Chapter 11

Rethinking End-User Training Strategy: Applying a Hierarchical Knowledge-Level Model

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Training in information technology (IT) tools has traditionally been defined in terms of skills. Consequently, training methods and approaches have focused almost exclusively on ensuring that a trainee acquires the skills required to use an IT tool, and in a specific domain. With the advent and increasing use of enterprise-wide IT architectures, such as client/server, integrated processes such as workflow systems and integrated packages such as SAP, this narrow view of training will prove to be inadequate in preparing the workforce of the future. To train such a workforce, we propose a re-conceptualization of training based on a hierarchy of knowledge levels that a trainee will need. We then use this hierarchy to propose an integrated framework that can be used to develop a comprehensive training strategy. We offer directions for research that are needed to use our model to develop effective training strategies.

Traditional technology training is skills-focused. The goal is to teach programmers and users how to operate their tools and applications. In this chapter, we argue that such a narrow approach to training is not truly effective, and is inadequate for training the workforce of the future. We illustrate our thesis by the following example. Snell (1997) reports that an implementation of a client/server architecture at Carnegie Mellon University was a failure because it was limited to skills-focused training. Programmers did not see the need for the new development tools, and users could not distinguish between hardware and software problems.

The organizational landscape of future information technology (IT) use will differ

markedly from the traditional organizational function-based and end-user computing views of recent decades. The future workforce will be required to develop and operate applications based on enterprise-wide architectures, processes, and systems. These include integrative applications such as SAP that feature workflow systems and run on groupware platforms that depend on client/server architectures. IT will be integrated into the very fabric of organizations, which will be characterized by a focus on knowledge management and continuous learning.

In fact, the technologies noted above have been in use for some time, but are rapidly changing. This means that the learning process for computer users must be rapid and continuous. Rapid changes have led to enormous spending on IT training. Nelson, Whitener, and Philcox (1995) estimate it at over $5 billion in 1994. Still, the lack of successful implementation of new technologies often has been a lack of skilled personnel (Snell, 1997). Accelerated and continuous learning requires a different level of focus in IT training practices, one not found in traditional skills-focused training.

One of the aspects of a higher level of focus is that of conceptual training. Snell (1997) describes how Carnegie Mellon finally realized that in order to successfully deploy a client/server system, both IT staff and end users had to be given a broad conceptual view of the overall architecture. In this chapter, we introduce a framework of knowledge levels that comprise a more complete range of knowledge outcomes for training the workforce of the future. The framework covers six types of knowledge from syntactical to meta-cognition. It is designed to serve as the cornerstone of developing an effective training strategy. We define a training strategy as the selection of a training method appropriate to a specific type of trainee and a specific IT tool given specific knowledge outcomes.

The rest of the chapter is organized as follows: The next section indicates the importance of conceptualizing IT training in terms of a set of knowledge outcomes rather than as a task of cost minimization. The following section presents prior research on the knowledge outcome, and introduces the "levels of knowledge" framework. Then a discussion of training research frameworks leads to the presentation of another framework, this one related to designing training strategies. The chapter concludes with a discussion of implications for practice and suggestions for further research.

CONCEPTUALIZING TRAINING IN TERMS OF OUTCOMES

We noted above that IT training is big business today. Doane (1996) describes an SAP implementation where training costs, including change management, were in the order of 10% of the total implementation costs. Some analysts believe that this figure can rise to as much as 20%. With burgeoning costs come attempts to devise innovative methods for cost minimization. A current popular approach is to develop or acquire computer-based training (CBT) packages. In addition, companies form partnerships with universities or even competitors to outsource some of the training burden (Blumfield, 1997). However, there is no evidence about the extent to which these cost reduction measures are influencing the effectiveness of training as reflected in use of the IT tools on the job. Cost minimization may reduce training benefits.

The potential intangible benefits of training can outweigh costs if the training is appropriate and effective. That is, the training must give the trainee appropriate knowledge and the motivation to use the system (Bostrom, Olfman, & Sein, 1990). It is evident that a traditional approach falls short in defining appropriate knowledge. Moreover, the traditional