

# An Overview of an Evaluation Framework for E-Learning

**Maria Alexandra Rentroia-Bonito**

*Technical University of Lisbon, Portugal*

**Joaquim A. Jorge**

*Technical University of Lisbon, Portugal*

**Claude Ghaoui**

*Liverpool John Moores University, UK*

## INTRODUCTION

Technology-based education is taken as an effective tool to support structured learning content dissemination within pre-defined learning environments. However, effectiveness and efficacy of this paradigm relate to how well designers and developers address the specificities of users' learning needs, preferences, goals, and priorities taking into account their immediate work, social, and personal context. This is required in order to focus development efforts on the design of e-learning experiences that would satisfy identified needs. Thus, studying and assessing the human computer interaction side of such projects is a critical factor to designing holistic and productive e-learning experiences.

Literature does not show consistent and integrated findings to support the effectiveness of e-learning as a strategic tool to develop knowledge and skill acquisition (Rosenberg, 2001; Shih & Gamon, 2001). The objective of this article is to develop on one hand, main identified issues of an integrated evaluation framework, focusing on key variables from people and technology standpoint within context of use, and, on the other hand, to summarize the relevant tasks involved in designing e-learning experiences. Main identified issues of an integrated evaluation framework include: (i) some relevant context-specific factors, and (ii) other issues that are identified when people interact with technology. Context-specific factors such as culture, organization of work, management practices, technology, and working processes may influence the quality of interaction (Laudon & Laudon, 2002) and may also

help define the organizational readiness to sustain the acceptance and evolution of e-learning within organizational dynamics. Thus we propose an e-learning evaluation framework to be used as a diagnostic and managerial tool that can be based on: (a) an observed individual variable, as a visible sign of implicit intentions, to support development effort during instructional design and initial users' engagement, and/or (b) usability and accessibility as key identified technology variables addressing acceptance and usage.

The Background section presents our proposed theoretical evaluation framework to guide our analysis based upon the reviewed issues arising from the proposed framework. Last, we elaborate on some future work and general conclusion.

## BACKGROUND

Natural, effective, and also affective interactions between humans and computers are still open research issues due to the complexity and interdependency of the dynamic nature of people, technology, and their interactions overtime (Baudisch, DeCarlo, Duchowski, & Gesiler, 2003; Cohen, Dalrymple, Moran, Pereira, & Sullivan, 1989; Gentner & Nielsen, 1996; Horvitz & Apacible, 2003; Preece, Rogers, & Sharp, 2002). Despite last-decade advancements in principles associated to usability design, there is still an ever-present need to better understand people-technology relationship in their context of use in order to design more natural, effective, satisfying and enjoyable users' experiences. Multimodal inter-

actions, smart, ambient, and collaborative technologies are some current issues that are driving new interaction paradigms (Dix, Finlay, Abowd, & Beale, 1998; Oviatt, 1999). New skills and methods to perform work-related tasks at operational and strategic levels within organizational dynamics, plus societal attitudes, individual lifestyles, priorities, preferences, physical and cognitive capabilities and locations require more innovative approaches to designing user experiences. In addition, technical and users' feedback coming from different evaluation sources require workable methods and tools to capture and analyse quantitative and qualitative data in a systematic, consistent, integrated, and useful way. This situation makes e-learning evaluation process a complex one (Garrett, 2004; Janvier & Ghaoui, 2004; Preece et al., 2002; Rosson & Carroll, 2002). Moreover, interpretation of an evaluation outcome requires an additional set of skills. Figure 1 shows three main aspects to consider when evaluation e-learning experiences: (1) people-related issues (learning preferences), (2) instruction-related issues (instruction design), and (3) system-related issues (usability and accessibility).

Organizational context and individual learning preferences aim at improving people-task fit. This means that people's skills and related learning objectives are defined by: (a) their preferred ways of learning, and (b) the tasks individuals have to perform within the scope of their organizational roles and specifics contexts. Principles and practices of

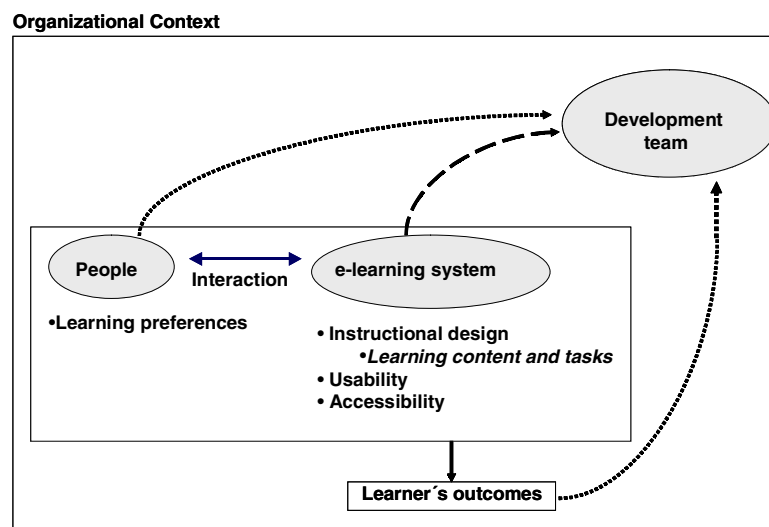
instructional design and multimodal feasible choices are taken into account to structure, organize, and present learning content and related tasks (Clark & Mayer, 2003). This way, contextual and work-relatedness of content is ensured.

Usability and accessibility, as quality attributes of system performance, address the acceptance and usage of a system by the intended users. Learning outcomes, namely performance and satisfaction after being analyzed, would drive initiatives for improvement or new developments at operational and strategic levels. These issues are further described in the next sections.

## Evaluating People-Related Issues

From a people standpoint, learning styles are identified by researchers, among the multiple individual traits that influence learning process, as a key component to design and evaluate effective and satisfactory instructional methodologies and education-oriented technologies. Reviewed literature on learning styles and individual differences (Atkins, Moore, Sharpe, & Hobbs, 2000; Bajraktarevic, Hall, & Fullick, 2003; Bernardes & O'Donoghue, 2003; Leuthold, 1999; McLaughlin, 1999; Sadler-Smith & Riding, 2000; Storey, Phillips, Maczewski, & Wang, 2002; Shih & Gamon, 2001) show that most research findings are not conclusive and often contradictory regarding the impact of learning styles on outcomes of e-learning (McLaughlin, 1999; Shih & Gamon,

Figure 1. Designing e-learning experiences: People and technology aspects



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