



## The role of emotions and task significance in Virtual Education

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### ARTICLE INFO

#### Article history:

Accepted 21 March 2012

Available online 29 March 2012

#### Keywords:

Academic emotions

Virtual learning environments

Second life

Simulation

Academic performance

Task significance

### ABSTRACT

This paper analyzed the role of emotions in a virtual world (Second Life) through students' level of enjoyment and boredom and their influence on students' achievement level. The virtual world was an educational tool used to fully immerse students in the content of the course. In addition to supporting prior research on the importance of task value on academic enjoyment, the current research provides a new perspective on the relationship between academic emotions and academic success, particularly for virtual worlds. A regression analysis was conducted to measure the relationship of task value and emotions on two types of academic performance: Individual exam scores and team scores on their Second Life assignment. Pekrun's Academic Emotions Questionnaire (AEQ) was used to measure two academic emotions: boredom and enjoyment. Both academic emotions were measured on an individual level. Results from this study show that task value was positively related to enjoyment and negatively related to boredom, yet it was unrelated to academic performance. While enjoyment had a positive relationship to exam performance, boredom also had a positive relationship to the team assignment conducted in the virtual world. The possibility that students might have answered the AEQ relating to the theoretical aspects of the course instead of the practical aspects of the Second Life Assignment, may be one possible explanation for this result.

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*Tell me, and I will forget. Show me, and I may remember. Involve me, and I will understand.* — Confucius, 450 B.C.

### 1. Introduction

With the advent of emergent technologies, simulations can mimic reality and provide opportunities to deliver learning experiences in a realistic setting (Galvão, Martins, & Gomes, 2000). Simulations are used in learning environments and offer a time-efficient way to reach the desired level of performance, while simultaneously increasing the performance level reached (Parush, Hamm, & Shtub, 2002). Simulations not only copy the physical aspects of an environment, (such as weather disturbances for pilot training), but can also incorporate intangible aspects of that environment (such as stress or a breakdown in collaboration between team members). In both cases, participant actions determine the learning experience and, thus, the path of simulation.

Virtual worlds represent a specific type of simulation, which differs from other forms of simulation in the following ways: First, virtual worlds have a persistent character (Cannon-Bowers & Bowers, 2008). This implies that action in the virtual world continues, even if not all players are currently online. A second characteristic of virtual worlds is that multiple learners, who are geographically dispersed, can interact within the same environment (Cannon-Bowers &

Bowers, 2008). While research on synthetic learning environments has been conducted, further research on the usefulness of virtual worlds in education is needed. As in virtual worlds, synthetic learning environments provide a simulated learning experience through technology-enabled learning environments (Cannon-Bowers & Bowers, 2009). The research in this broad field of technology-based learning environments, has shown that authenticity of those environments leads to increased learning performance (Honebein, Duffy, & Fishman, 1993; Petraglia, 1998). Next to authenticity, the level of engagement and the immersion opportunities created in such environments are often cited as a possible explanation to their effectiveness (Cannon-Bowers & Bowers, 2008; Kozlowski & Bell, 2007). However, while these findings are promising, they do not clearly depict how the emotional context relates to the learning outcome (Cannon-Bowers & Bowers, 2008; Pekrun, 2005).

Research on emotional experiences in classroom settings has grown in recent years, yet this strand of research remains sparse regarding online learning environments. Studies have shown that emotional experiences influence a student's motivation, learning strategies and achievement; and that such emotional experiences are influenced by personality and classroom characteristics (Goetz, Pekrun, Hall, & Haag, 2006; Pekrun, Elliot, & Maier, 2009; Pekrun, Goetz, Daniels, Stupnisky, & Perry, 2010; Pekrun, Goetz, Titz, & Perry, 2002). Järvenoja and Järvelä (2005) and Wosnitza and Volet (2005) indicate the important role of social emotions in technological environments and found the nature of emotions to be based on student's perceived control over the learning activity. Interestingly, Artino (2009) demonstrates that negative emotional experiences

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increase students' metacognitive activities, and reduce their satisfaction level and motivation to continue with the course. These findings confirm aspects of the research on emotional experiences in offline course environments, yet point towards the different impacts of boredom on learning activities in online learning environments.

The discussion above highlights the lack of research into emotional experience in virtual worlds. While Pekrun has established a benchmark related to the types of emotional experiences in classroom settings, research on emotional experiences in online learning environments requires further inquiry and research. To date, it remains unclear how emotional experiences influence performance in virtual worlds. Therefore, the aim of this study is to analyze the relationship between emotional experiences and student performance in virtual worlds, and to discuss their implications.

## 2. Conceptual framework

### 2.1. Virtual worlds as an educational simulation tool

Simulation can be a concrete form of reality or an abstraction (Sauvé, Renaud, Kaufman, & Marquis, 2007). Virtual worlds (such as Second Life) provide for an abstract form of reality, where learners are not physically present but instead use technology to interact with people and objects in the virtual world. The value of Second Life lies in its capability to provide an authentic replication of reality (Kozlowski & Bell, 2007; Sauvé et al., 2007). Second Life is a system that attempts to provide realistic environments, which incorporate a working representation of reality where users log in via a web-based application in a world that mimics reality. Communication takes place synchronously (in real time) and is instantaneous, via text messaging or voice chat; a concept being referred to as immediacy (Wood, 2010). Immediacy offers the opportunity for learners to gain direct feedback or assistance from fellow learners or teachers. The realistic setting results from various elements, such as an in world economy including a currency system (Linden Dollars), resulting in an actual economy with market data and the representation of numerous multinational companies, national governments and other institutes. In the case of Second Life, the setting and thereby the degree of reality, are simplified (Galvão et al., 2000). Instructional designers limit the various elements in Second Life to narrow overexposure for students. Although the environment might be simplified, what is being simulated is not limited to the physical aspect of the system, (e.g., driving a car or flying an airplane) but can also incorporate the underlying structure of the task or problem (e.g., the aspect of competition or social interaction). A special feature of Second Life in comparison to other virtual worlds is that it allows for multi-user online role-playing. Furthermore, users can collaboratively create and use in-world artifacts such as text, images, and three-dimensional models, increasing a sense of community among players (Wood, 2010). This creates a persistent character, which implies that actions continue and the world evolves irrelevant of the presence of specific players who can enter the world at any desired time. By means of this persistence Second Life mimics reality to an even further extent than other virtual worlds allowing for complex interactions amongst players and with the environment.

Research shows the importance of immersion (offered by Second Life), as it enables players to gain an understanding of their future work environment after graduation and allows players to experience how elements of their future professional environment interact with each other (Belei, Noteborn, & De Ruyter, 2011; Kozlowski & Bell, 2007). Through the authentic environment and unique characteristics of Second Life, the gap between learning and transfer environment narrows and leads to increased student performance (Cannon-Bowers & Bowers, 2008; Kozlowski & Bell, 2007). While it is suggested that students are immersed while working in a virtual world (Cannon-Bowers & Bowers, 2008), it remains unclear whether

emotion influences the learning outcome of students in these environments (Cannon-Bowers & Bowers, 2009).

### 2.2. Task value

An important predictor of learning is the perceived task value students attach to the learning tasks. Task value is the degree to which the quality of the task contributes to the probability of potential participants selecting it or not (Eccles, 2005). Thus a task is valued high if a learner perceives that it will advance his/her understanding of the relevant domain. Eccles based this on the expectancy-value theory of achievement and argues that task value is composed of four value elements: Attainment value, intrinsic or interest value, utility value and costs of engaging (Durik, Vida, & Eccles, 2006). Attainment value refers to a person's value attached to performing well on the given task. Intrinsic or interest value is the perceived enjoyment a person can take out of this task. Utility value is the degree to which the task contributes to an individual's long term goal; whereas costs of engaging relate to the opportunity costs, energy and other forms of costs the individual has to invest in while engaging in the task (Eccles, 2005).

Research has shown task value to be related to academic success (Durik et al., 2006; Simons, Dewitte, & Lens, 2004). This relationship is mainly grounded in the utility component of task value (Simons et al., 2004). Therefore, to attribute a high utility value, students must comprehend the rationale for engaging in a specific task and understand the added value it offers to their professional development (Debnath, Tandon, & Pointer, 2007). A study conducted by Hulleman, Durik, Schweigert, and Harackiewicz (2008) used a classroom setting and a high school sports camp to demonstrate how task value positively relates to performance. Furthermore, Artino, La Rochelle, and Durning (2010) showed task value to be positively related to enjoyment and negatively correlated to boredom. However, based on this research, there was no indication that task value related to academic performance. Studies investigating task value in technology-based learning are still rare. For example, Chiu and Wang (2008) have investigated perceived task value for professionals with regard to continuing a web-based course. In other studies, task value has been shown to positively relate to satisfaction of online learners (Artino, 2009) and to their cognitive and metacognitive learning activities (Artino & Stephens, 2007). Nevertheless, Cannon-Bowers and Bowers (2009) call for more research on the impact of task value in technology based learning environments, and further inquiry is needed to expand the foundation of knowledge on this topic.

### 2.3. Role of emotions for achievements

Emotions are defined as subjective experiences which are dependent on the context in which they arise (Linnenbrink, 2006). Goetz, Cronjaeger, Frenzel, Lüdtke, and Hall (2010) have shown that the emotions experienced by students, such as boredom and enjoyment, significantly differ across domains. Research has shown that positive emotions, such as enjoyment, facilitate the recovery of positive material (Isen, 1990), whereas negative emotions reduce performance (Beier & Kanfer, 2009). The amount of positive or negative emotions students experience, while engaged in learning tasks, influences their goal and thereby their learning process (Bruinsma, 2004; Kay, 2008).

Emotions are experienced in various situations. Achievement emotion is one specific type of emotion (Pekrun, 2006). Achievement emotions are directly tied to the achievement activity itself (e.g. writing an exam) or the outcome associated with the activity (e.g. the exam grade) (Pekrun, 2006). According to Pekrun, Goetz, Frenzel, Barchfeld, and Perry (2011), achievement emotions influence student learning and performance, yet are induced by feelings of control over activities that students perceive as important; in other words, those activities that have a high task value. Control-value theory states that

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