



An integrative model of e-learning use: Leveraging theory to understand and increase usage

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ABSTRACT

Employees are increasingly using technology to access content for learning, and theory development has been outpaced by practice. Drawing on a well validated theory of behavior change (the Transtheoretical Model of Change), as well as theories on technology acceptance and employee development, this paper offers an integrative model of factors that influence employee use of e-learning as well as practical recommendations for how use might be increased. Recommendations for future research on e-learning are also offered.

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1. Introduction

Arguably the most dramatic trend in employee training and development over the last 20 years has been the increased use of technology to deliver training (Brown & Sitzmann, 2011; Heathfield, 2010; Patel, 2010; Rossett & Sheldon, 2001). Part of what explains this trend is the convergence of technologies used to deliver content. Increasingly, movies, games played via dedicated consoles, books, audio recordings, and even live presentations are all being digitized and delivered via computer and network technologies. In the case of workplace learning, convergence allows learning materials of all kinds to be used by employees, on demand, through a variety of platforms – desktop computers, laptops, cellular “smart” phones, and increasingly agile digital book readers and media players. Digitally transmitted content accessed by employees for purposes of learning work-related knowledge and skill, which we label e-learning, is becoming an increasingly common aspect of work.

Concerns have emerged that e-learning often does not live up to its full potential, in part because of low usage rates and high attrition (Bell, Martin, & Clarke, 2004; Brown, 2001; Brown, 2005; Tyler-Smith, 2006; Wang, 2010). In short, the availability of an e-learning resource does not ensure its use, let alone its effectiveness as a tool to change employee behavior. Three related streams of research are useful for understanding these concerns, including research on: (1) general information technology usage (e.g., Davis, Bagozzi, & Warshaw, 1989; Venkatesh & Bala, 2008), (2) employee development broadly defined (e.g., Maurer, Lippstreu, & Judge, 2008), and (3) the limited research focusing directly on e-learning use (e.g., Brown, 2005; Luor, Hu, & Lu, 2009; Wang, 2010). Even though each of these areas offers some insight into e-learning use, no consensus has emerged about the dominant factors that determine employees' usage decisions. This paper seeks to develop a theory, drawing from all three of these research streams, to explain the various factors that influence an individual's use of e-learning. In addition, drawing on the logic of research regarding pre-training interventions and behavior change, the theory incorporates an intervention designed to boost the probability that a given individual will make use of a particular e-learning opportunity. More specifically, we adopt a well-validated model of behavior change, the Transtheoretical Model of Change (TTM; Prochaska, DiClemente, & Norcross, 1992), as a framework for designing a pre-training intervention to boost e-learning use. In this vein, our model is not intended to be an exhaustive portrayal of e-learning effectiveness, but a theory-driven perspective on the most proximal influences of e-learning

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usage within a particular context. That is, the primary outcome in our model is use of e-learning, not learning (or transfer) as a result of it.

The paper is organized as follows. First, we will offer brief reviews of the literatures on e-learning effectiveness and use, information technology use (specifically through the lens of the Technology Acceptance Model; Davis et al., 1989), participation in employee development, and pre-training interventions. We then describe the TTM and adopt it to this context, offering both a conceptual model and specific research propositions. We conclude with limitations and suggestions for future research.

2. Literature review

The annual State of the Industry Report by the American Society of Training and Development (ASTD) offers a snapshot of changes that have occurred in training practices over time. The latest available report indicates that since 2001, the percent of training time organizations offer via technology has more than doubled (Patel, 2010). Even though classroom-based training still accounts for over 60% of training hours, the growth of technology-based training has been substantial – 36.5% of learning hours offered in 2009 were available via technology, the highest level since ASTD began collecting this data. Importantly, this estimate only accounts for formal training delivered via technology. The increase in on-line resources for learning, resources used informally to gather or share information, is harder to track. As one example, estimates suggest that approximately two-thirds of large organizations in the United States offer SharePoint to their employees (Infotrends, Inc, report cited in Greenfield, 2009). SharePoint is a Microsoft software platform that allows for file sharing and collaboration. SharePoint may be used simply to archive documents; or, more relevant to our model, it may be used as a platform to distribute materials intended to help others learn. Our definition of e-learning would subsume this use of the software. So estimates of e-learning derived from studies of formal training likely underestimate its prevalence, at least in organizations and industries where employees frequently work with computers.

2.1. e-Learning effectiveness

There are both advantages and disadvantages of the trend toward e-learning, which are discussed in more detail elsewhere (e.g., Welsh, Wanberg, Brown, & Simmering, 2003). The Welsh et al. (2003) review found that organizations can achieve numerous benefits from implementing e-learning programs, including consistency in training, reduced cycle time, increased convenience for learners, improved tracking capabilities, and reduced cost. Potential drawbacks, according to the authors, can include higher up-front cost, lack of trainee interaction, and the possible confusion within organizations of providing information (i.e., content to be learned) without actually providing training (i.e., content embedded within an instructional framework including objectives, practice, and feedback; Welsh et al., 2003).

Another potential advantage of e-learning is the flexibility and control that it typically affords learners. This increase in learner control has been noted as a defining feature of the shift to e-learning (e.g., Brown & Ford, 2002; Orvis, Fisher, & Wasserman, 2009). But learner control does not always result in better outcomes. As Kraiger and Jerden (2007) note in their meta-analysis, allowing learners control means that learners are free to not use the materials, or use them superficially. Learners may, for example, open an e-learning resource on their computer, but ignore it while they do other tasks. Or they may skim e-learning information quickly without paying attention to the materials.

Given the relatively equal number of advantages and disadvantages, research has been undertaken on the relative effectiveness of e-learning and traditional classroom instruction. One early meta-analysis of computer-based versus classroom classes found small advantages for computer-delivery (Kulik & Kulik, 1991). Similarly, a meta-analysis of video-delivered versus face-to-face delivery found a small advantage for video delivery (Machtmes & Asher, 2000). However, a more recent meta-analysis on the relative effectiveness of instructor-led versus web-based training reveals that many of the observed differences are attributable to differences in instructional design. The Sitzmann, Kraiger, Stewart, and Wisher (2006) meta-analysis found an effect favoring web-based training, but it was reduced dramatically when studies were restricted to those with similar instructional design across the classroom and web training. The finding that learning does not differ across different forms of delivery methods, so long as the content and instructional design are held constant, is a position well established in the instructional design and technology community (e.g., Clark, 1994, Russell, 1999; but see Kozma, 1994 for an alternative view). In general, meta-analytic work continues to indicate that learning outcome differences across technology delivery and more traditional face-to-face delivery, when potential confounds are controlled, are inconsistent or minimal (Allen, Bourhis, Mabry, Burrell, & Timmerman, 2006; Cook et al., 2008).

These results suggest that future research on the broad question of “which is more effective, e-learning or classroom instruction” is likely to offer little theoretical or practical value. e-Learning offers the potential to increase access to learning resources, access that might not occur in the absence of the technology. Viewed from this perspective, more interesting research questions included, “how can we increase use of e-learning resources?” and “how can we design e-learning to maximize learning?” To this end, researchers have offered design principles relevant to e-learning. For example, Salas, DeRouin, and Littrell (2005) present a series of recommendations for the design and delivery of distance learning programs, of which e-learning is increasingly becoming the most common form (see Table 1). These empirically-based guidelines cover various topics including organizational contextual factors, design features, recognition of technology efficacy differences in learners, and learner control issues. An e-learning training program can be, for example, more cost effective than traditional classroom training if travel costs are eliminated. No travel may also mean employees spend less time away from the job. E-learning can also be useful for standardizing training and delivering it to large, geographically dispersed learners simultaneously. Learners might include

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