a comprehensive and critical analysis of the literature that deals with emotion and time management in learning. Then in Section 3, we present our approach at a conceptual design level, we set our research hypothesis and questions, and we explain how we address these questions through a real experiment in a class of high school students. Section 4 presents the results of the experiment. Next in Section 5, we discuss and analyze the obtained results with regard to the research questions set and we check the validity of our research hypothesis. Finally, we provide our conclusions and possible future work.

## 2. Theoretical background in emotion and time management in learning

### 2.1. Emotion awareness

Emotions are defined as subjective experiences which are dependent on the context in which they arise. They are experienced in various situations and serve a variety of functions in the academic environment including promoting or undermining behavioral and cognitive engagement, self-regulation of learning activities and achievement (Linnenbrink-Garcia & Pekrun, 2011). Learning involves three particular cognitive processes, attention, memory and reasoning; with respect to each of them, students' cognitive ability depends on their emotions (Frasson & Chalfoun, 2010). According to them, emotions can be used in the learning context to increase students' attention as well as to improve memory and reasoning. As a consequence, relationships between objects or ideas are made more easily while they promote efficiency and rigor in decision making and problem solving (Isen, 2000). Therefore, emotional learning involves the acquisition of skills to recognize and manage emotions, develop care and concern for others, make responsible decisions, establish positive relationships, and handle challenging situations effectively (Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011).

In the recent years, research in emotion awareness in learning situations has focused on several issues that include: analysis of learning interactions to detect emotions through the application of a variety of methods, such as discourse analysis, sentiment analysis or opinion mining that allows non-intrusive automatic detection and extraction of emotions from student-created texts and dialogues (Daradoumis, Arguedas, & Xhafa, 2013a, 2013b); capturing the sentiments and the emotional states enclosed in textual information so that opinions and emotions embedded in them could play a key role in decision-making processes (Loia & Senatore, 2014); examining the impact of the so-called academic emotions (enjoyment, anxiety, pride, anger, hope, shame/fault, relief, boredom, hopelessness) on students' ways of thinking and information processing (Pekrun, Goetz, Frenzel, & Perry, 2011); embedding emotion awareness into e-learning environments “ecologically”, by avoiding introducing obtrusiveness or

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