OPTIMIZING E-LEARNING: RESEARCH-BASED GUIDELINES FOR LEARNER-CONTROLLED TRAINING

Renée E. DeRouin, Barbara A. Fritzsche, and Eduardo Salas

The widespread availability of the Internet has revolutionized the way organizations train their workforces. With e-learning methods, learning can take place on-demand, and trainees can be given greater control over their learning than ever before. This increased control has the potential to improve training effectiveness. However, the failure of many e-learning programs suggests that organizations would benefit from a set of research-based principles on providing learner control in e-learning. In this article, we offer guidelines for preparing trainees for learner-led instruction, the design of learner-controlled training, and the creation of workplace conditions that facilitate successful learner-led training. © 2004 Wiley Periodicals, Inc.

Introduction

In this rapidly changing work world, organizations are investing more money in training than ever before (Bassi & Van Buren, 1999). At the same time, advancements are being made in training technology and research (Mantyla, 2000; Salas & Cannon-Bowers, 2001). One important advancement in training technology is e-learning. E-learning is defined by the American Society for Training and Development's e-learning glossary as "a wide set of applications and processes, such as Web-based learning, computer-based learning, virtual classrooms, and digital collaboration" (Kaplan-Leiserson, 2002, paragraph 85). Whereas text pages are the primary means of presentation in traditional instruction, e-learning can deliver information through such varied formats as graphics, videos, audios, animations, models, simulations, and visualizations (Federico, 1999).

E-learning allows training to reach a diverse and geographically dispersed workforce

Correspondence concerning this article should be addressed to Renée E. DeRouin, Department of Psychology, University of Central Florida, P.O. Box 161390, Orlando, FL 32816-1350, e-mail: renee@derouin.com; Barbara A. Fritzsche, PhD, Department of Psychology, University of Central Florida, P.O. Box 161390, Orlando, FL 32816-1350, e-mail: bfritzsc@mail.ucf.edu; or Eduardo Salas, PhD, Department of Psychology, University of Central Florida, P.O. Box 161390, Orlando, FL 32816-1350, e-mail: esalas@pegasus.cc.ucf.edu. The authors thank Edward DeRouin and three anonymous reviewers for their guidance in developing this manuscript. This article was awarded the 2004 Robert J. Wherry Award for the Society for Industrial and Organizational Psychology. Portions of this article were presented at the 18th annual meeting of the Society for Industrial and Organizational Psychology, Orlando, FL, April 13, 2003.

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in a cost-efficient manner. Learning can take place on-demand, at any time, and at any place. Training programs can even be structured so that learners have the opportunity to collaborate remotely on training tasks. For instance, in synchronous learning environments, trainees complete Web-based training tasks together in "real time." Conversely, e-learning may be designed so that trainees follow more structured programs individually. These programs are typically referred to as asynchronous learning environments (Selix, 2001).

Learning can take place on demand, at any time, and at any place.

Recently, organizations have attempted to capitalize on the benefits of both e-learning and traditional instructor-led training by creating training programs that involve a combination of both classroom and computer-based training techniques. In these programs, learners are able to interact in classroom settings and to work on training tasks at any time and at any place via e-learning methods. These training programs have the potential to improve the quality of instruction by meeting the needs of learners who perform better under either classroom or Web-based training techniques (Goodridge, 2001).

Another benefit is that e-learning provides a unique opportunity for learner control. Learner control generally refers to "a mode of instruction in which one or more key instructional decisions are delegated to the learner" (Wydra, 1980, p. 3). In other words, learners are given command over instructional options that were traditionally instructor- or program-controlled (Ross & Rakow, 1981). Since Mager coined the term in 1961, learner control has grown to include control of many instructional design elements, including control of the content, sequence, pacing, context within which to learn, method of presentation, provision of optional content, locus of instructional control, incentives, and task difficulty of instruction (Mattoon & Klein, 1993; Ross & Rakow, 1981; Sims & Hedberg, 1995). In classroom training, instructors generally direct learning tasks, and training is often tailored to meet the needs of the average trainee. However, e-learning employs technology that allows learners to choose the material that is most important to them to study and to move at their own pace through a flexible sequence of topics.

The provision of learner control may have several benefits. For instance, learner control can improve learning outcomes (e.g., Ellermann & Free, 1990; Freitag & Sullivan, 1995; Milheim, 1990; Shyu & Brown, 1992), increase satisfaction with training (e.g., Freitag & Sullivan, 1995; Hintze, Mohr, & Wenzel, 1988; Ross, Morrison, & O'Dell, 1989; Schnackenberg & Sullivan, 2000), and increase the amount of time trainees choose to spend on the instructional task (e.g., Shyu & Brown, 1992). Thus, learner-led instruction has the potential to improve training effectiveness.

However, learner control is not always associated with better training outcomes. In several studies, researchers found that learner control led to decreased learning outcomes (e.g., Lai, 2001; Ross & Rakow, 1981; Steinberg, Baskin, & Matthews, 1985; Tennyson, 1980), less training satisfaction (e.g., Carlson, 1991; Gray, 1987), and reduced time on task (e.g., Freitag & Sullivan, 1995; Lai, 2001; Murphy & Davidson, 1991; Tennyson, 1980). These studies suggest that learner control is not always beneficial.

The amount of training offered and the relevance of the instructional material to study participants may potentially explain why some researchers found positive effects of learner control interventions while others found negative effects. On the one hand, studies that found that learner control improved training effectiveness generally involved longer instructional sessions (e.g., approximately 45 to 60 minutes) and provided instruction on topics directly relevant to college courses participants were taking or to requisite workplace skills. For example, photography instruction was provided to educational media students, and information on the international commercial terms of shipment was provided to employees in the purchasing departments of a large company. On the other hand, studies that found that learner control was detrimental to training outcomes typically had shorter instructional periods (sometimes as brief as 7.7 minutes but generally around 35 minutes) and involved topics that were not directly related to classes participants were taking (e.g., participants from a basic educational psychology

course were given remedial math instruction). These two factors may have reduced the participants' perceived value of the instruction and, as a result, their motivation to learn the material covered in the instructional sessions.

Several researchers have offered general instructional guidelines for learner control (e.g., Brown & Ford, 2002; Chung & Reigeluth, 1992; Hamel & Ryan-Jones, 1997; Hannafin, 1984; Merrill, 1988; Milheim & Martin, 1991; Ross & Morrison, 1989). However, these guidelines are not specifically geared toward adult workplace e-learning. Workplace e-learners often lack the time necessary for formal training and instead require training to be quick, on-demand, and accessible from a variety of locations; e-learners also require that training focus on specific skills with immediate applications (Brown & Ford, 2002). Because workplace e-learners have different needs and motivations than other types of learners, learner-controlled training may need to be designed differently in order to be successful. Therefore, this article is based on findings from educational, industrial, and military settings and focuses on findings that are most relevant for workplace learning. Our intent is not to provide a literature review on adult learner control (for that, see DeRouin, Fritzsche, & Salas, in press; Friend & Cole, 1990; Goforth, 1994; Steinberg, 1977, 1989), but to report research-based principles that apply to adult learner control in e-learning contexts.

In developing succinct guidelines, there is always the risk of trivializing the findings of complex empirical studies. We tried to minimize that risk by providing a research-based rationale following the presentation of each guideline (see Table I for an overview of the guidelines and the references from which they were derived). Moreover, within each section, we present the guidelines in order of our level of confidence about them, beginning with guidelines based upon empirical results and ending with guidelines based upon theory and suggestions from researchers. We hope that this article will offer practitioners an organized set of guidelines for preparing trainees for learner-led instruction, the design of learner-controlled training, and the creation of workplace conditions that facilitate successful learner-led training. Moreover, because the guidelines are offered in order of confidence, we hope to provide researchers with the impetus for future studies on workplace learner control.

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Preparing Trainees for Learner-Led Instruction

Trainees who are given control over their learning are often poorly equipped to use that control. In fact, this may be a primary reason why many learner control programs fail (Reeves, 1993). In this section, therefore, we offer research-based guidelines for preparing trainees for learner-led instruction.

Guideline # 1: Understanding Learner Control Is Half the Battle

Give trainees instructions that allow them to understand the control they have and how that control can contribute to improved learning outcomes (Brown & Ford, 2002). Researchers often fail to mention how learner control was presented to learners and what instructions were provided on how to use it. In our review, we found only one study (i.e., Tennyson, 1980) that explicitly stated that learners were told about the amount of control they would be given. Yet, if trainees are unaware of the amount of control they have, they may not know what control options they can use or how to use them (Gay, 1986). In fact, Steinberg et al. (1985) argued that control over learning tools is useless if trainees do not understand the purpose of the tools or the way in which the tools are used.

Hintze et al. (1988), in reference to their research paradigm, noted that "no information was given beforehand to the students regarding the pedagogic ideas behind the construction of the programs, and teaching methods were never discussed. It is interesting to note that when this is the case, almost half of the students were not able to distinguish between very different teaching methods" (p. 8). This finding emphasizes the importance of providing learners with instructions on the use of the learner control that they have. Otherwise, they may think

TABLE 1 **Summary of Research-Based Guidelines for Offering Learner Control in Workplace E-Learning**

Guideline	*Description*	*References*
	Preparing Trainees for Learner-Led Instruction	
Understanding Learner Control Is Half the Battle	Give trainees instructions that allow them to understand the control they have and how that control can contribute to improved learning outcomes.	Gay, 1986; Steinberg et al., 1985; Hicken et al., 1992.
Give It Time	Provide trainees with enough time in training to learn how to use learner control strategies.	Cronbach & Snow, 1981; Reeves, 1993.
Calibrate Expectations	Help trainees understand that adult training, especially learner-controlled training, is challenging.	Freitag & Sullivan, 1995; Gray, 1987.
	Designing Learner-Controlled Training	
Offer Help	Trainees should be given tools during training that help them to diagnose their skill development.	Metacognitive/self-regulatory skills training: Osman & Hannafin, 1992; Schraw, 1998; self-tests/feedback: Brown & Ford, 2002; advisement/ adaptive guidance: Bell & Kozlowski, 2002; Shyu & Brown, 1992; Tennyson, 1980.
What's Good for One Trainee May Not Be Good for Another	Certain trainees may benefit more from learner control than others (e.g., trainees with high ability, prior experience, and motivation).	Colquitt et al., 2000; Gay, 1986; Kanfer & Ackerman, 1989; Lai, 2001; Tsai & Tai, 2003.
More Isn't Necessarily Better	The amount of control given needs to be matched to the amount necessary for effective training; with too much control, trainees' cognitive resources may become tied up in decision making rather than training content.	Freitag & Sullivan, 1995; Gray, 1987.
"Skipping" Is Better Than "Adding"	Allowing trainees to skip instruction rather than add extra instruction during training may increase the amount of time spent on the optional portions of a program and still offer trainees control over the amount of instruction.	Hicken et al., 1992.

TABLE I **Summary of Research-Based Guidelines for Offering Learner Control in Workplace E-Learning** *(continued)*

Guideline	*Description*	*References*
Keep It Real	Trainees may benefit from control over the context of their examples (e.g., nursing, sports, etc.).	Ross et al., 1989.
Footprints Help ("You Are Here")	The training program may need to provide trainees with tools that allow them to pilot themselves through the program and utilize the control they have.	Cognitive maps: El-Tigi & Branch, 1997; Large, 1996; footprints, "return" arrows, and "landmark" links: Nielsen, 1990.
Keep Each Instructional Segment Self-Contained	Trainees in learner-controlled training should not be required to remember too much material when transferring from one instructional segment to another.	Kearsley, 1988.
Share Design Control	Trainees can be given some control over the program's design (e.g., to open multiple windows at once and to control their size and location on the screen).	Kearsley, 1988; Park, 1991.
Be Consistent	The design of the training program should be relatively consistent so that trainees are able to better focus on learner control decisions.	El-Tigi & Branch, 1997.
Create Smooth Transitions	In learner-led instruction, transitions between instructional segments are important so that trainees understand how the segments are functionally related.	Park, 1991.
	Creating Workplace Conditions That Facilitate Successful Learner-Led Instruction	
Promote It	Organizations can promote learner-controlled training through supervisor support of learner-led instruction.	Baldwin & Ford, 1988; Rouiller & Goldstein, 1993; Salas & Cannon-Bowers, 2000, 2001; Tannenbaum & Yukl, 1992.
Organizational Climate Matters	Some organizational climates may be more supportive of learner-controlled training than others. Organizations should assess employees' receptivity to learner-led instruction prior to its implementation.	Rouiller & Goldstein, 1993; Theory Y cultures: McGregor, 1957; need for future research.
Make It Matter	Use of learner control strategies can be linked to organizational incentives to increase trainee motivation.	Colquitt et al., 2000; Vroom, 1964; need for future research.

that their training is simply a computerized version of typical instructor-led training.

Moreover, to be motivated to use learner control, trainees need to expect that learner control will lead to better training outcomes. Therefore, the instructions given to trainees should demonstrate that learner control is instrumental in improving training performance (Vroom, 1964). In addition, because the perception of learner control may be more important than the actual amount of learner control offered (Hicken, Sullivan, & Klein, 1992), ensuring that trainees understand the control they have over their instruction may be more critical than offering a lot of learner control at once (e.g., control of pacing, sequence, content, and amount of instruction).

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For example, instructions might state, "In this training course, you are free to select the context of training examples. In other words, because you are the best judge of your own learning style, this program offers you a choice of the types of examples you would like to view. Your choices include business-related, military, and educational contexts. You can choose the example context that you believe will best help you to understand the topic in each example. This helps you to be in the driver's seat of your own learning experience."

Guideline # 2: Give It Time

Many learner-controlled training programs fail because researchers do not provide enough time in learner-led instruction for learners to understand the control they have (Reeves, 1993). Typically, learner-controlled training tasks last from 30 to 60 minutes (e.g., Burwell, 1991; Ellermann & Free, 1990; Gray, 1989; Lai, 2001; Mattoon & Klein, 1993; Milheim, 1990; Ross & Rakow, 1981). Cronbach and Snow (1981), however, note, "With most of the instructional variables examined in ATI [aptitude-treatment interaction] research, a period of habituation is probably necessary before the student is working with full effectiveness; this leads us to believe that an experiment lasting any less than ten class periods will be uninformative" (p. 44). This suggests that, although the performance of trainees at their first introduction to learner control may be low compared to other forms of instructor-led training, their performance is expected to improve after several exposures to the new instructional technique. As a result, the amount of time trainees need to spend in learner-led instruction is likely to decrease as trainees become more accustomed to the amount of control they have.

Although technology is often developed to make learning easier, new skills are often needed to manage this new technology (Halpern, 2002). Therefore, by providing trainees with enough time to learn how to use learner control and with suggested completion times for each section of the training task, trainees may be better prepared to use learner control strategies and to gauge the amount of time needed to successfully complete the task. As Cronbach and Snow (1981) point out, how much time is enough time, however, depends upon the investment and goals of the instructional treatment; generally, however, ten or more separate sessions are recommended.

Guideline # 3: Calibrate Expectations

Learner-led instruction requires effort. Help trainees understand that adult training, especially learner-controlled training, is challenging. Halpern (2002) notes that adult learners tend to assume that learning is easy; when they find out that it is not, the result is often frustration. The addition of learner control in organizational e-learning programs may make the learning process even more difficult, because trainees have to both understand the content of the program and continually make decisions about the direction of their learning (Freitag & Sullivan, 1995; Gray, 1987). Thus, in order to develop task efficacy, the program instructions may need to explain that training, especially learner-controlled training, is difficult, yet surmountable and worth the extra effort.

The program instructions can describe the difficulty inherent in learner-controlled training before training begins. For example, they might state, "Because this training program expects you to control your own learning, you may find that it is more difficult than other training methods you have experienced. However, when you are actively en-

gaged in the learning process, you will likely learn more and be more satisfied with training. Although you may find the program challenging at first, you will become more adept at using this form of instruction as you become increasingly familiar with it."

Designing Learner-Controlled Training

Several instructional design issues need to be considered when learner control is offered in adult workplace e-learning. Because many e-learning programs are nonlinear, trainees can be given a greater command over their instructional sequences in addition to other forms of learner control (e.g., Large, 1996; Smith & Weiss, 1988). Consequently, e-learning programs need to be designed so that trainees are able to effectively use learner control strategies and, at the same time, structure their learning tasks.

Guideline # 4: Offer Help

Trainees are often poor judges of their learning needs (Carrier, 1984). Therefore, self-monitoring skills need to be taught throughout learner-controlled training so that trainees learn how to better assess their own skill development. Because metacognitive and self-regulatory skills contribute to effective learning (Osman & Hannafin, 1992; Schraw, 1998), enhancing these skills during learner-led instruction may allow trainees to better evaluate their training needs. Otherwise, trainees may be unable to judge the appropriate amount, sequence, or content of training they need.

Self-regulation and metacognition can be enhanced throughout training by giving trainees tools to help them diagnose their skill development (Brown & Ford, 2002). By offering self-tests and feedback, trainees may be better able to decide on the number of examples to view and the amount of practice items to complete. For example, brief self-tests throughout the instructional program can provide trainees with a gauge of their performance on the training task. Self-test results may be offered in the form of absolute (i.e., task) feedback that suggests how trainees are performing individually on the task or in the form of normative (i.e., competence) feedback that suggests how their performance relates to the performance of others (Sansone, 1986). Kanfer (1990) suggests that during early stages of skill acquisition, it may be beneficial for learners to adopt a mastery goal orientation; however, during later phases of skill acquisition, a performance goal orientation may be better. From this, we can infer that absolute feedback may be more useful early on in the training task and that normative feedback may be more useful later. Guidance in the form of program advisement (i.e., recommendations to trainees on the number of examples or practice items to complete; e.g., Shyu & Brown, 1992; Tennyson, 1980) or adaptive guidance (i.e., recommendations to trainees on the type of material to study; e.g., Bell & Kozlowski, 2002) can also help trainees by suggesting where their efforts should be focused in the instructional task.

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Guideline # 5: What's Good for One Trainee May Not Be Good for Another

Know your trainees. Certain trainees may benefit more from learner control than others (Chung & Reigeluth, 1992; Hannafin, 1984; Milheim & Martin, 1991; Ross & Morrison, 1989). Specifically, trainees who are high in ability, prior experience, and motivation may benefit the most from learner control.

Learner ability or "*g*" has generally referred to reading ability (e.g., Ross et al., 1989), mathematical ability (e.g., Lai, 2001), and general academic ability (e.g., Schnackenberg & Sullivan, 2000). In contrast, prior experience has referred to prior achievement and knowledge in the domain (e.g., Gay, 1986; Ross et al., 1989; Shute, Gawlick, & Gluck, 1998) and general scholastic achievement (e.g., Gray, 1989). In most cases, learners high in ability and prior experience outperform learners low on ability and prior experience, regardless of whether they are in program or learner control conditions (e.g., Gray, 1989; Ross et al., 1989; Schnackenberg & Sullivan, 2000; Shute et al., 1998). High-ability learners, however, have also been found to perform better under learner control than under program control conditions (e.g., Gay, 1986; Lai, 2001).

Because one of the goals of training is not to leave anyone behind, it is important that the amount of control given is matched to trainee ability and prior experience. Therefore, it is advisable that organizations first understand the ability level and prior experience of their trainees before a learner-controlled e-learning program is designed. After assessing trainees on these characteristics, organizations can create programs that provide trainees high in ability and prior experience with more learner control options than trainees low in ability and prior experience. For trainees low in these characteristics, greater program control may be preferable.

Before offering learners additional control, training designers should always ask the question, "For what purpose am I adding this control?"

In addition to trainee ability and prior experience, motivation to learn can significantly affect learning outcomes. For example, in a recent meta-analytic review of over 100 studies, Colquitt, LePine, and Noe (2000) found that together *g* and motivation to learn explained 9–63% of the variance in learning outcomes, including declarative knowledge, skill acquisition, post-training self-efficacy, and reactions to training. Moreover, Kanfer and Ackerman (1989) found that motivation had a significant impact on learning outcomes during the intermediate stage of skill acquisition (i.e., during knowledge compilation) and that this influence was independent of the effects of cognitive ability.

In a study investigating perceived importance as a mediator of training assignment and training motivation, Tsai and Tai (2003) found that as trainees became more aware of the importance of training to the achievement of organizational objectives, they also reported being more motivated to participate in training. Learner-controlled training has the potential to be more highly motivating if, before and during training, trainees are reminded of the purpose of training and the ways in which it contributes to organizational goal achievement.

Guideline # 6: More Isn't Necessarily Better

With too much control, trainees' cognitive resources may become tied up in decision making rather than in the content of the instructional program (Freitag & Sullivan, 1995; Gray, 1987). Too much control may mean that trainees are simultaneously given control over pacing, amount of instruction (e.g., number of examples and practice items), sequence of topics, context of examples, and course content. Because trainees are constantly being bombarded with instructional decisions, they may be unable to focus the majority of their attention on the subject matter of the instructional program. This may cause learning to suffer. Before offering learners additional control, training designers should always ask the question, "For what purpose am I adding this control?" The purpose should be consistent with the goals of the instructional program. As a result, the amount of control offered will be limited to that which is required for effective instruction and will be matched to training objectives.

Human resource practitioners can measure learner preferences for the content, sequence, or amount of instruction before training begins. These preferences can then be used to structure training tasks so that learners focus their training efforts on understanding task material rather than on making instructional decisions. Freitag and Sullivan (1995) employed this strategy in a computerized training study that examined the effects of matching trainee preferences to the amount of instruction learners were provided. Before training, trainees were asked to indicate whether they preferred to receive a brief or a comprehensive training program. They were then assigned to instructional treatments that either matched or mismatched these indicated preferences. The authors found that when learning preferences were matched to the amount of instruction participants received, trainees performed better on the training post-test and had more positive attitudes toward the training task. In contrast, when learning preferences were mismatched to the amount of instruction participants received, trainees performed worse during training and felt less confident about the transfer of training to their jobs.

Guideline # 7: "Skipping" Is Better Than "Adding"

Allowing trainees to "skip" extra instruction has been found to encourage trainees to view

more examples and optional content than allowing trainees to "add" extra instruction (Hicken et al., 1992). As a result, trainees allowed to skip extra instruction may be exposed to greater amounts of instructional material than trainees allowed to add extra instruction. Research suggests that learners in control of the amount of instruction tend to "rush" through the instructional task (Murphy & Davidson, 1991; Tennyson, 1980) and select fewer options (Ross & Rakow, 1981; Tennyson, 1980) than learners under program control. However, Hicken et al. (1992) also found that trainees are less likely to "skip" instruction (in what is called a FullMinus program) than they are to "add" instruction (in what is called a LeanPlus program). In other words, learners tend to follow the default options of an instructional program.

Although Hicken et al. (1992) did not find a difference between the post-test performances of learners allowed to skip or add instruction, they did find that learners allowed to skip instruction spent more time on the optional content and completed more examples than learners allowed to add instruction (who spent more time on the mandatory content). Generally, completing more practice exercises and examples improves learning outcomes (Brown, 2001; Driskell, Willis, & Copper, 1992). It appears then that allowing trainees to skip extra instruction rather than add extra instruction during training will increase the amount of time spent on the optional portions of a program and still offer trainees control over the amount of instruction.

Guideline # 8: Keep It Real

Context control can be important. Research suggests that learners who are allowed to choose the context of their examples (e.g., nursing, sports, and educational contexts) tend to view more examples and have better attitudes toward the instructional task (Ross et al., 1989). Moreover, Wexley and Latham (2002) note that when learning material is presented using familiar contexts and examples, the material becomes more meaningful to trainees and they are better able to learn and remember key concepts.

Guideline # 9: Footprints Help ("You Are Here")

Research suggests that learners who are allowed to choose the context of their examples (e.g., nursing, sports, and education contexts) tend to view more examples and have better attitudes toward the instructional task.

Trainees may not be able to navigate through cyberspace alone. The training program may need to provide trainees with tools that allow them to pilot themselves through the program and to utilize the control they have. A major problem associated with Web-based instruction, in particular, is the issue of "getting lost in cyberspace." Trainees who are not given sufficient direction may be unable to find their way back to a particular part of the instructional program (e.g., Park, 1991).

Researchers have offered a few recommendations for providing direction in e-learning programs. For instance, Nielsen (1990) suggests that trainees be given "landmark" links that can be accessed from almost every instructional segment, footprints indicating where they have been, and a "return" arrow so that trainees can backtrack to items they have already completed. In addition, El-Tigi and Branch (1997) and Large (1996) advise that trainees be given a cognitive map of the instructional task so that they can better understand where they are in the instructional program.

Guideline # 10: Keep Each Instructional Segment Self-Contained

Trainees should not be required to remember too much material when transferring from one instructional segment to another. In other words, each segment should contain enough information so that trainees do not have to return to previous pages to understand the concept being trained. For example, a practice problem on one instructional segment should not require trainees to find requisite information on previous segments unless that is a specific skill the program is attempting to train. All of the information needed to complete the problem should be available on one segment. If trainees have to remember considerable amounts of material from one segment to another, and, at the same time, make decisions about the path of their instruction, trainees' cognitive resources may become overloaded (Kearsley, 1988).

Guideline # 11: Share Design Control

Trainees can be given some control over the program's design. For instance, some trainees may like to have multiple windows open at once and to control their size and location on the screen. This may help trainees refer to screens or nodes they have already visited (Kearsley, 1988; Park, 1991). Given this option, trainees may feel more control over the learning process.

The format of the training program should be consistent throughout the training.

In addition, trainees might like to have control over when and where they stop and start in the instructional program. Because e-learners require training to be available on-demand and to present all necessary information as quickly as possible (Brown & Ford, 2002), the instructional program should be built so that trainees are able to pause, stop, or restart the program when and where they wish. This way, trainees are able to receive training on requisite skills just in time for the performance of these skills on the job.

Guideline # 12: Be Consistent

The format of the training program should be consistent throughout the training. If possible, keep the font size and color as well as the background color consistent from one instructional segment to another in learner-controlled training programs (El-Tigi & Branch, 1997). If the format for each text page changes, trainees may become distracted and focus on aspects of the program that are peripheral to the subject matter (El-Tigi & Branch, 1997). Bear in mind that one of the goals of instruction is to minimize the cognitive burden on learners (Kearsley, 1988). If trainees are forced to attend to several things at once, they may be unable to focus as much of their attention on learner control decisions.

Guideline # 13: Create Smooth Transitions

Effective transitions are critical to learning in learner-led training environments. Park (1991) recommends that Web-based training programs provide transitions between instructional segments so that trainees understand how the segments are functionally related. For example, links to segments may be preceded by a few brief lines of text that describe the types of information offered by the different segments, such as, "for an in-depth description of central tendency, click here" and "to see a video example of how to change your camera lens, click here." If trainees do not recognize the relationship between segments, they may not be able to appropriately create their instructional paths and may eventually become lost in cyberspace.

Creating Workplace Conditions That Facilitate Successful Learner-Led Instruction

When learners are prepared and training is designed appropriately, learner-led instruction may improve learning outcomes. However, certain workplace conditions (e.g., organizational culture, incentive systems) may prevent learner-controlled training from being effective. Borrowing from the literature on the science of training (e.g., Baldwin & Ford, 1988; Brown, 2001; Colquitt et al., 2000; Rouiller & Goldstein, 1993; Salas & Cannon-Bowers, 2000, 2001; Tannenbaum & Yukl, 1992), we have constructed the following four guidelines for facilitating learner control in workplace settings.

Guideline # 14: Promote It

Organizations can facilitate the effectiveness of learner-controlled training through supervisor support. Research (e.g., Baldwin & Ford, 1988; Rouiller & Goldstein, 1993; Salas & Cannon-Bowers, 2000, 2001; Tannenbaum & Yukl, 1992) suggests that supervisory support is critical for training transfer. Therefore, it is important that supervisors support learner control in workplace e-learning. Supervisors can do this by setting difficult but attainable goals with employees (Locke & Latham, 1990) regarding the level of mastery or performance expected in learner-led instructional programs. In addition, supervisors can help trainees engage in post-training activities that reinforce the concepts and procedures learned in training programs (Tannenbaum & Yukl, 1992). Through these and other ways of providing

supervisor support, the chances may increase that the material learned in learner-controlled training transfers to the job.

Guideline # 15: Make It Matter

Organizations can offer trainees valued rewards if they take advantage of learner-led instruction. Expectancy theory suggests that people will be more motivated to perform when they believe that their efforts will be rewarded with worthwhile incentives (Vroom, 1964). In fact, the value (i.e., valence) of the incentive may be particularly important when motivating trainees to use learner control strategies. A recent meta-analysis by Colquitt et al. (2000) found that the valence of the reward was highly correlated with training motivation, reactions to training, and training transfer. Therefore, organizations offering incentives for participation in learner-controlled training should not only ensure that trainees judge the incentives to be attainable but also valuable. Although research suggests that offering incentives for using learner control strategies will increase their use, research is needed to determine the specific types of incentives that may improve employee responsiveness to learner control. Learner-controlled training is challenging and results are often delayed (Reeves, 1993). Therefore, organizations may need to provide trainees with immediate incentives for using learner control so that trainees are motivated to participate early on in the process of learner-controlled instruction.

Guideline # 16: Organizational Climate Matters

As Rouiller and Goldstein (1993) suggest, organizational climate can significantly alter the effects of training. Organizations with climates that encourage employee participation, empowerment, and autonomy (e.g., Theory Y cultures; McGregor, 1957) may find it easier to implement learner-controlled training programs. Because employees in these organizations are accustomed to having control over their jobs, they may respond positively to more control in training. Conversely, organizations with climates that are not traditionally supportive of participation, empowerment, or autonomy (e.g., Theory X cultures; McGregor, 1957) may find that learner-controlled training is particularly difficult to implement. In fact, these organizations may find that employees who are not accustomed to having autonomy at work respond negatively to learner control in training. In our review of the literature, we were unable to find any research that specifically investigated the role that organizational climate plays in learner-led training. The paucity of research on this topic suggests a promising area for future study. Until researchers discover the climate's specific role, our recommendation is that organizations assess employees' receptivity to learner-led instruction prior to its implementation.

It is only by bringing learner control research into the "wild" that we can begin to understand how workplace trainees respond to learner-led instruction.

Conclusion

Most learner control research is conducted with student participants, in educational contexts, and in laboratory settings. A review of research on adult learners and college students (Bates, Holton, & Seylor, 1996), however, suggests that adults may differ from college students in their learning needs and motivation. In particular, because adult learners prefer training with immediate applications, they may perform differently than college students when training emphasizes the understanding of abstract theories and concepts. In addition, because adult learners need to acquire the skills taught in training in order to remain job-knowledgeable, they may have different motives for learning than college students who attend learner-controlled training to earn extra credit or course grades.

Therefore, learner-controlled training may need to be designed differently for workplace e-learners. As a result, the time has come for adult learning research—in particular, learner control research—to be moved "out of colleges and into the workplace, military, home, and other settings where adults learn" (Halpern, 2002, p. 34). It is only by bringing learner control research into the "wild" that we can begin to understand how workplace trainees respond to learner-led instruction.

Moreover, organizational factors, such as corporate cultures and incentive systems,

can greatly impact the success of learner-controlled training. For instance, if the organizational culture or incentive system does not support learner-led instruction, trainees may be reluctant to accept and use learner control in training and their training performance may be reduced. Therefore, because the outcomes of e-learning are inseparable from the organizational contexts in which they occur, these factors cannot be ignored in the design of learner-controlled training.

Despite the difficulties inherent in designing and implementing learner-controlled e-learning programs, e-learning is becoming increasingly popular in workplace training.

Although we believe that the guidelines we recommend will improve e-learning outcomes, we recognize that they may also require the development of more elaborate and costly training techniques. For example, our guidelines recommend that trainees be given enough time in learning-led instruction to understand how to use learner control. Although one goal of workplace e-learning is to reduce the time and costs associated with traditional instructor-led training, trainees may need to spend more time in learner-controlled training initially in order to practice using learner control strategies. However, the increased time required of learner-led instruction may only result in a one-time cost. After practice with learner-controlled training, trainees will gradually become more adept at using learner control strategies.

Moreover, the benefits of better design in learner-controlled training can outweigh the costs. For example, offering trainees adaptive guidance and advisement strategies can increase the costs associated with learner-led instruction, but research has also shown that learning outcomes can improve (e.g., Bell & Kozlowski, 2002; Shyu & Brown, 1992; Tennyson, 1980). Therefore, although better training designs may cost more, they may also lead to better training outcomes.

In addition to the guidelines that we present, there are many hallmarks of good training that are similarly applicable to training via e-learning (e.g., providing trainees with clear learning objectives, defining assessment criteria for training before training begins, evaluating whether or not instructional goals are met). A complete review of best practices in training is, however, beyond the scope of this article. The guidelines discussed here were chosen due to their particular relevance to providing learner control in e-learning. These limitations notwithstanding, we do not intend to discount the importance of more general, research-based training principles. For these principles, readers are referred to Kraiger (2002), Salas and Cannon-Bowers (2000, 2001), and Tobias and Fletcher (2000).

Despite the difficulties inherent in designing and implementing learner-controlled e-learning programs, e-learning is becoming increasingly popular in workplace training. In fact, e-learning is so popular that it was projected to account for nearly $11 billion of corporate training funds in 2003 (Moe & Blodget, 2000). In some instances, organizations may find that e-learning provides the most efficient means currently possible for training job-relevant skills. For instance, 28.8 million people in the United States (i.e., one in five U.S. employees) currently telework from home, satellite offices, telework centers, or on the road at least one day a week (International Telework Association and Council, 2001). E-learning can provide these employees with training that is on-demand and easily accessible.

Learner-controlled training programs can also help organizations make the shift from organizational training to self-regulated, lifelong learning. In a rapidly changing workplace, it is critical that trainees remain up-to-date on requisite job skills (Halpern, 2002; Tobias & Frase, 2000), and it is important that organizations create a workplace environment that supports continuous learning (Tannenbaum, 1997). Creating a lifelong learning environment is challenging, but learner-controlled training may play one small part in creating such an environment because it actively engages trainees in the learning task (Brown, 2001; Ellermann & Free, 1990).

We hope that our guidelines will help organizations improve learner control in their workplace e-learning programs. The widespread adoption of e-learning for workplace training suggests that trainees will continue to be given control over instruction; therefore, the findings of research on learner-controlled training will prove invaluable to the design of successful e-learning programs.

Renée E. DeRouin is a doctoral student in the industrial and organizational psychology program at the University of Central Florida. She is the recipient of the Society for Industrial and Organizational Psychology's Robert J. Wherry Award for 2004. Her research interests include training, distance learning, learner control, and stereotype threat, and her work will be appearing in the *Journal of Management, Research in Personnel and Human Resources Management*, *Advances in Human Performance and Cognitive Engineering Research*, and the *Handbook of Human Factors and Ergonomics Methods*.

Barbara A. Fritzsche is associate professor and director of the PhD program in industrial and organizational psychology at the University of Central Florida. Her applied background includes validating psychological tests, developing surveys, and conducting job analyses. Dr. Fritzsche's research interests include learner control in training, decision making in job selection, personality predictors of job performance, diversity in the workplace, and prosocial personality in the workplace. She has published papers in journals such as *Journal of Personality and Social Psychology*, *Journal of Occupational and Organizational Psychology, Journal of Vocational Behavior*, *Personality and Individual Differences*, and *Journal of Applied Social Psychology*.

Eduardo Salas is a professor of psychology at the University of Central Florida and program director of the human systems integration department at the Institute for Simulation and Training (IST). He has authored over 250 journal articles and book chapters and co-edited eleven books. He is editor of *Human Factors* and is on the editorial boards of *Journal of Applied Psychology*, *Personnel Psychology*, *Military Psychology*, *Group Dynamics*, and *Journal of Organizational Behavior*. He is a Fellow of the Society for Industrial and Organizational Psychology, and his research interests include team training, distributed training, learning principles, and training evaluation.

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