Modeling for E-Learning Systems

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INTRODUCTION

Computer-based instruction is touted as an effective tool to support knowledge dissemination within predefined learning environments. Indeed, many see it as a way to overcome geographical or social barriers to knowledge transmission and educational institutions. However, its domain of application has traditionally been restricted to basic skills and educational contexts. Recently, dynamic and complex business environments shaped by technological changes and the downsizing trend of the '90s placed new constraints on the underlying assumptions (Fuglseth, 2003). Organizations are now pushing for skill flexibility, demanding specialized knowledge and requiring faster learning curves from employees. Many advocate Internet-based education materials as one way to meet those challenges (Bernardes & O'Donoghue, 2003; Karoulis et al., 2004; Storey et al., 2002; Strazzo & Wentling, 2001). However, this raises important questions concerning both effectiveness and efficiency of such tools and materials. Indeed, developing interactive multimedia-based courseware remains pretty much a black art, consuming enormous resources. So far, there is a lack of established models to predict the performance and evaluate how adequately courseware can meet user needs. In fact, developing courseware should take into account the target constituency requirements, organizational context, and the stated educational or training goals. Developing the wrong training materials can lead to costly investments in creating and maintaining content to match the increasing expectations on e-learning. Perhaps this can explain the recent rash of failed e-learning projects—current results do not measure up to business and individual expectations yet.

A better understanding of the many factors affecting e-learning performance would allow individuals and organizations to achieve the expected benefits. In so doing, development teams need methods, techniques, and tools to evaluate in advance which features are needed to achieve higher outcomes, namely, performance and satisfaction. Thus, the need to develop predictive models to improve learning effectiveness is in order.

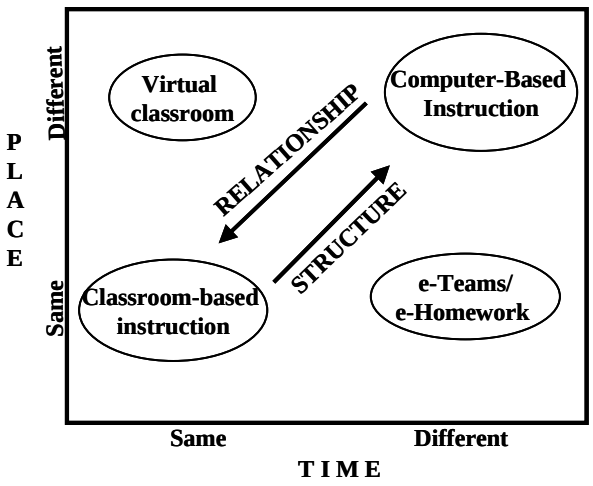
This overview includes four sections. "Background" presents a proposed e-learning theoretical framework to guide our analysis based upon the reviewed literature. "Key Issues" section describes main issues arising from the proposed e-learning conceptual framework. "Future Trends" describes our vision on how to approach e-learning initiatives and future trends. Finally, we present a general conclusion.

BACKGROUND

Organizational investment in e-learning strategies reflects strategic choices regarding skill development through e-learning. According to Wentling, Waight et al. (2000), e-learning involves acquiring and using distributed knowledge facilitated by electronic means in synchronous or asynchronous modes. As shown in Figure 1, knowledge could be distributed geographically within varying time frames.

Thus, the effective use of technology-based instruction would provide to organizations the ability to succeed at operational levels. This justifies the adoption of a holistic approach to courseware evaluation as a diagnos-

Figure 1. Proposed types of e-learning in terms of time and place



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tic and managerial tool. We propose a framework, shown in Figure 2, which comprises three basic entities, business processes, people, and information systems, and three main relationships: (a) interaction between people and systems, (b) process-based roles played by people during this interaction, and (c) having the learning task be executed, as part of the e-learning experience, by people performing their process-based roles. This framework could lead to working techniques and approaches that assist development team members in designing work-related e-learning experiences within organizational contexts. To motivate a workable approach, we will now discuss each of these entities and relationships.

Reviewed literature strongly suggests that the external and internal fit among business strategies, culture, human resource practices, and leadership styles is critical to worker performance. Moreover, work contexts, for example, physical and technological conditions surrounding individual tasks, affect people's perceptions and, in turn, influence their motivation to engage into and perform learning tasks (Astleitner, 2001; Bandura, 2000; Chen, 2002; Dix et al., 1998; Kim, 2000; Liu & Dean, 1999; Reeves & Nass, 1996; Strazzo & Wentling, 2001; Vouk et al., 1999; Welbourne et al., 2000; Wentling et al., 2000).

Within the e-learning experience, business processes provide yardsticks to define educational or training goals and monitor outcomes. However, we need also to consider the roles people perform when interacting with courseware. Such process-based roles could be as diverse as e-learners, e-instructors, e-speakers, systems and courseware designers, supervisors, reviewers, human resource managers, and information technology officers among many others.

Human-computer interaction can model parts of the e-learning experience in accordance with Norman's extended model (Dix et al., 1998). Furthermore, the experience is also shaped by the way people relate to systems. This is supported by Reeves' and Nass' (1996) work, which suggests that people relate to media as they would relate to real people, treating them with affection and courtesy. Building on these findings, we argue that the more e-learning systems themselves are easy to use and learn and are "nicely behaved," the likelier e-learners will engage in the experience and profit from their outcomes.

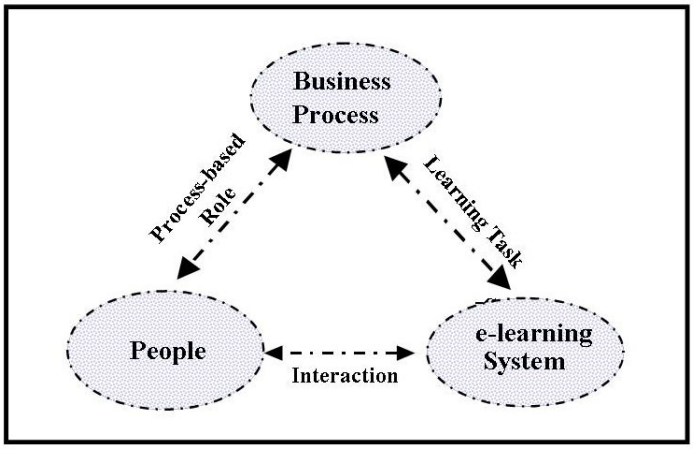
The interplay among these three relationships (process-based role, learning task, and interaction) relates to a just-in-time learning concept. Strategic knowledge acquisition should be enmeshed in current activities to support employees in learning new skills when performing day-to-day business tasks. We believe this concept can foster gradual alignment between learning outcomes, and technology with strategic aspects of business.

KEY ISSUES

We identify structure and relationship as the main issues within our framework as presented in the previous section. Figure 1 shows different modes of e-learning regarding the use of technology in education, both in terms of distance and time. As technology gets more extensively used for delivery, the need for course structure becomes higher and the relationship between instructor and e-learner turns increasingly weaker. Figure 1 also shows this relationship as defining three types of e-learning, which are set apart from conventional classroom instruction.

This shows that using technology to support learning requires higher course structure than traditional classroom-based instruction to be effective (Karoulis et al., 2004; Liu & Dean, 1999). However, current approaches take a one-size-fits-all method to provide courseware

Figure 2. Proposed e-learning framework



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