

## Chapter 3.25

# When Technology Does Not Support Learning: Conflicts Between Epistemological Beliefs and Technology Support in Virtual Learning Environments

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### **ABSTRACT**

Central to the design of successful virtual learning initiatives is the matching of technology to the needs of the training environment. The difficulty is that while the technology may be designed to complement and support the learning process, not all users of these systems find the technology supportive. Instead, some users' conceptions of learning, or epistemological beliefs may be in conflict with their perceptions of what the technology supports. Using data from

307 individuals, this research study investigated the process and outcome losses that occur when friction exists between individuals' epistemological beliefs and their perceptions of how the technology supports learning. Specifically, the results indicated that when there was friction between the technology support of learning and an individual's epistemological beliefs, course communication, course satisfaction, and course performance were reduced. Implications for design of virtual learning environments and future research are discussed.

## INTRODUCTION

Advances in information technology have enabled organizations and educational institutions to deliver training and learning initiatives free from time and/or place constraints, creating virtual learning environments (VLEs).<sup>1</sup> These environments are becoming central to the design and development of both corporate training programs and university curricula. While there are multiple ways to design these environments, common characteristics of virtual learning environments include the mediation of course interactions and materials through information and communication technologies (Alavi & Leidner, 2001) and greater control over the learning environment (Piccoli, Ahmad, & Ives, 2001).

The market for this type of training is substantial, with recent estimates suggesting that the industry will generate nearly \$25 billion by 2006 (IDC, 2003) and grow annually at approximately 37% (Mayor, 2001). Universities are also undertaking distance initiatives, with estimates suggesting that nearly 90% of public universities offer distance education courses, over three million students participate in these courses, and these numbers are projected to grow (Wirt & Livingston, 2004). The major push behind these initiatives has been both convenience and cost. These initiatives have both potential and pitfalls as can be seen through the findings of two recent studies. Although the potential for cost savings is large, with some large companies finding cost savings of between \$30-\$400 million dollars per year and reductions in training costs of nearly 50% (Salas, DeRouin & Littrell, 2005), another study has suggested that as many as 80% of employees drop out of these programs before they are complete (Flood, 2000).

Thus, it is important to understand the factors that affect the successful implementation of VLE initiatives. Previous research has suggested that instructor characteristics, pedagogical approach or learning models, learner/user characteristics,

and the technology each play a key role in creating successful outcomes (Alavi & Leidner, 2001; Piccoli et al., 2001; Webster & Hackley, 1997). Recently it has also been argued that a key to the successful implementation of these environments is the convergence between the technology used in the learning environment and the implemented learning model (cf. Benbunan-Fich, 2002; Leidner & Jarvenpaa, 1995; Robson, 2000).

However, when the technology used to support learning is designed to support a specific learning model, this can often lead to a compulsory learning process that users must follow to reach the course objectives (Vermunt, 1998). For some users, the learning approach supported by the technology can be in direct conflict with their beliefs about how learning should occur (i.e., their epistemological beliefs) (Bakx, Vermetten, & Van der Sanden, 2003; Schommer-Aikins, 2004). Relatively little is known regarding the implications of the conflict between an individual's epistemological beliefs (EBs) and the learning environment supported by the technology, but given the centrality of technology to the learning process in VLEs and the central role of EBs in how individuals approach learning and how they learn (Marton, Dall'Alba, & Beaty, 1993; Marton & Säljö, 1976; Perry, 1968; Vermunt, 1996), the relationship between the two is likely to be important. Thus this research represents the beginning of a systematic examination of the role of EBs in VLEs.

Drawing from research on EB, evidence suggests that when users do not perceive that the technology supports their optimal learning approach (i.e., there is friction between the individual's EBs and the learning approach supported by the technology), there will be both process and outcome losses. If negative expectations regarding the ability of the technology to adequately support a learning environment consistent with the user's EB emerge it can be difficult for the user to accept this novel way of course delivery (Vermunt & Verloop, 1999, 2000). We argue that

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