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An empirical examination of e-learning design: The role of trainee socialization and complexity in short term training

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ABSTRACT

Using data from 143 individuals, this study examined how pre-training socialization and task complexity affected learning in an online environment. A controlled laboratory experiment, using a 3 (socialization) × 2 (complexity) between subjects design was conducted. Participants were assigned to either more or less complex training and received either face-to-face, online, or no socialization before beginning the training. Results indicated that those who received face-to-face socialization performed better than those who received either online socialization or no socialization. There was no learning difference between the online and no socialization condition. Those who received simpler training performed better than those who received more complex training. Socialization and complexity were not interactively related. Implications for research and practice are discussed.

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1. Introduction

Organizations continue to invest billions of dollars annually into the training and development of their employees with the goals of producing positive changes to their workforce, maximizing employee potential, and improving organizational performance. In 2011 alone, U.S. organizations spent $156.2 billion (or $1,182 per employee) on learning and development (Miller, 2012). Of this training, over 25% of the hours were spent online and nearly 40% were technology supported (Miller, 2012). Organizational commitment to these e-learning initiatives is high, with some estimating that the global e-learning market will be nearly $50 billion by 2015 (Adkins, 2011). E-learning is argued to provide efficiency and cost savings (DeRouin, Fritzsche, & Salas, 2004; Welsh, Wanberg, Brown, & Simmering, 2003), greater flexibility and learner customization (Cascio & Aguinis, 2005; Kraiger, 2003; Long & Smith, 2004), and reduction of training time (Salas, DeRouin, & Littrell, 2005; Welsh et al., 2003). For example, companies have found cost reductions of over 40% compared to traditional training (Gill, 2000) and IBM was able to provide five hundred percent more training at one third the cost by switching to e-learning (Hall & LeCavalier, 2000).

However, the implementation of e-learning has not automatically resulted in increased training efficacy (Goldstein & Ford, 2002). There are potential drawbacks that can limit the effectiveness of e-learning. These include an added level of complexity resulting from the technology mediation of course interactions (Hillman, Willis, & Gunawardena, 1994), a sense of isolation

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felt by learners (Garrison & Arbaugh, 2007; Welsh et al., 2003), and lower learner engagement (Salas et al., 2005). Thus, it should not be surprising that many students, faculty, and professionals have indicated that they prefer face-to-face (FtF) courses over online courses (Means, Toyama, Murphy, Bakia, & Jones, 2010). Some scholars have therefore argued that e-learning is less effective than FtF training because it is simply an adaptation of other training tools and inferior to the original delivery method (Barton & Delbridge, 2001). But, research has shown that performance deficits in e-learning are often less due to technology and more due to training design (Sitzmann, Kraiger, Stewart, & Wisher, 2006).

Ultimately maximizing the advantages of e-learning while mitigating its drawbacks is less about technology, and more about applying sound training principles and using technology in a manner that best supports these design principles. For example, a key recommendation made by Salas et al. (2005) was to "allow for interaction between trainees and for communication between trainees and facilitators" (p. 117). Research has shown that purposeful interaction between trainees improves e-learning outcomes (e.g., Arbaugh & Benbunan-Fich, 2006; Johnson, Gueutal, & Falbe, 2009; Johnson, Hornik, & Salas, 2008). But a remaining question is what can be done to increase the frequency of purposeful interactions when e-learning occurs in a compressed timeframe, rather than in an ongoing setting?

Facilitating purposeful interactions in shorter courses will likely grow in importance because the length of a course has become one of the most important considerations by CEOs as they evaluate training investments (Skillsoft, 2012). Research has shown that even for short-term teams, having members develop stronger interpersonal relationships is important (Druskat & Kayes, 2000). Therefore, it is important to investigate mechanisms for designing e-learning that enhances the likelihood that members gain stronger interpersonal relationships and a shared learning environment. Thus, one purpose of this research is to focus on the use of pre-training socialization to build peer connections early in the training. Pre-training socialization occurs when learners are provided with an introductory socialization period where they have the opportunity to get to know each other, develop relationships, and develop a sense of trust with their peers. For example, in pre-training socialization, trainees could engage in activities where they could share information about themselves such as their job titles, location, hobbies, and interesting facts about themselves.

To this research question, we add a second one, how does learning complexity can affect performance in e-learning? Learning complexity is a reflection of the information load, information diversity, and rate of information change involved in training (Sweller, 1988). Salas et al. (2005) recommended that organizations "provide distance learning for hard-skill training but supplemented with other forms of instruction for training on such abstract topics as workplace ethics" (p.120). It has been argued that some material may be too complex to effectively communicate in an online environment (Salas et al., 2005; Welsh et al., 2003). But only limited empirical work on the role of complexity exists. Therefore a second goal of this study is to investigate the role of learning complexity.

Despite the concerns about using e-learning for more complex tasks, it has been argued that the more that trainees are connected and part of a shared learning environment, the more effective learning should be (Johnson et al., 2008). In addition, research has also argued that the more individuals have a shared understanding and communication environment, the greater the complexity of tasks that they can complete electronically (Markus, 1994; Zack & McKenney, 1995). Even though complexity can make learning more challenging, these previous studies suggest that peer connections and a shared learning environment may be even more important when the training tasks are more complex. Therefore, the final focus of this study was to investigate whether learning complexity and trainee socialization were interactively related to learning.

2. Theoretical overview

2.1. E-learning

E-learning has been defined as a form of training where "learning material [is provided] in online repositories, where course interaction and communication and course delivery are technology mediated" (Johnson et al., 2008: 357). Research on e-learning can be broadly categorized into three main areas: course/training design factors, technology factors, and student/trainee factors. For example, research on e-learning design has compared the effectiveness of online versus FtF instruction (Campbell & Swift, 2006; Sitzmann et al., 2006). It has also focused on the role of peer and instructor interactions (Arbaugh & Benbunan-Fich, 2006; Arbaugh, 2000, 2001; Russell, Kleiman, Carey, & Douglas, 2009) and the use of learner control (Akyol & Garrison, 2008; Orvis, Fisher, & Wasserman, 2009). Still other research has focused on how using techniques such as metacognitive instruction (Schmidt & Ford, 2003) or adaptive guidance (Bell & Kozlowski, 2002) can improve outcomes.

E-learning research has also focused on how technology can enhance e-learning. For example, studies have focused on the use of WebCT/Blackboard, mobile phones, group support systems, and online video tutorials (Alavi, Marakas, & Yoo, 2002; Chao & Chen, 2009; Lu, Yu, & Liu, 2003; Zhang, Zhao, Zhou, & Nunamaker, 2004). Research has also focused on the adoption and use of e-learning technology and how these adoption factors affect e-learning effectiveness (Carswell & Venkatesh, 2002; Ong, Lai, & Wang, 2004). Finally, research has focused on student/trainee characteristics such as computer experience, conscientiousness, goal orientation, self-efficacy, and metacognitive activity (Brown, 2001; Johnson et al., 2009; Schmidt & Ford, 2003; Schniederjans & Kim, 2005). The current study best fits within the design factors research stream and extends research on two design considerations: trainee socialization and training complexity.