

If E-learners Get There, Will They Stay? The Role of E-learning Self-Efficacy

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This article presents results of a recent empirical study examining types of e-learning barriers and the relationship between these barriers and e-learning self-efficacy. A significant inverse relationship ($r = -.086$, $p < .05$) emerged. The sample was comprised of 865 employee e-learners ($n = 865$). The theoretical framework was centered on social cognitive learning theory's construct of self-efficacy. The concept of e-learning self-efficacy is introduced.

Keywords: E-learning, employee training, E-learning Self-efficacy

By 2005, it is projected that 85% of all jobs will require skilled workers (Moe, 2002). However, although possessing a highly trained and educated workforce has become an important key to success in today's highly competitive global economy (Kreitner & Kinicki, 2002), over 75% of adults in the US do not have a bachelor's degree (Moe, 2002). According to Kreitner and Kinicki, training is considered to be a key educational practice and strategic organizational tool, strongly associated with significantly higher profits and lower employee turnover. With the increasing need for better employee training and development, greater research attention and investment in online training and learning might be critical to understanding the hurdles being faced by learners who are both key stakeholders and pivotal organizational resources.

E-learning represents a paradigm shift in instructional delivery techniques and has brought with it unique issues that could impact e-learners' satisfaction (Schilke, 2001), learning (Garland, 1993), motivation to learn online (Kramarae, 2001), involvement, and even completion (Giles, 1999).

Problem Statement

Based on research conducted in higher education institutions, it is evident that a daunting number of barriers exist for adults engaged in distance learning (Garland, 1993; Schilke, 2001; Simmons, 2002). Like any other training delivery method, e-learning methods are sometimes flawed (Schank, 2002). This calls for an examination of the possible barriers faced by employee e-learners, populations that have not been addressed in previous barriers to learning studies.

This situation is further exacerbated by the lack of a systematic analysis of the possible barriers to organizational learning. Most of the barriers that have been referenced in the literature are either theoretical or conceptual, but lack systematic or empirical validation (Gieskes, Hyland, & Magnusson, 2002). Moreover, the majority of studies examining learning barriers have been done in traditional courses or other modes of distance learning, but little research has examined the barriers facing adult e-learners in organizational contexts. Despite the lack of guidance from organizational research, more than 60% of companies are planning to incorporate e-learning systems within two years (Simmons, 2002). With such compelling evidence of the increasing investment into and the growth of e-learning technologies for instructional delivery, it is imperative that likely e-learning barriers be determined. HRD practitioners must become aware of such barriers if they are to foster successful e-learning experiences.

Previous researchers have emphasized the need for research pertaining to learning barriers, particularly attrition-related research where there is Web-based instruction (Giles, 1999; Schilke, 2001), because learner attrition may be indicative of obstacles in the learning process. Unfortunately, the investigation of obstacles encountered in distance education (DE) has been ignored often and there is but anecdotal information and speculation to support best HRD practice (Dean, Biner, & Coehen, 1996; Feldhaus, 1999). Galusha (1998) calls for more research that closely scrutinizes the intrinsic problems facing learners in DE contexts.

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Purpose and Research Questions

The purpose of this study was to investigate the factors that employees consider as barriers to starting, continuing, and completing online training. The potential factors that could influence and/or predict e-learning barriers deserve research attention. This study also examined the relationship between barriers and e-learning self-efficacy (computer and Internet self-efficacy). Although other employee demographic and background factors were under study, they are beyond the scope of this article. The research questions guiding the study were:

- (1) What are the barriers employees engaged in e-learning face?
- (2) What is the relationship between perceived e-learning barriers and an employee's e-learning self-efficacy?

Theoretical Framework

The theoretical foundation of this study is grounded in social cognitive learning theory. In particular, self-efficacy was explored, as one's level of efficaciousness can pave the way for success or failure (Kreitner & Kinicki, 2002). "Perceived self-efficacy is a judgment of one's capability to accomplish a certain level of performance" (Bandura, 1997, p.391) or the belief in one's ability to successfully accomplish a specific task (Kreitner & Kinicki, 2001). Since self-efficacy is domain specific (Joo, Bong, & Choi, 2000), the concept of e-learning self-efficacy (ELSE) is introduced, referring to the belief that one can be successful in e-learning activities.

"Self-efficacy is a form of self-evaluation that influences decisions about what behaviors to undertake, the amount of effort and persistence put forth when faced with obstacles, and finally, the mastery of the behavior. Self-efficacy is not a measure of skill; rather, it reflects what individuals believe they can do with the skills they possess" (Eastin & LaRose, 2000, p.2). Self-efficacy beliefs may contribute to the success with which a task is completed (Cassidy & Eachus, 2002). This is why it is important to measure an e-learners' self-efficacy, since such information could help to bridge the gap between e-learners' knowledge and skills and to translate such gaps into appropriate courses of action (in this case starting, continuing, and completing online training).

Due to the nature of the myriad of barriers reported in previous research in distance and traditional education, this study examined barriers from both a multi-dimensional and systemic perspective using Schilke's (2001) conceptual framework. Further, Bandura (1977, 1986) argues that a triadic reciprocity exists among: (a) The person (one's cognitive and personal factors like demographics and personality), (b) one's environment (influences such as social pressures), and (c) one's behavior.

Method

This research is part of a larger study of workplace e-learning (Mungania, 2004). For the purpose of determining ELSE, two existing instruments (a) computer self-efficacy (CSE) by Cassidy and Eachus (2002), and (b) Internet self-efficacy (ISE) by Eastin and LaRose (2000), were modified and synthesized resulting in a 24-item ELSE scale. The researcher could not locate an already existing instrument appropriate for this study thus the items in the demographics section and Barriers in E-learning Scale (BELS) were developed based on suggested issues in the literature and refined through a pilot study.

These findings are based on an empirical study (n = 865) of employee e-learners' perceptions. Response rates were 52.5% (pilot study) and 18% (main study), respectively. The research method employed was quantitative, but there was one question yielding open-ended responses on additional barriers faced. The design was ex-post-facto and there was no manipulation of the independent variables.

An anonymous, self-administered, Web-based survey referred to as the Barriers in E-learning and Self-Efficacy (BELSE) survey was used to collect data from a large convenience sample of volunteer employees. This Web-based instrument had 82 Likert-type scale questions comprising three separate scales: (a) Demographics and background characteristics (b) Barriers in E-learning (BEL) scale, developed for the purpose of determining barriers, and (c) E-learning Self-Efficacy (ELSE) scale, measured employees' Internet and Computer self-efficacy.

Web surveys (also called e-surveys or Internet surveys) are receiving a great deal of attention from researchers (Simsek & Veiga, 2001) and have been found to be extremely useful for conducting organizational surveys to assess attitudes and employees' perceptions. This instrument was validated using subject matter experts and a pilot study. The two scales (BEL & ELSE) were highly reliable with both yielding an alpha coefficient of .95.

An email invitation linked to a Web-based survey was sent to employees. These emails originated from the researcher but were sent through a contact person in each of the seven participating organizations. A URL was embedded in the email message that was sent to the target population. The respondents were directed to click on a

hypertext link (URL), which launched a Web browser that contained the survey. The data collection process lasted one month.

Data analysis was accomplished through a number of statistical procedures. An exploratory factor analysis was used to reduce data complexity and to search for possible underlying factors that existed among the items under study in the BEL scale. Stevens (2002) explains its use: “The purpose of exploratory factor analysis is to identify the factor structure or model for a set of variables. This often involves determining how many factors exist, as well as the pattern of the factor loadings” (p. 411). The factorability of the data was determined using the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy (.950) and Bartlett’s Test of Sphericity, which indicated significant correlations ($p < .05$); this convergent evidence suggested the sound “factorability” of the data. Because Stevens recommends the use of principal components analysis as a preliminary data reduction method, it was used to ascertain a parsimonious number of components for later rotation and interpretation. The Kaiser criterion (eigenvalues > 1.0) was used as well. Both suggested the presence of seven components. A varimax rotation subsequently was employed to interpret the factors.

Pearson’s correlations of the factor scores derived from the seven factors were used to determine the relationship between each of the seven factors (barrier categories) and e-learning self-efficacy (independent variable). Open coding using Creswell’s (1993) steps to data analysis was used to analyze data emerging from the open-ended response question.

Results

Seven factors with an eigenvalue of > 1.00 or greater were retained for interpretation accounting for 58.65% (cumulative percentage) of the variance. Guided by the item loadings, a common theme or name was given to each factor. Analysis of the data indicated that e-learning barriers are indeed multi-dimensional. A model of barriers facing adult e-learners in organizations emerged, indicating seven categories of barriers: (1) dispositional, (2) learning style, (3) instructional, (4) organizational, (5) situational, (6) content-suitability, and (7) technological barriers. The emerging factors (barriers) were used as dependent variables. Table 1 indicates these seven factors, their alpha reliability and means. The reliability of each of these factors was determined using the reliability function in SPSS.

Stevens (2002) table of critical values (CV) was used in the calculation. To calculate this, the formula $n \times CV$ was used. The sample size in this study was 865 and the absolute value for a significant factor loading in this analysis was .196. Therefore, only factor loadings for each item loading with an absolute value that exceeded .196 were selected from the “Rotated Component Matrix” and interpreted. However, this criterion resulted in duplication and many items loading on different factors. Statisticians have suggested using higher criteria. Consequently, the criterion was raised to $>.50$ to reduce duplication.

Table 1. *Components of Barriers in E-learning (BEL) Scale with Initial Eigenvalues and Names of Extracted Factors*

Component	Initial Eigenvalues			Names of Extracted Factors/Barriers	Alpha reliability	Mean
	Total*	% of Variance	Cumulative %			
1	14.67	34.93	34.93	Dispositional	.89	1.54
2	2.33	5.55	40.48	Learning Style	.85	2.01
3	2.11	5.02	45.50	Instructional	.86	1.96
4	1.76	4.19	49.69	Organizational	.83	1.84
5	1.42	3.38	53.07	Situational	.73	2.81
6	1.21	2.89	55.96	Content-suitability	.65	2.31
7	1.13	2.69	58.65	Technological	.69	2.05
					.94	1.98

Extraction Method: Principal Component Analysis. * Loadings with a critical value of $> .50$ were used. The 32 items had a loading of $>.50$ on each factor

The barrier items’ means ranged from 1.29 to 3.00 on a 5-point Likert-type scale (1 = weak and 5 = strongest barrier). The cumulative mean was 1.98, indicating that employees perceived weak barriers in the course of starting,

continuing, and completing online courses. Personal barriers ($M = 1.54$) were the least common, while situational barriers were the most prevalent ($M = 2.81$).

Description of the Seven Factors or Types of Barriers

A description follows of the barriers cited by employees, including the open-ended response question from the survey:

1. *Dispositional barriers.* The items that loaded under this factor indicated the perception of barriers emerging from employee personal characteristics and attitudes towards e-learning. Dispositional barriers are synonymous with personal barriers. Items under this factor had to do with fear of failure, confidence in one's ability to participate in e-learning, prerequisite knowledge, resistance to change, physical or psychological health, communication skills, and adult pride.
2. *Learning style barriers.* The items that loaded under this factor had to do with barriers pertaining to the employee e-learners' comfort with technology and the fit between e-learning and individual learning styles or preferences. Specific barriers cited were discomfort with technology, lack of fit with one's preferred learning style, isolation or lack of interaction, preference for instructor-led training, limited access to the instructor, and the impersonal nature of e-learning.
3. *Instructional barriers.* The barrier items that loaded under this factor had to do with the online instructor, instructional design, and instructional materials. Specifically, respondents cited poor quality of materials, timeliness and frequency of feedback, clarity of course expectations and instructions, lack of progress reports, limited learner engagement or interaction, poor instructional design, limited reference materials, access and navigation problems, information overload, limited opportunities for transfer of learning or skills learned online, too many links within a course, changes in the course titles while a course was in progress, poorly constructed assessments, and course materials not being printable or downloadable.
4. *Organizational barriers.* These barriers that had to do with the organizational environment. For example, limited support from coworkers, supervisor, or employer to engage in e-learning, reliability of technical support, level of technical expertise or familiarity with e-learning technologies, lack of training on how to learn online, long waiting lists before one could enroll in an online course, organizational culture that did not support e-learning, lack of credibility of e-learning in some organizations, registration problems, lack of awareness of online course availability, lack of credit or certification after completion of online training, non-involvement in decision-making concerning e-learning, and course management problems.
5. *Situational barriers.* The items that loaded under this factor had to do with life circumstances or situations that limited study opportunities. Some examples cited were commitment to other roles and responsibilities, interruptions during study, the lack of time for study, and time management problems.
6. *Content suitability barriers.* The items that loaded under this factor had to do with the fit between one's career plans or job requirements and courses offered. Some of the barriers in this category included courses that were not audience-specific, of poor quality, and not rigorous enough (especially for "seasoned" employees).
7. *Technological barriers.* The items that loaded under this factor had to do with learning technologies. Barriers in this category included affordability (cost of hardware, software or services), consistent access to the course, slow Internet connection speed, poorly designed Learning Management Systems (LMS), poor navigation, and inability to save or transfer data leading to loss of data.

These findings support what other researchers on distance education have reported. For example, Berge, Muilenburg, and Haneghan (2002) reported seven types of barriers including situational, philosophical, psychological, pedagogical, technical, social, and cultural barriers. Gieskes, Hyland, and Magnusson (2002) reported Interrupted learning processes, psychological and cultural blocks, organizational structure, and leadership-related barriers. Schilke (2001) reported situational, dispositional, epistemological, institutional, and technical barriers. Clearly, these findings seem to support that barriers do stem from various sources within and beyond the organization, hence the systemic nature.

The Relationship between Barriers and E-learning Self-Efficacy

The findings indicated very high levels of e-learning self-efficacy, as measured on a 5-point Likert scale. The evidence indicates that e-learners believe that computers are good aids to learning, help save a lot of time, and made learning more interesting.

To determine the relationship between perceived barriers and an employee's self-efficacy, a two-tailed Pearson correlation was used. The results indicate a statistically significant relationship ($p = .011$) between self-efficacy and e-learning barriers ($r = -.086$, $p < .05$). According to Davis (1971) description criteria, this is a negligible association. The inverse relationship shows that participants with high self-efficacy are more likely to rate e-learning barriers lower. The relationship between these two variables was further investigated by looking at each of the seven types of barriers identified earlier (DVs) against the overall ELSE score. The results are illustrated in Table 2.

Dispositional barriers ($r = -.076$, $p = .026$), learning style barriers ($r = -.084$, $p = .013$), and situational barriers ($r = -.090$, $p = .008$) had a significant relationship with ELSE ($p < .05$). Thus situational, dispositional, and learning style barriers are inversely related to ELSE. Using Davis (1971) criteria of descriptors, these associations were negligible since the correlation coefficients were less than .09. The other four categories of barriers did not have significant relationships with ELSE.

Table 2. Relationship between Each Type of Barrier and E-learning Self-efficacy

Type of Barrier/DV	Self-Efficacy
1. Dispositional Barriers	-.076*
2. Learning Style Barriers	-.084*
3. Instructional Barriers	-.020
4. Situational Barriers	-.090**
5. Organizational Barriers	-.029
6. Content Barriers	-.060
7. Technological Barriers	-.064

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

Conclusions and Recommendations

This study accentuates the need for the ongoing evaluation and close involvement of e-learners' in improving e-learning and reducing present or emergent barriers. Similar studies done on a continual basis are recommended.

The results of this study plainly delineate the heterogeneous nature of barriers and support earlier studies on barriers in higher education where most of the e-learners' attrition was the culmination of a series of small individual problems (Schilke, 2001). From a corporate standpoint, Simmons (2002) acknowledges that technology is only one of several barriers encountered, contrary to popular claims that barriers are mostly technological. These findings suggest that barriers may be systemic in nature, encompassing both individual attributes and external environmental factors. Clearly, the multi-dimensional nature of these barriers demands a systemic approach to best manage them.

The present study found a significant relationship between dispositional barriers and e-learning self-efficacy. Therefore, practitioners should take into consideration the learners' dispositions and find ways through which e-learning self-efficacy could be improved.

E-learners must understand their personal roles and responsibilities in e-learning. The "person" is one of the central facets of the social cognitive theory. Although many changes can be made to the environment (organization, design, or technology), each individual must realize that as an adult learner, one has to take responsibility for one's learning (Knowles, 1990). A prospective or current e-learner, for example, must participate in training if one's skills are lacking. Without the necessary skills to perform effectively, frustrations are likely, regardless of other changes in the system. "Personal commitment to either an academic or occupational goals is the single most important determinant of persistence in college" (Cope & Hannah, 195, p. 19, cited in Tinto, 1993, p. 43).

Having sufficient skills and high self-efficacy is not enough (Bandura, 1986). "Persons may possess constituent skills and a strong sense of efficacy that they can execute them well, but they still choose not to perform the activities because they have no incentives to do so" (Bandura, 1986, p.395). This is why e-learning stakeholders must consider proving incentives. Success in building self-efficacy should be measured in terms of self-improvement (Bandura, 1994); thus, efforts such as engaging in and completing online training should be rewarded to enhance employees' self-efficacy. Pay-for-knowledge or some skill recognition might be key considerations in Web-based training (Colbrunn & Tiem, 2000).

Physical or social constraints further impose limits on what people can do (Bandura, 1986). Self-efficacy also does not translate into action when people do not have access to necessary physical resources, such as equipment. Consequently, for e-learning to be successful, skills are not enough; resources are critical. The discrepancy between internal factors (people's capabilities) and external factors (resources) should be resolved.

Although instructional barriers in this study were few, their presence has implications for facilitators and instructional designers, who should pay attention to the design, accessibility, content, and communication. Learner support has been reported to influence e-learning dropout rate (ASTD & Masie, 2001; O'Connor, Sceiford, Wan, Fourcar, Szocki, & Griffin, 2003) and thus have implications for support staff who market, provide support services, and manage online courses.

Administrators or management need to craft appropriate e-learning policies, especially those that will prioritize time for learning at work, enhance communication, provide incentives, and support services to e-learners.

Since lack of time for study was the most prevalent barrier, the implication for policy makers and supervisors is to provide opportunities or time for training. Unless employers and employees prioritize study time, online learning efforts may continue to suffer.

Content-suitability barriers were the second highest rated barriers. To reduce them, Dick, Carey and Carey (2001) recommend viewing instruction from a systems perspective. Dick, Carey and Carey (2001) recommend conducting needs assessments through instructional-, context-, and learner analysis as critical steps for good instructional design. Witkin and Altschuld (1995) recommend doing needs assessments as well to identify organizational needs to ensure that the learning content was sufficiently rigorous and of high quality; otherwise, it will affect the credibility of e-learning.

Although the technological barriers were few ($M = 2.05$), their presence cannot be ignored. Essential measures need to be taken to reduce such barriers emerging from ever-changing technologies.

Limitations

This study was based on a purposive sample made up of employee e-learners drawn from a convenience population in seven organizations. "A convenience sample also makes it difficult to randomly assign individuals to groups, a hallmark of a true experiment" (Creswell, 2003, p. 164).

Using a Web-based for data collection limited access to only those who had been granted the password and to those who had access to a computer, email, and the Internet at the time of data collection. There was uncertainty about pre-determining the main study's response rate because Web-surveys have a very wide range of response rates from 7% to 76% (Simsek & Veiga, 2001). Similar varying response rates were reported by the contact persons in organizations under study, ranging from 10% to 100% in their previous surveys. The big difference in response rates between the pilot study (52.5%) and the main study (18%) clearly illustrate this limitation. The 18% response rate limits the generalizability of these results to similar research samples only. The researcher relied on the willingness and reliability of the contact persons in each participating organization to communicate with the targeted population. Like any other study, lack of direct access to the population may be a limitation.

How this Study Contributes to New Knowledge in HRD

E-learning presents both challenges and opportunities to HRD practitioners, researchers, and e-learners. While addressing barriers is important, it is even more pertinent to find ways to reduce or eliminate them altogether. The implication for HRD practitioners and researchers is to consistently seek solutions to the barriers that e-learners encounter.

The relationship between e-learning barriers and e-learning self-efficacy was statistically significant, signifying that HRD needs to acknowledge the concept of e-learning self-efficacy and how it might impact employee participation in e-learning. This relationship is best summed up by the following quote:

"There is a growing body of knowledge that human accomplishments and positive well-being require an optimistic sense of personal efficacy. This is because ordinary social realities are strewn with difficulties. They are full of impediments, adversities, setbacks, frustrations, and inequities. People must have a robust sense of personal efficacy to sustain the perseverant effort needed to succeed. In pursuits strewn with obstacles, realists either forsake them, abort their efforts prematurely when difficulties arise or become cynical about the prospects of effecting significant changes." (Bandura, 1994, Section III, ¶ 1).

The empirical data emerging from this study is an example of how organizations might learn through e-learners' feedback. Decisions are likely to be more effective when changes or improvements to e-learning are based on the audiences' needs and experiences.

"Part of the challenge in researching obstacles in distance education is to identify a convenient framework for discussion and study" (Berge, Muilenburg, & Haneghan, 2002, p.2). While the researchers faced a similar challenge, this study shows how inter-disciplinary theories from other fields such as psychology can be incorporated into the study of e-learning.

Lastly, this study illustrates how new survey tools available on the Internet can be used to evaluate e-learning. Web-survey tools are readily available and can be incorporated into most courses or sent via email. HRD practitioners should investigate new innovative ways of collecting data to advance e-learning generalizability.

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