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The effectiveness of distance learning initiatives in organizations☆

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Abstract

Today, organizations are increasingly adopting distance learning methods to train and develop their employees. Despite the widespread use of these methods, little research has been done regarding their effectiveness. The present paper reviews current literature on the effectiveness of distance learning methods in terms of employees' reactions, learning, behavior, and organizational results. Suggestions for future research and practice are also offered.

1. Introduction

"Distance learning" is a training technique with which most people have become familiar, in large part due to its coverage in practitioner journals and its widespread use in organizations. To meet the challenges of a fast-paced work environment, many corporations are using video, audio, computer, and internet distance learning technologies to train and retrain their global workforces (Chute, Thompson, & Hancock, 1999). Topics such as management development, job skills training, customer

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education, and new products are among some of the many being taught by these methods.

Anecdotal reports of distance learning's success in combination with its supposed cost savings and efficiencies are encouraging; however, few academic treatments, either theoretical or empirical exist. This is disappointing, as improvements to this training method are possible through the application of current behavioral theory and related empirical research. As more organizations and educational institutions adopt distance learning methodologies, it becomes increasingly important to ensure that they are implementing programs that are effective in enhancing employees' skills, rather than simply adopting the latest fad (Besser & Bonn, 1996).

The purpose of this paper is to review the extant literature surrounding the effectiveness of distance learning programs in organizations. Initially, we define terminology and potential sources of confusion with regard to the types of distance learning programs that are being utilized. Then, anecdotal reports, surveys, and empirical articles that provide evidence of both tangible and intangible outcomes are synthesized. We conclude with suggestions for future practice and research.

2. Background

2.1. History of distance learning

Distance learning, although viewed as a "current" phenomenon, actually has a long history. Both Rumble (1999) and James and Gardner (1995) described four generations of distance learning. Although their models are slightly different, both show the iterative fashion in which technology has allowed trainers and educators to increase the effectiveness of distance learning techniques.

Correspondence courses or self-study, first introduced in the late 1800s, were considered to be the first generation of distance learning. In their most traditional sense, correspondence courses rely on print materials as the method of instruction and the postal service for communication between instructor and student. Although this method allows geographically dispersed students to participate in educational opportunities, feedback and interaction with the instructor is delayed which may disrupt the learning process.

Correspondence courses, although rudimentary, were utilized for several years until the dawn of audio and video conferencing and educational television. These techniques allow more interaction between the instructor and the trainees, although much of the communication is one-way, similar to the classroom lecture. Of course, this method can be enhanced with print materials and interactive sessions at each site. As enhancements have become more extensive and integrated, the third form of distance learning emerged.

Systems-based distance learning includes multi-media such as print, audio, and video coupled with interaction by phone and face-to-face; this is the third generation of distance learning. While this generation does not include any strikingly "new" learning modalities, it is the systems perspective, the interactive feature, and the

combination of many transmission methods that warrants its label as a separate generation. It is very popular today, and may take many forms. For instance, GTE Learning Systems uses a combination of instructors, self-paced learning on the web or via CD-ROM, knowledge management systems, and mentors to meet its organization's training objectives (Sabia & Cassarino, 1999).

The fourth evolution of distance learning relies upon two-way communication via desktop computers and cutting edge technologies such as virtual reality. In this generation of distance learning, trainees are linked with other trainees with audio technology, or by virtual chat rooms. Moreover, trainees may interact with instructors via these methods, or in some cases, may view the instructor through streaming video. The line between the third and fourth generation technologies is blurred when one considers that the fourth generation technological breakthroughs may become part of a more integrated learning system as described in the third generation.

2.2. Definitions

As distance learning has evolved, various terms have been used to describe the particular technique being utilized. Moreover, distance learning techniques have become more widely diffuse across educational and organizational settings, spawning even more unique terms and definitions. Before discussing the evaluation of distance learning programs, we thought it necessary to delineate between several major forms of learning often described in the distance learning literature.

Distance learning is training that takes place largely synchronously; that is, the material is delivered to all participants at the same time even though participants are separated by geographical distance. The US Distance Learning Association defines distance learning as "the delivery of education or training through electronically mediated instruction including satellite, video, audio, audiographic computer, multimedia technology and learning at a distance" (Leonard, 1996). Types of distance learning technologies include: one-way and two-way interactions using audio (e.g., audiotape, voice mail, audioconferencing), data (e.g., computer-based training, internet), video (e.g., videotapes, video messaging, two-way videos), and combinations of audio, video and data (e.g., multimedia programming, multimedia messaging) (Chute et al., 1999).

In the practitioner literature, few authors separate distance learning from the broader concept of e-learning. *E-learning* is training that capitalizes upon the wide variety of new training technologies such as web-based training and CD-ROM. Although any form of e-learning may be useful for geographically dispersed training audiences, e-learning can also take place on-site, in a self-paced fashion (for a review see October 2002 issue of Training and Development Journal). Comparisons between traditional classrooms and e-learning indicate the following differences (Primelearning, Inc, 2001):

- Location (i.e., e-learning can be done anytime and anywhere, whereas traditional classes are dependent on certain times and locations).
- Content (e-learning can use audio, animation, video, simulation, online resources and communities whereas traditional classrooms often rely on presentation slides, textbooks, and video).

- Personalization (e-learning allows the learning pace and path to be determined by the user whereas traditional classrooms require only one learning path for all students).

Lastly, elementary and secondary schools as well as universities have capitalized upon new technologies in order to provide courses, and sometimes entire degrees to students that are geographically dispersed. To distinguish these college and university efforts from those being undertaken in industry, we refer to this type of coursework as *distance education*. The University of Phoenix Online, Worcester Polytechnic Institute, and Colorado State University are examples of degree-granting, distance learning institutions (Peterson's Distance Learning, 2002). Other schools (e.g., Indiana University, University of Wisconsin-Extension, University of Maryland, Penn State) offer numerous courses via distance education (Chute et al., 1999). In fact, as of 1997, it was reported that there were over 150 accredited colleges and universities with degree programs that allow students to spend little or no time physically on college campuses. Popular topics include technology-based courses and business management courses (Herther, 1997). Incidentally, much of the research on the effectiveness of distance learning has taken place in educational settings.

The focus of the present paper is primarily on *distance learning* programs in organizations rather than *distance education* efforts (i.e., academic settings) since there already is a body of literature in this area (see Rourke & Szabo, 2002 for a review). In fact, numerous journals exist that report research on distance education efforts (e.g., *American Journal of Distance Education*, *Journal of Distance Education*, *Educational Technology Research and Development Journal*, and *Journal of Computer Based Instruction*). In addition, there are several international journals addressing distance education initiatives (e.g., Australian journal *Distance Education*, *British Journal of Educational Technology*). Interestingly, though, in a review of the research published from 1986 to 2001 in the *Journal of Distance Education*, it was noted that only 4.3% of the articles published dealt with evaluation issues or the effectiveness of various programs (Rourke & Szabo, 2002). It appears that both the distance learning and distance education areas would benefit from more research in the area of evaluation.

2.3. Popularity

In organizations, e-learning is widespread. The Gartner Group, an IT consulting firm, estimated that $12 billion dollars would be spent for online business training in 1998. Moreover, the research firm Quality Dynamics predicted that half of all corporate training would be online by the end of the century (Herther, 1997). The results of current studies seem to confirm these predictions of growth. In a study of large organizations conducted by Drake Beam Morin, 42% of the respondents were using e-learning, while a staggering 92% expected to either use the technology or expand its use within the next year (Growing Number, 2000). As noted in ASTD's current state of the industry report, this translates to approximately 8.8% of the training done in organizations being done using some form of e-learning technology (American Society for Training & Development, 2002).

The ASTD researchers also noted that decreased travel as a result of the September 11, 2001 tragedy in the US may have increased the percentage of e-learning above this figure in the latter part of 2001. In fact, Galvin (2002) noted that many companies completely cancelled their international training events. To offset the drop in classroom training, however, some firms accelerated the rollout of their distance learning programs. For example, Pfizer started IDL, its Interactive Distance Learning program, which consists of a virtual studio where training courses are digitally broadcast via satellite and broadband to dishes at more than 1000 homes of managers and representatives (Galvin, 2002). Invensys, a production technology and energy management firm of 76,000 employees, likewise developed e-learning programs that are offered to their employees, distributors, customers, and others (Taylor, 2002).

Many companies are very public about their successes with e-learning, providing rich anecdotes of successful programs. DaimlerChrysler and General Motors both conduct ISO training via the web, and Ford has an extensive system that includes training in team problem solving. Companies such as Boeing, Novell, MCI WorldCom, and Dunkin Donuts use web-based training (Hall, 1999). Other firms using various features of distance learning include videoconferencing at Kinko's and Hilton Hotels, and satellite technology at GE Spacenet and PBS (Abernathy, 1997). The flexibility of distance learning programs is apparent with the joint partnerships undertaken by the United Artists Theatre Circuit and two major corporations: Nike and Microsoft. In both cases, training sessions were broadcast by satellite to movie theatres around the nation where trainees were assembled. In Nike's case, hundreds of employees were trained; in Microsoft's the number was an estimated 50,000 (Sayre, 1998).

In addition to the private sector, many governmental agencies are employing e-learning strategies to help their employees keep up with the fast pace of the knowledge economy. For example, the World Bank implemented an interactive online course using multimedia tools and simulations. Similarly, the US Department of Defense plans to develop a networked, live virtual environment where troops can collaborate on various tasks. The US government also developed a one-stop shop for selecting and delivering e-learning (Kaplan-Leiserson, 2002). The Department of Defense (DOD), Department of Energy (DOE), and US Environmental Protection Agency (EPA) are among other US agencies that have employed distance learning methods to train and retrain their employees (Chute et al., 1999).

Usage statistics are one thing, but dedication of time, resources, and staff is quite another. Evidence of this explicit shift in resources exists as well. Galvin (2002) reported that 24% of companies now have a separate technology-based training budget. This was particularly true for larger firms and those in finance, banking, real estate, and insurance industries as well as public administration. Larger firms were also more likely to use computer-based training without instructors than were smaller firms. Typically, computer-delivered training consisted of self-paced web courses (e.g., CD-Rom; DVD; Diskette). Galvin further noted that 88% of technology-based training activities occurred during employees' paid work time. Interestingly, 50% of technology-based training programs were designed by outside sources, but only 37% were actually delivered by outside sources.

2.4. Advantages of distance learning

Researchers (Chute et al., 1999; Davy, 1998; Primelearning, Inc, 2001) note a variety of benefits reported by organizations that have successfully implemented distance learning programs: These include:

- A fast, effective way to train global employees.
- The opportunity to use the best instructors and provide high-quality courses.
- A high rate of course completion and knowledge retention.
- Information for training is always up to date.
- Learners have more responsibility for their personal success.
- An increase in the impact and productivity of dollars invested in training and education programs.
- Reduction in travel costs and more productive use of time previously spent in travel.
- Training of more people, more often, in short learning sessions that are easier to schedule and coordinate.
- The ability to add trainees and instructors as needed without incurring significant additional costs.
- The delivery of a consistent message companywide to all trainees or employees.
- Provision for real-time updates and just-in-time information access.
- Delivery at work or home sites convenient to trainees.
- Offering live interactive programs delivered to multiple networked sites for group learning.
- Use of learner-centered programs such that trainees are in more control of the pacing, sequencing, and style of interaction of the learning experience.
- Easy access to learning resources and experts.

The benefits of distance learning programs to HR professionals are even clearer when considering specific organizational examples. Graybar Electric Company, a leading manufacturer and distributor of telecommunications equipment based in St. Louis, capitalized on the ability to track and identify employees' skills through e-learning (Greengard, 1998). HR professionals at Graybar developed a database within the organization that records what types of programs employees have taken. This helps them with succession planning efforts because they can easily see which skills various employees have and whether they are ready for various positions in the firm.

Other anecdotal reports reveal that distance learning is less expensive, more flexible, and more interactive than other forms of computer-based training. Moreover, distance learning sessions may be more expedient, allowing just-in-time learning at several times throughout the year rather than once or twice (Alexander, 1998; Berger, 1998; Roberts, 1998). The Department of Defense reported that distance learning increased employee productivity through reduced travel time, and simultaneous communication with immediate feedback (Chute et al., 1999). A more indirect benefit of distance learning may be that it allows more work/life balance (Leonard, 1996). Indeed, the flexibility associated with distance learning reinforces organizational initiatives to increase work/life balance.

As distance learning and, more broadly, e-learning become more firmly established as viable training techniques, growing attention is being paid to the factors that make such training a success. It appears that internal marketing, support, and incentives are key factors in the acceptance of these courses (When do employees, 2001). Moreover, in 2001, ASTD produced a report examining e-learning at 16 US companies and obtained feedback from 700 learners. One of the most important findings was that the amount of support trainees received from co-workers and managers for participating in e-learning programs was one of the primary indicators regarding their level of involvement in the programs (Sloman, 2002). Despite these examples, little attention has been paid to the effectiveness of such programs aside from anecdotal evidence of their success. Somewhat disappointingly, academic research provides little empirical evidence supporting or discounting the use of such techniques. In the following section, we review the current research on the effectiveness of distance learning initiatives for enhancing trainees' reactions to the program, learning, behavior, and organizational results in accordance with Kirkpatrick's (1976, 1998) well-known model of criteria. Our summary focuses on reviews of distance learning initiatives, although it also includes some research evaluating distance education.

3. Effectiveness of distance learning initiatives

3.1. Trainees' reactions

In many cases, reactions to distance learning and education programs have been positive, although more research is needed. Roberts (1996) reported that both trainees and trainers were satisfied with the methods used. In addition, Foell and Fritz (1995) found that students taking a distance education course were satisfied with the instructor, teaching methods, and course content. Gallagher and McCormick (1999) found that students perceived telecommunications as an acceptable method for delivering course content. Similarly, when a control group was used, Spooner, Jordan, Algozzine, and Spooner (1999) found few differences in overall perceptions of a course taught by distance learning methods. This result was replicated in a meta-analysis of satisfaction ratings between traditional classroom and distance learning methods (Allen, Bourhis, Burrell, & Mabry, 2002). Interestingly, in one study, instructors felt as though distance education courses were equal or lower quality than on-campus courses, but students rated them favorably (Inman, Kerwin, & Mayes, 1999).

Not all results are positive, however. In a review article, Phillips, Phillips, and Zuniga (2000) reported that most of the evidence indicates that trainees prefer traditional classroom instruction to e-learning methods. For example, they report that trainees in face-to-face groups were more satisfied with the course than those in an online course. The traditional trainees reported greater communication with other participants, more shared learning experiences with their peers, a greater sense of team atmosphere, and higher instructor support. In another study, students consistently suggested

that the distance education format was less effective in course content, format, and effectiveness when compared to classroom instruction (Ponzurick, France, & Logar, 2000). Also, Gallagher and McCormick (1999), found that despite distance learning being an acceptable delivery method, students would prefer traditional learning methods if given a choice. This has also been cited by managers, who claim that distance learning is not a substitute for classroom training (Alexander, 1998). Employees seem to agree with this in that only 38% of employees preferred e-learning to classroom training (When do employees, 2001).

Some work has been done identifying the variables influencing trainees' ratings. Inman et al. (1999) found that trainees' ratings were most heavily influenced by the quality of the materials, the presence of an on-campus orientation session, and the perceived availability of the instructor. Similarly, Webster and Hackley (1997) found that the reliability and quality of the technology used impacted several attitudes variables such as attitudes toward distance learning, relative advantage of distance learning, and usefulness of the technology. Comfort and convenience have also been repeatedly cited as positive aspects of distance education (Spooner et al., 1999).

3.2. Learning of trainees

As noted by Chute et al. (1999), testing for distance learners is in many ways similar to the testing of students in face-to-face classes. Traditional essay exams or objective tests can be used, but they will have to be distributed differently (e.g., on the web) where issues of test security must be addressed. In general, few studies have been conducted on the effectiveness of distance learning methods for enhancing learning, but those that have been done have been mixed. Phillips et al. (2000) reported that often the evidence has shown that traditional and e-learning methods are similarly effective in terms of learning outcomes. They also cited the Distance and Open Learning Scale (DOLES) and Dimensions of Distance Education (DDE) as appropriate tools to assess online instruction and learning.

Many other distance education studies have shown few differences between distance learning and traditional programs in their relative ability to increase knowledge (Spooner et al., 1999; Webster & Hackley, 1997). In a highly integrated course offered by two professors at two different universities, Alavi, Yoo, and Vogel (1997) found no differences between the perceived and actual learning reported by local students and that reported by students at the distant location. Russell (1997) compiled results on the effectiveness of distance learning over a 30 year period based on over 250 research studies and reported that there were no significant differences in the achievement of students in traditional versus distance learning programs in standard learning measures. This was considered to be an encouraging finding for distance learning advocates as critics had previously charged that students would not be able to learn as much in a distance learning program as in a traditional classroom environment.

In a large-scale study of distance learning in industry, learning outcomes were higher when training was delivered via classroom training rather than electronic

learning; however, the authors noted that this was based upon a very small number of respondents and many of the programs may not have been customized (ASTD, 2000). In studies commissioned by the federal government, a sector that has made ample use of distance learning techniques, it was found that employees trained through distance learning consistently scored higher than those in a traditional classroom-based session (Leonard, 1996).

Three variables were found to influence trainees' ratings of how much they had learned in a distance learning course in a study by Inman et al. (1999). Materials for the course were the most important predictor, followed by the amount of work the students had to do in relation to other classes (i.e., the more work required, the more students felt that they learned). Instructor attitudes were also found to contribute to learning outcomes (Webster & Hackley, 1997).

3.3. Behavior of trainees

In general, few studies have been conducted on the degree to which any training methods have resulted in behavioral change on the job. Even fewer studies have examined the degree to which distance learning methods enhance behaviors. In the few that have been conducted, the findings are positive. In one study, it was suggested that technology-based training that is available just-in-time, or that can be accessed once the participant is back on the job may enhance transfer (Dulworth & Shea, 1995). In another study, it was shown that Lockheed's technical training department successfully used videoconferencing for hands-on training and assessment of NASA personnel in "launch critical" skills (Chute et al., 1999). Clearly, much more research is needed before definitive conclusions can be drawn about the benefits of distance learning for improving trainees' behaviors on the job.

3.4. Organizational results

Perhaps the most common way in which e-learning methods have been evaluated has been in terms of cost savings for firms (Phillips et al., 2000). In fact, most practitioners have suggested that the important "results" measures for distance learning programs should primarily consist of cost-saving factors. Overall, the results have been positive indicating that distance learning methods have brought about large cost savings to firms.

It has been found that technology-based training leads to a 50% reduction in time and cost over classroom training. It is assumed that web-based training will produce the same ROI results (Roberts, 1998). These include costs such as travel and salary expenses for trainers and trainees, productivity costs associated with trainees' time spent traveling, and costs for dedicated classrooms and supplies. Evidence consistently shows that distance learning programs can be more cost effective than traditional classrooms (Chute et al., 1999; Rumble, 1999). In addition, ROI (Return on Investment) studies indicate a positive return for companies implementing e-learning programs (Phillips et al., 2000). Findings from organizational studies bear this out.

In a governmental study, the US Army National Guard determined that costs of training decreased nearly $1.6 million after distance learning was introduced. Most of the cost savings were in travel (Leonard, 1996). These cost savings are magnified when employees are located in several different locations, as travel costs for each individual employee add up and the costs of the technology are amortized over a large number of employees (Berger, 1998). Similarly, Budget Rent-A-Car Corporation reported spending about $2000 per student on travel and expenses for a two week training course. By implementing a distance learning program (including audioconferencing and PC-based data sharing) they spent only $156 per person which was a considerable savings given the large number of employees to be trained at over 1100 rental sites nationwide (Hamblen, 1997). Bell Atlantic Network Services examined its computer-based training program for its employees and found that the return on investment was 366% (Phillips et al., 2000). In a review of several firms (e.g., Aetna, Cisco, Novell, Hewlett-Packard), Primelearning (2001) reported that all firms reduced their costs or showed considerable savings after implementing online training programs.

Even large-scale programs that are heavily technology-driven have been shown to reduce costs. Ford Motor Company expanded its broadcast satellite network FORDSTAR in the US, Canada, Mexico, and Australia. In 1997 in the US alone, they provided 14,000 hours of programming to 400,000 students with 5000 classes. They cited the advantages of the program: learners could interact with a live instructor and guest experts without having to travel, speed of training delivery was faster than traditional training, reach to remote locations was possible and at a much lower cost, and dealer savings were achieved (Chute et al., 1999).

Many times, web-based training is justified as a replacement for current programs. If it can be shown that the costs of running the program are less, web-based training will likely be adopted. For instance, in a workshop on business strategy delivered to 17,000 managers in 156 locations, Boeing claims to have saved more than $9 million in travel costs alone. Using distance learning was also efficient. The training was completed in just eight months instead of the estimated three years (Sayre, 1998). PNC Bank made this type of argument for replacing its new-hire classroom and manual training program. They replaced it with 13 CD-Rom training modules that will eventually be placed on the network. They reported savings in the areas of travel, postage, printing, and facilities. Likewise, AT&T reported saving more than $20 million in travel due to distance learning methods (Thompson, 1994).

In addition to considering cost savings, it is important to examine the learning and behavioral outcomes from distance learning programs. GTE Learning systems tracked the performance of salespeople who learned using an integrated learning system (i.e., CD-Rom, web-based training, instructor-based training, online facilitator/mentor) with those that had not. The average time to first sale was decreased by 25%, and the average value of the first sale increased by 100% (Sabia & Cassarino, 1999). Similarly, Century 21, the real estate firm, worked with Click2learn to offer sales training solely on the web. Results indicated that sales agents trained by e-learning achieved a 33% increase in commissions (due to greater sales) compared with more traditionally trained agents (Taylor, 2002).

4. Implications

4.1. Implications for practitioners

A number of issues arise for practitioners to consider. First, if trainers are to use distance learning programs to develop employees, then they need to assure they possess the skills and information needed to design, implement and evaluate such programs. Addressing specific issues such as interpersonal interaction and trainee familiarity with technology are paramount. Both of these aspects of distance learning programs have been shown to affect satisfaction and learning measures. Moreover, one of the frequent complaints about distance learning programs is that trainees want more time to interact with others. For example, research by Corporate University Exchange found that one of the most common requests by trainees was to have active correspondence with an online facilitator who had frequent virtual office hours (Osberg, 2002).

Many organizations are finding positive returns on investment from distance learning, as outlined above. It seems as though distance learning has the potential for great cost savings, and some studies have shown encouraging results on the benefits side of the equation such as increased and more timely sales. Not all programs report positive results, though. Distance learning initiatives can be costly to design (Segers, 2002), and they certainly will not replace all the traditional methods of training. Thus, it is recommended that organizations use "blended learning" or a "holistic" approach combining several learning methods (Primelearning, 2001; Taylor, 2002). While more effective, this approach is more labor-intensive, and the costs incurred both in terms of money, time, and energy may be prohibitive. Determining the proper place of distance learning within a program of employee training and development is necessary.

Webb (1999) acknowledges that calculating return on investment (ROI) for web-based training is much more complex. More variables come into play and the determination about which variables to include in the calculation is unclear. It is suggested that ROI calculations only be conducted with programs of some duration, those that involve a number of employees, and those that involve a relatively large monetary outlay. For example, American Petroleum Company estimated ROI for their web-based sales training tool since the cost of the program was more than $500,000 and it was going to be widely used. This convinced top managers that the high price of the training would be worth the investment.

Lastly, practitioners may need to consider how to integrate distance learning with other HR activities such as career development programs. In a sense, this involves following the path of the third generation of distance learning (i.e., integrated systems) at the HR functional level. As an example, if better systems are being developed and used to track employees' skill development, this would in turn be advantageous for those involved in designing and developing succession planning initiatives. Although the research has not specified the degree to which distance learning programs are being used to help develop employees' career skills, presumably this is occurring. In the career field, counselors have learned to be familiar with

career assessments and the internet [see special issue of Journal of Career Assessment, 2000, 8 (1)] and administering career counseling over the internet (Boer, 2001). Likewise, it would seem to be important to continue to research the impact of distance learning initiatives on career development efforts in organizations. For example, to what degree can employees advance in their careers by enrolling in various distance learning programs? How can counselors and HR professionals groom employees for jobs through distance learning programs? These are questions that need to be answered. Although distance learning is often considered a training program, it also has implications for employees' career development and adjustment.

4.2. Implications for researchers

As previously noted, while there is some evidence on the effectiveness of distance learning techniques, much more research is needed. This is particularly important given the higher costs associated with technology-based training programs. In particular, it is important to document the long-term effectiveness of distance learning initiatives on employees' skills. It may be that distance learning is more effective for individuals' acquisition of knowledge, yet may be less valuable in their retention of skills. Particularly with the dearth of research at the behavioral level of training evaluation, there is not enough conclusive evidence to this point. In addition, longitudinal studies are also needed to allow trainees time to adjust to learning how to use the new e-learning methods. Gallagher and McCormick (1999) and Alavi et al. (1997) suggested that satisfaction with distance learning methods might increase as trainees become more comfortable with the medium. This may be due to the reduced stress associated with transitioning to a new technology (Dolan & Tziner, 1988).

Future research is also needed to determine to which topical areas (e.g., accounting, sales, interpersonal skills) distance learning methods seem best suited and which ones might be better conveyed through more traditional methods (e.g., classroom instruction, role plays, simulations). It seems intuitively obvious that interpersonal skills (e.g., negotiations, communications) might be better taught using other training formats than distance learning methods; however, more research is needed. Likewise, as organizations continue to rely on teams to conduct work, more research will be needed to examine how effectively individuals work together in "virtual teams." Perhaps distance learning initiatives will be well suited to teaching team members how to operate as a virtual team.

5. Summary

The present review found that distance learning programs are increasingly being implemented in a variety of organizations and academic settings, despite the limited amount of empirical research on their effectiveness. Evidence regarding trainees' reactions, learning, behavior, and organizational results are in many cases positive, yet they are based on anecdotal reports rather than empirical tests. Future research on the value of distance learning and e-learning initiatives is important. In particular, it

is crucial to examine how distance learning programs affect an employee's development on his/her job and career development.

References

Abernathy, D. (1997). A start-up guide to distance learning. *Training and Development Journal, 51*(12), 39–47.

Alavi, M., Yoo, Y., & Vogel, D. R. (1997). Using information technology to add value to management education. *Academy of Management Journal, 40*, 1310–1333.

Alexander, S. (1998). A touch of virtual class. *Computerworld, 32*, 77–78, 82–83.

Allen, M., Bourhis, J., Burrell, N., & Mabry, E. (2002). Comparing student satisfaction with distance education to traditional classrooms in higher education: A meta-analysis. *American Journal of Distance Education, 16*, 83–97.

American Society for Training and Development (2002, February). *The 2002 ASTD state of the industry report: Executive summary*. Alexandria, Virginia: Mark E. Van Buren and William Erskine.

American Society for Training and Development (2000). *The 2000 ASTD learning outcomes report*. Alexandria, Virginia: Laurie Bassi and Amanda Ahlstrand.

Berger, M. (1998). On-the-job training: Online classes keeps reps up-to-date and in the field. *Sales and Marketing Management, 150*, 122–125.

Besser, H., & Bonn, M. (1996). Impact of distance independent education. *Journal of the American Society for Information Science, 47*(11), 880–883.

Boer, P. M. (2001). *Career counseling over the internet: An emerging model for trusting and responding to online clients*. Mahwah, NJ: Erlbaum.

Chute, A. G., Thompson, M. M., & Hancock, B. W. (1999). *The McGraw-Hill handbook of distance learning*. New York: McGraw-Hill.

Davy, J. (1998). Education and training alternatives. *Managing Office Technology, 43*(3), 14–15.

Dolan, S., & Tziner, A. (1988). Implementing computer-based automation in the office: A study of experienced stress. *Journal of Organizational Behavior, 9*, 183–187.

Dulworth, M., & Shea, R. (1995). Six ways technology improves training. *HR Magazine, 40*, 33–36.

Foell, N. A., & Fritz, R. L. (1995). Association of cognitive style and satisfaction with distance learning. *Journal of Industrial Teacher Education, 33*, 46–59.

Gallagher, P. A., & McCormick, K. (1999). Student satisfaction with two-way interactive distance learning for delivery of early childhood special education coursework. *Journal of Special Education Technology, 14*, 32–47.

Galvin, T. (2002). 2002 Industry report. *Training, 39*(10), 24–28, 30, 32, 34, 36, 39–40, 42, 44, 46, 51–52, 54, 56–58, 63–64, 66, 68–70, 72–73.

Greengard, S. (1998). Going for distance. *Industry Week, 247*(9), 22–29.

Growing number of employers jump on e-learning bandwagon (2000). *HR Magazine, 45* (9), 34.

Hall, B. (1999). Five common questions—and the answers. *Inside Technology Training*, 42–43.

Hamblen, M. (1997). Budget drives savings. *Computerworld*, 55–56.

Herther, N. K. (1997). Education over the web: Distance learning and the information professional. Online, September/October.

Inman, E., Kerwin, M., & Mayes, L. (1999). Instructor and student attitudes toward distance learning. *Community College Journal of Research and Practice, 23*, 581–591.

James, W. B., & Gardner, D. L. (1995). Learning styles: Implications for distance learning. *New Directions for Adult and Continuing Education, 67*, 19–31.

Kaplan-Leiserson, E. (2002). E-learning gov. *Training and Development Journal, 56*(10), 14–15.

Kirkpatrick, D. L. (1976). Evaluation of training. In R. L. Craig (Ed.), *Training and Development Handbook: A guide to Human Resource Development*. New York: McGraw-Hill.

Kirkpatrick, D. L. (1998). *Evaluating training programs: The four levels* (2nd ed.). San Francisco, CA: Berrett-Koehler.

Leonard, B. (1996). Distance learning: Work and training overlap. *HR Magazine, 41*, 41–47.

Osberg, C. (2002). How to keep e-learners online. *Training and Development Journal, 56*(10), 45–46.
Peterson's Distance Learning. Retrieved October 31, 2002, from http://www.petersons.com/distancelearning/.
Phillips, J., Phillips, P.P. & Zuniga, L. (2000). Evaluating the effectiveness and the return on investment of e-learning. American Society for Training and Development. Retrieved January 23, 2003 from http://www.astd.org/virtual_community/research/What_Works/e-learning.
Ponzurick, T. G., France, K. R., & Logar, C. M. (2000). Delivering graduate marketing education: An analysis of face-to-face versus distance education. *Journal of Marketing Education, 22*, 180–187.
Primelearning, Inc (2001). http://www.primelearning.com.
Roberts, B. (1998 August). Via the desktop:// HR Magazine 43, 99–100, 102, 104.
Roberts, J. M. (1996). The story of distance education: A practitioner's perspective. *Journal of the American Society for Information Science, 47*, 811–816.
Rourke, L., & Szabo, M. (2002). A content analysis of the Journal of Distance Education 1986–2001. *Journal of Distance Education, 17*(1).
Rumble, G. (1999). Cost analysis of distance learning. *Performance Improvement Quarterly, 12*, 122–137.
Russell, T. (1997). The no significance difference phenomenon. NB TeleEducation (on-line) (http://tenb.mta.ca/phenom/). Or Raleigh, NC: North Carolina State University. Office of Instructional Telecommunications.
Sabia, C., & Cassarino, C. (1999). Best of all worlds. *Inside Technology Training*, 44, 45, 47.
Sayre, A. (1998). Intelligence in space: How satellites are put to the test in the learning environment. *Satellite Communications, 22*, 28–32.
Segers, G. (2002). Dazed and confused about e-learning. *Training and Development Journal, 56*(10), 33–34.
Sloman, M. (2002). Breaking through the e-barriers. *Training and Development Journal, 56*(10), 37–41.
Spooner, F., Jordan, L., Algozzine, B., & Spooner, M. (1999). Student ratings of instruction in distance learning and on-campus classes. *The Journal of Educational Research, 92*, 132–140.
Taylor, C. R. (2002). The second wave. *Training and Development Journal, 56*(10), 25–28, 30–31.
Thompson, M. M. (1994). Speaking personally with Alan G. Chute. *The American Journal of Distance Education, 8*(1), 72–77.
Webb, W. (1999). Show me the return. *Inside Technology Training, 19–20*, 22.
Webster, J., & Hackley, P. (1997). Teaching effectiveness in technology-mediated distance learning. *Academy of Management Journal, 40*, 1282–1309.
When do employees accept e-learning? (2001). Retrieved June 18, 2002 from http://www.astd.org/virtual_community/research/.

Further reading

American Society for Training and Development, 2003. Introduction to E-Learning. Retrieved January 30, 2003, from http://www.astd.org/virtual_community/library/hot_topic.html.

*Distance learning resources**

American Center for the Study of Distance Education. http://www.cde.psu.edu/acsde.
American Society for Training and Development. http://www.astd.org
Center for Distance Learning Research. http://cdlr.tamu.edu
Distance Education and Training Council. http://www.detc.org
Federal Government Distance Learning Association. http://www.fgdla.org
International Center for Distance Learning. http://www-icdl.open.ac.uk
International Society for Technology in Education. http://www.iste.org
International Teleconferencing Association. http://www.itca.org
Network for the Evaluation of Education and Training Technologies. http://socserv2.mcmaster.ca/srnet/evnet.htm

Office of Learning Technologies. http://olt-bta.hrdc-drhc.gc.ca
Primelearning, Inc. http://www.primelearning.com
Society for Applied Learning Technologies. http://www.salt.org
Society for Human Resource Management. http://www.shrm.org
United States Distance Learning Association. http://www.usdla.org

Note. The resources listed above are not meant to be exhaustive. In addition, for information on actual types of distance learning programs and methods available refer to a special issue (*Training*, 1998, October).