An Exploratory Analysis of the Role of Emotions in E-Learning

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INTRODUCTION

Technology-rich environments are assuming a key role in the individual learning processes. Still, one of the major IT challenges identified in the education field is to establish e-learning as a credible and viable complement to face-to-face education. This represents a paradigm shift in the way of learning, which is driving changes at individual, process, institutional, and societal levels. However, despite last-decade advances in the application of usability principles in system design, there is still a need to better understand the people-technology fit in learning contexts. Current results, gaps, and issues define the challenges that dictate new requirements. Among these new requirements, minimizing the impact of the distance factor on communication and learning effectiveness calls for alternatives approaches. Due to the importance of communication among instructor and students in learning, the scope of this work focuses on exploring the role of emotions within the user and learning-support technology fit.

Research work in related fields, namely in neurology (Damásio, 1994, 2000), affective computing (Picard, 1997), captology (Fogg, 2003), social psychology (Bandura, 1997; Coleman, 1995), usability (Preece, Rogers, & Sharp, 2002), education (Clark & Mayer, 2003; Martinez, 2001) attest the impact of emotions on cognitive processes. This body of knowledge could contribute to human-computer interaction (HCI) community to pursue its main goal: designing more natural, productive, satisfying, and enjoyable user experiences.

However, to satisfy this goal, development teams should approach the design of technology-assisted learning experiences thinking out-the-box and searching for innovative and multi-disciplinary solutions. This is in order to capture and monitor emotions, and other individual- or group-related variables that could influence engagement rates and learning results, as the process evolves. Though this is a difficult task that involves technical, pedagogical, contextual, process-related, and individual issues, we think that supporting the role of instructors, as process managers, could minimize the negative impact of sources of learning events on learner emotions. Given the adequate articulation between business strategies, process, technology, and people skills, this will also contribute to learning cost-effectiveness within organizational contexts.

Based on the literature and some empirical work, the main objective of this work is to conceptually describe the role of emotions in technology-assisted learning experiences and share some preliminary results. These results were obtained within a blended-learning experience that we run during the Spring Semester 2004/05 at our university, when lecturing the multimedia content production course. This was a first attempt for a better understanding on the dynamics of emotions of online learners within a real instructional setting. In order to achieve the objective of this work, the next section presents a proposed conceptual framework based on reviewed literature. The following section summarizes preliminary results and lessons learnt. The fourth section identifies some future trends. Last section presents a general conclusion.

BACKGROUND

Within learning environments, current results have yet to show consistent and integrated findings to support

the effectiveness of e-learning (Britain & Liber, 2004; Jenks & Springer, 2002; McGettrick & Boyle, 2004). Two are the main causes. A first cause relates to the structure of a technology-assisted learning experience, namely process and technology issues. Systems are not designed to tightly support learning processes within organizational contexts. Current learning environments are designed to sustain educational practices, commonly and mostly based on behaviourism. That is because behaviourist approaches have proven useful for humans to adapt to contexts, especially conditioned behaviour. Human adaptation is done by assimilating survival values (Damásio, 2000). Supporting behaviourist approaches, as a design option, translates into two relevant perspectives within learning contexts.

From pedagogical perspective, behaviourism sustains the role of instructors as sources of information that is linearly and sequentially transmitted without considering the dynamics of the learning process. Indeed, knowledge and comprehension are the main driving factor of instructional design that supports the transference of knowledge between instructor and learners. These two factors cover the first two steps of Bloom's taxonomy of educational objectives when defining learning objectives. The remaining three steps are still to be supported by technology due to the current unresolved issues (McGettrick & Boyle, 2004). They are knowledge application, analysis/synthesis, and evaluation. From organizational perspectives, the principles of taylorism and bureaucracy are yet present in current organizations. These principles impact the dynamic of e-learning in the workplace because they emphasize the "organization man" view of employees and the "control-and-command" mentality as active parts of the organizational value system. These values translate into development efforts mainly focused on cognitive/rational attributes within social contexts.

These perspectives indicate three specific needs to design technology-supported learning experiences. First, learning-design process should be reengineered for it to effectively adjust to supporting technology. Instructional-design process should be also timely articulated with business processes in order to contribute to cost-effectively disseminate required context- and task-specific content to proper learner groups. Second, technology should advance to fully support more constructivist educational practices.

A second cause for current learning results relates to people issues. Potential e-learners are not adequately and timely prepared and coached to effectively benefit from technology-supported learning (Britain & Liber, 2004; Walter, 2003). An integrated view of learners, considering cognitive and emotional aspects, must be adopted by organizations. This is in order to implement effective and ethical interventions to improve the user-system fit within learning contexts. In fact, this integrated view started changing during mid-90s after scientific evidence about the impact of emotions on cognitive processes was published (Damásio, 1994). In addition, Coleman (1995) stated that instructors know very well the impact of affective states on mental activity; since anxious, depressed, or angry students simply do not effectively perceive or transform information. Indeed, a typical learner can experience, along his/her learning process, several basic emotions such as joy, excitement, frustration, fear, sadness, and anxiety. Further, in late 90s, individual actions, goals, motivation, intentions, and emotions were identified as "missing" variables in this picture (Bandura, 1997; Kort, Reilly, & Picard, 2001; Martinez, 2001). These studies, among others, called attention to the role of emotions on intra- and inter human effective functioning. Within technology-assisted learning experiences, managing the interplays between the learner, instructional-design process, and support technology fit will gradually improve cost-effectiveness.

By definition, emotion is a sequence of interrelated, synchronized changes in the states of all organismic subsystems (cognition, motivation, action, subjective feeling) in response to the evaluation of a significant external or internal event (Sherer, 1994). An emotion involves a somatic (physical) and an affective component. Thus, this involves perceptions, action plans, and associated feelings. In fact, emotions, as an integral part of cognitive processes, give automatic responses to assure the survival of the organism (Damásio, 2000). This definition is two-fold.

First, the consistent emotional response when facing same significant stimuli means a biological design prepared to systematically react by producing specific responses and regulating those responses. The uniqueness of individual configuration of neural system patterns supports those individual responses and internally regulates the organism to react toward induced stimuli. Results of reaction-induced stimuli reinforce behaviours and actions by rewarding, or not, the link between behaviours-survival values of context. This way, emotions sustain individual reactions facing