

Recurrent Themes in E-Learning: A Meta-Analysis of Major E-Learning Reports

Consuelo L. Waight, Pedro A. Willging, Tim L. Wentling
University of Illinois at Urbana-Champaign

A meta-analysis of 15 major e-Learning reports provides a basic insight on what government, business, and professional organizations are saying about e-Learning. Findings, though basic, look at the purpose of the e-Learning reports, features of e-Learning and the trends affecting e-Learning.

Keyword: e-Learning, policy reports, meta-analysis

E-Learning sometimes referred to as online learning, web-based learning, distance learning and technology-based learning, among other names, is a concept that has garnered significant global attention (Gotschall, 2000; Hall, 1997). Though the history of e-Learning (primarily distance learning) dates to the early 1950's and even before (Saba, 1999; Clark, 2000; Rosenberg, 2001), not until the last eight years has it become a momentous, collective imperative of several entities. This broad attention to e-Learning has resulted in numerous e-Learning reports. In doing extensive web searches for e-Learning reports, the researchers estimate that more than 250 e-Learning reports, excluding white papers, have been released worldwide over the last three years; by governments, business, academia and professional associations.

Problem Statement

The significance and relevance of technology and education has gained momentum; research on e-Learning is imperative. The discourse on e-Learning has focused on topics such as the effectiveness of e-Learning (Strommen & Lincoln, 1992; Harasim, Hiltz, Teles, & Turoff 1996; Webster, & Hackley, 1997), evaluation of distance education (Magalhaes, & Schiel, 1997; Thomas, 2000; Clark, 2000), e-Learning issues (Jonassen, 1992; Sherry, 1995; Banas & Emory, 1998), comparison of traditional and online learning (Saba, 1998; Ponzurick, France, Russo, & Cyril, 2000), and learning needs of organizations and their human resources amidst the technological, social and economical forces affecting the world (Gotschall, 2000; Karon, 2000; Wentling, Waight, King, 2002). Though not exclusive, and with little synthesis existing among these topics, the importance and challenges of e-Learning is omni-present.

With e-Learning being a huge imperative for government, business, and professional associations, and with these institutions being major players in the advancement of e-Learning, it is important to be cognizant of and synthesize what these institutions purport about e-Learning. These institutions have published various reports, their common discourse on e-Learning, however, is unknown. If government, business, and professional associations are leading the advancement of e-Learning, it is critical that there be cognizance on what these institutions say about the purpose, features and trends of e-Learning. This basic information can be the foundation to focusing research on e-Learning, a focus that is direly needed. Thus, this meta-analysis of e-Learning reports focuses on the following questions:

1. What is the purpose of e-Learning reports?
2. What are features of e-Learning?
3. What are the trends affecting e-Learning?

Conceptual Background

E-Learning is the acquisition and use of knowledge distributed and facilitated primarily by electronic means. This form of learning currently depends on networks and computers but will likely evolve into systems consisting of a variety of channels (e.g., wireless, satellite), and technologies (e.g., cellular phones, PDA's) as they are developed and adopted. E-learning can take the form of courses as well as modules and smaller learning objects. E-learning may incorporate synchronous or asynchronous access and may be distributed geographically with varied limits of time (Wentling, Waight and Kanfer, 2000).

The history of the technological revolution reveals that of all the sectors of society, education remains at the bottom of scale when it comes to integrating information technology (Strommen & Lincoln, 1992). The initial slow integration of technology into education can be a derivative of the early visions of distance education.

Matthews (1999) indicated distance education was first and foremost a movement that sought not so much to challenge or change the structure of higher learning, but to extend the traditional university and to overcome inherent problems of scarcity and exclusivity.

As we move into the 21st century this vision of distance learning has changed as the delivery of education now extends to commercial centers. Along with personal productivity software, windows environments, local area networks, client server computing, internets, intranets, and extranets has come the introduction of personal digital assistants (PDA), and mobile and wireless technologies. These technological advances have enabled electronic commerce systems, anytime, anyplace data retrieval and updating, education, professional development, and the rapid growth of e-Learning (Wentling, Waight & King, 2002; Close, Humphreys, Rutenbur 2000; Webster & Hackley, 1997).

As the integration of technology and education becomes addressed and as innovative information technology continues to surprise us, it is critical that a systemic approach to the organizational, process and individual (Rummler & Brache, 1992) issues such as insufficient empirical research, minimal application of research to practice, and application of traditional instructional design and teaching methods need to be addressed. In addition, the ineffective use of technology, the absence of the learner in the instructional design, antiquated policy; intellectual property and inadequate online teacher training are other issues affecting the effective integration of technology and education. Swanson (1999) related that, a wide range of systemic disconnects adversely affect performance. McNamarra (2001) related, 'a system is a collection of part unified to accomplish an overall goal. If one part of the system is removed, the nature of the system is changed as well'. (p.1). Cognizance that there are multiple factors that need concerted, consistent attention, is crucial, if e-Learning is to move from promise to practice. Learning and performance need to be seen, by every organization that implements e-learning, as outcomes of all the resources that go into any e-Learning effort. A strong partnership needs to be recognized and realized among all individuals and institutions involved in e-Learning.

At present, the systemic disconnects run across four main institutions: they are: government, business, academia and professional associations. Very few studies, for example, capitalize, extend or review existing research studies. Even more so, very few studies, move from research to practice. Thus, e-Learning continues to be plagued by learner, faculty and administrative issues. The issue of learner interaction, for example, has been researched in various but limited contexts (Webster & Hackley, 1997; Sherry, 1995; Ponzurich, France, Russo and Cyril, 2000;

Thomas, 2000; Moore & Thompson, 1990, 1997). E-Learning reports, another example, are growing in number, however we do not know what is in common across these reports.

Simply stated, there is presently a flurry of e-Learning research projects – few, if any, however, are making an impact on practice. Systems theory as a philosophy and systemic approach as a method for the government, business, academia and professional associations in their e-Learning efforts could start to bring changes in how we approach research and development of e-Learning.

Methodology

This study is the first part of a three-phase research project on e-Learning. The phases are: 1) identify e-Learning themes, 2) understanding the social, economic and research dimensions of e-learning, and 3) comparing themes between US and European e-Learning reports. The purpose of the first phase of the project, that is reported herein, is to identify the recurrent e-Learning themes. This is a qualitative study that intended to explore themes in the e-Learning reports. The major method of data collection was web searches using Metacrawler, Yahoo, Google and Lycos as the search engines. The reports provide rich descriptions (qualitative data). The qualitative data were content analyzed to provide recurrent themes. Content analysis is a research technique for systematically examining the content of communications, in this case, the e-Learning reports (Gall, Borg, & Gall, 1996).

Selection of Reports

A three-year span (1999-2001) was chosen to select the most recent and most cited public e-Learning reports published in the United States. Reports in this study do not include white papers, or research articles; they represent reports written by a group or organization. The rationale for choosing the most recent and most cited reports is that to identify the common denominator in the e-Learning reports. The reports used in the analysis needed to have some sort of impact on the knowledge base in e-Learning. Thus, the reports most commonly cited were considered significant and these reports were generally the most recent.

To identify the e-Learning reports, the researchers searched the web extensively using Metacrawler, Yahoo, Google, and Lycos. Understanding the dynamic nature of the web, an estimated 250 e-Learning reports were published world wide from 1999 to 2001. Of these 250 reports at least 100 were published and are presently sold by private companies for prices between 100 and 3000 dollars. Of the remaining 150 at least 70 reports were published outside of the United States. The researchers reviewed research articles, white papers, and e-Learning portals to identify which among the remaining 80 reports were the most cited reports. Fifteen (15) reports were the most recurrent and their sources were government, business and professional associations. These 15 reports altogether contained 1169 pages.

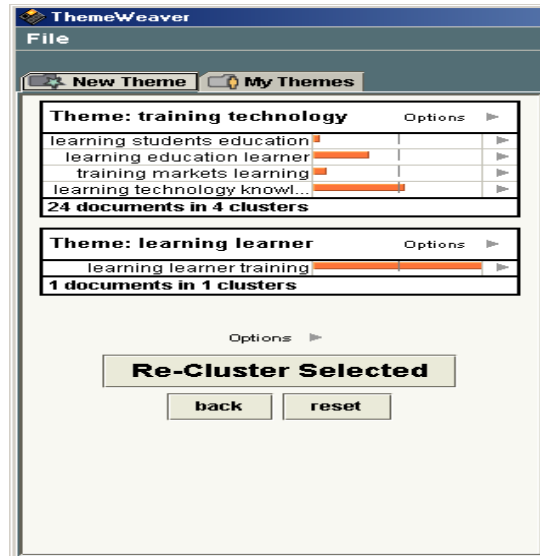
Analysis of Reports

The first level of analysis involved reviewing the first three pages of the reports for their sources. Second, the researchers reviewed the reports for keyword and phrases by using 'Theme Weaver', content analysis software, developed by the Automated Learning Group at National

Center for Supercomputing Applications. Following is a description of ‘Theme Weaver’ that provides a description of how the analysis was done.

Some of the keywords that Theme Weaver produced were: training technology, learning learner, information, workers work, time technology, technology learning, training time, work user learning, performance learning technology, learning market, and education training technology, time products, future individuals, project products, learner business, time knowledge work, and adult economy policy, and knowledge people organizations.

The following shows the theme results of one search using Theme Weaver.



Third, the researchers used the ‘NVivo’, a qualitative software tool, to further understand the keywords produced by ‘Theme Weaver’. NVivo produced the specific paragraphs where the keywords appeared in the reports. The researchers then reviewed the paragraphs to understand the context of the keywords and phrases. This review led to the identification of the research questions:

1. What are the purposes of e-Learning reports?
2. What are features of e-Learning?
3. What are the trends affecting e-Learning?

The fourth level of analysis was content analysis of the reports using the research questions as keywords. The researchers reviewed each report consecutively by research question. Content analysis is a research technique for systematically examining the content of communications--in this instance, the reports. Emergent themes were ranked by their frequency of mention and were ultimately categorized. Essentially, the study used a qualitative approach to analyze the responses. A quantitative method in the form of frequencies and percentages supported the qualitative data. The qualitative method was considered an appropriate way to explore the reports because of its descriptive nature to understand the whole of an event through insight and discovery (Bogdan & Biklen, 1992).

Results

The total number of reports analyzed was 15. The reports' sources were four government, seven businesses, and four professional training and development associations. The following are a description of reports and their sources.

Government Reports

1. President's Information Technology Advisory Committee (February 2001) Using information technology to transform the way we learn. Report to the president. <http://www.itrd.gov/pubs/pitac/pitac-tl-9feb01.pdf>
2. US Department of Education (December 2000) e-Learning - Putting a world class education at the fingertips of all Children - <http://www.ed.gov/Technology/elearning/index.html>
3. Web based Education Commission (December 2000). The Power of the Internet for learning: Moving from Promise to Practice. <http://interact.hpcnet.org/webcommission/index.htm#report>
4. US Department of Labor (September 1999). Futurework - Trends and Challenges for Work in the 21st Century
<http://www.dol.gov/dol/asp/public/futurework/report.htm>

Business Reports

1. Bank of America Securities. Education Industry Overview (September 1999). The e-bang Theory - <http://www.masie.com/masie/researchreports/ebang.pdf>
2. Wit Capital (August 1999) The e-Knowledge Industry. E-Knowledge – New ways to build the new economy
http://www.witcapital.com/research/reports/eknow_19990811/eknow_990811.pdf
3. WRHambrecht+CO (March 2000). Corporate e-learning: Exploring a new frontier
http://www.wrhambrecht.com/research/elearning/ir/ir_explore.pdf
4. Thomas Weisel Partners (January 2000). Riding the big waves
<http://www.masie.com/masie/researchreports/b2breport.pdf>
5. Suntrust Equitable Securities (March 2000) E-learning and Knowledge Technology.
<http://www.masie.com/masie/researchreports/e-learn0.pdf>
6. Morgan Keegan & Co (June 2000). The engine of the knowledge economy
<http://www.masie.com/masie/researchreports/elearning0700nate2.pdf>
7. Merrill Lynch & Co April, 1999). Distributed Learning: Building Schools Without Walls.
<http://www.e-commerce.research.ml.com/30209833.PDF>

Association Reports

1. Commission on Technology and Adult Learning -ASTD, NGA (June 2001) A Vision of E-learning for America's workforce. <http://www.nga.org/cda/files/elearningreport.pdf>
2. ASTD Report http://www.masie.com/masie/researchreports/ASTD_Exec-Summ.pdf
3. Hodgins, H. W. (2000). Into the future. A vision paper. Commission on Technology & Adult Learning. American Society for Training & Development (ASTD) & National Governors' Association (NGA).
http://www.intemettime.com/itimegroup/astd_web/index.htm
4. Software & Information Industry Association (SIIA) (2001) Trends shaping the digital economy 2001 Summary
<http://www.TrendsReport.net/summary/summary.pdf>

Research Question 1: What are the purposes of e-Learning?

The analysis revealed six purposes among the 15 reports. The following table provides a description of the themes and their frequency.

Table 1 - Purpose

No.	Themes	N =15	%	G	B	PA
1	Inform (help) investors about e-Learning opportunities	7	46.6		7	
2	Discuss learning, the workforce and the workplace	5	33.3	1	1	3
3	Inform policy makers, educators, employers, and the public about e-Learning	4	26.6	4		
4	Identify the key drivers/players of e-Learning	4	26.6		4	
5	Discuss the contribution of technology to learning and performance	4	26.6	1	2	1
6	Identify major trends and winning strategies	3	20		3	1

G- Government, B- Business, PA- Professional Association

Upon reviewing the reports, the most recurrent purpose was to inform investors about e-Learning opportunities. The seven business reports provided detailed descriptive business models to inform investors of the strengths and weaknesses of the e-Learning market. The second most recurrent purpose was on learning, workforce and workplace. Five reports provide an in-depth picture of the changing nature of the learning, the workforce and workplace and how e-Learning positions itself in this change. Looking at informing policy makers, educators, employers and the public, this purpose was found in all the government reports. Overall, associations' reports looked at the workforce and workplace, while business dealt with the investment opportunities, and government paid more attention to the policy makers, educators, employers and the public at large. Concertedly, however, 'learning, workforce and workplace' and 'discuss the contribution of technology to learning' purposes were dealt with by government, business and professional associations.

Research Question 2: What are the features of e-Learning?

The analysis revealed 9 major features of e-Learning among the 15 reports. The following table provides a description of the themes and their frequency.

Table 2 - Features

No.	Themes	N =15	%	G	B	PA
1	Anytime, anywhere	15	100	4	7	4
2	Cost effective	15	100	4	7	4
3	Reach global customers	15	100	4	7	4
4	Just-in-time access to needed knowledge	15	100	4	7	4
5	Personalization	15	100	4	7	4
6	Improved collaboration and interactivity	15	100	4	7	4
7	Addresses learner diversity	11	80	4	5	2
8	Learner-centered	9	60	4	3	2
9	Working and learning lines blur	7	46.6	1	4	2

G- Government, B- Business, PA- Professional Association

Of all the research questions, the most recurrent themes surfaced in question 2. Six features of e-Learning were identified in all 15 reports. This communicates that the government, business and professional associations see e-Learning being anytime, anywhere, cost effective, have a global reach, be just-in-time, allow personalization and improve collaboration and interactivity. All these descriptors tell of a vision on integrating technology into education and how learning and performance can be facilitated. Learner diversity, identified 11 times, was seen as a major breakthrough for e-Learning because of technology that could be used to support e-Learning. Learner diversity included but was not exclusive to learning styles, location, experience, skills, language and learning pace. Of the nine reports that identified the learner-centered feature, the government reports were unanimous while of the seven reports that cited the lines of working and learning disappearing, four of the seven business reports were unanimous on this issue.

Research Question 3: What are the trends affecting e-Learning?

The analysis revealed that 19 trends were recurrent in the 15 reports. The following table provides a description of the themes and their frequency.

Table 3 - Trends

No.	Themes	N =15	%	G	B	PA
1	Lifelong learning	15	100	4	7	4
2	Improvements in technology	15	100	4	7	4
3	Demand for high level skill workers	15	100	4	7	4
4	Pervasiveness of computers	15	100	4	7	4
5	Globalization	15	100	4	7	4
6	New technologies bring new way of learning	15	100	4	7	4
7	Technology will improve the quality of learning	15	100	4	7	4
8	A way of sustaining and maintaining the human capital in the knowledge economy	12	80	3	6	3
9	Innovative business models that can attract investment in the technology-based instructional materials and methods	10	66.6	1	7	2
10	Public and private partnerships will be a major requirement	9	60	3	4	2
11	e-Learning market is growing	9	60	1	7	1
12	A core educational experience	9	60	4	3	2
13	Shortening product development cycle	7	46.6		7	
14	Corporations the fastest to explore and adopt e-Learning at a large scale	4	26.6		4	
15	e-Learning movement is strong in corporate learning	3	20		3	
16	Corporate universities are growing	3	20	1	1	1
17	Education is the only aspect of society least affected by technology	3	20	1	1	1
18	Accessibility to internet and e-Learning may not be as wide spread in disadvantaged areas	3	20	2		1
19	Branding of content	2	13.3		2	

G- Government, B- Business, PA- Professional Association

Seven trends appeared in all 15 reports. These trends all capitalize on technology, education, the human capital and the intertwined impact of these three. E-Learning was also identified in 12 reports as a mechanism for sustaining the growth of the intellectual capital while 10 reports cited the introduction of business models on e-Learning by investors. Along this topic the growth of the e-Learning market, the need for private and public partnerships and e-Learning becoming a core educational experience were mentioned in nine reports. That corporate universities are growing and that education has been the least affected by technology were cited by one report from each source. Overall, the trends show that e-Learning is moving forward and that the business as well as the education aspects holds promise.

Discussion and Conclusion

The content analysis of the 15 reports revealed basic but significant information. Though, the results from this study touches the tip of the e-Learning iceberg, it holds significance for many professionals researching or writing about e-Learning. In essence this basic study gives educators, researchers and developers from all institutions a quick glance into the recurrent themes of 1169 pages of e-Learning reports. Given that the study is in its first stage, the study provided a peripheral insight into the purpose, e-Learning features and trends of 15 reports. The second part of this study will focus on the economic, social, research and development, learning organization and futuristic case of e-Learning as purported by the reports government, business, and professional associations. The last part of the study will compare U.S and European reports on their purpose, feature and trends.

From this part of the study, it can be concluded that the government, business and professional associations converge in many aspects of e-Learning. The integration of education and technology, though presently lagging behind other aspects of society, will get better as technology improves and leaders in private and public institutions create partnerships to integrate technology into their education programs to improve learning and performance. Learning and performance are outcomes of e-Learning that hold promise given the features of e-Learning. The learner will have control of the learning; a model that has been found to be the best in an online environment (Jonassen, 1992; Harasim, Hiltz, Teles, Turoff, 1996). The just-in-time, anywhere, anytime capabilities will be topped off by the opportunities for collaboration, interactivity and personalization. All reports purport an agreement that a paradigm shift in the way education is viewed and delivered has occurred. In essence the perceptions of learning have undergone radical change (Rosenberg, 2001).

Therefore, as business organizations discuss the growing markets of e-Learning and develop business models to attract investors, the government targets policy makers, educators, employers and the public at large, while professionals organizations mainly focus on the workforce and workplace, it is imperative that all three entities become aware of their convergences and divergences. As Banas and Emory, (1998) stated, “while there is a growing recognition of and attention to distance learning in higher education, its growing inclusion in academia significantly changes the educational environment and experience. These changes need to be acknowledged and discussed by all stakeholders”. (p.5) This study opens the door to the second phase of this research which is getting the detail on how technology will bring a new way of learning, how technology will improve the quality of learning, how e-Learning will sustain and maintain the intellectual capital and address learner diversity. Addressing learner diversity is critical because as Cifuentes and Murphy (2000) related, “in order to strengthen bonds among the members of

expanding learning communities, administrators, teachers, and students in learner-centered schools and universities must honor diversity and emphasize the similarities that foster unity” (p.17). Overall, the themes revealed that there is a large consensus on the what, where, why and how of e-Learning. The next phase of this study is to understand the social, economic, research and development, learning organization and the futuristic case of e-Learning.

Implications for HRD

The first implication of this study is for all HRD educators and researchers. With e-learning, a rapid, effective and less expensive form of training and development (Schutte, 1996, Magalhaes & Schiel, 1999; Karon, 2000), the study provides preliminary information that educators as well as researchers could use when writing grants, or conducting research on e-Learning. The findings are basic but help to build a foundation for e-Learning. The study also gives educators and researchers an insight into what the government, business and professional associations are saying about e-Learning.

The second implication of the study is for the HRD practitioners. This study gives practitioners a snap shot of the e-Learning features and trends to help anticipate the e-Learning scenario. Both features and trends are important when assessing the workplace and the workforce in its readiness for e-Learning. HRD practitioners need to know how these trends and features will modify their practice.

The third implication of this study is more research. This study though preliminary, in its findings, highlighted recurrent themes in purpose, features and trends across government, business and professional associations. Reports from academia were unexplored, a source that needs to be reviewed. Also, because of the newness of the topic, there are still many avenues to explore across government, business, education, and professional associations.

The last implication is for professionals directing government, business, academia, and professional associations e-Learning efforts. This study’s preliminary findings show that there is overlap in their purposes, features and trends. It is important that each stakeholder be cognizant of each other’s efforts in realizing e-Learning promise.

References

- Banas, E. J., & Emory, W. F. (1998). History and issues of distance learning. Public Administration Quarterly, 22 (3) 365 –383.
- Bogdan, R. C., & Biklen, S. K. (1992). Qualitative research for education: An introduction to theory and methods. Boston: Allyn & Bacon.
- Cifuentes, L. & Murphy K. L. (2000). Cultural Connections: A model for eliminating boundaries and crossing borders. Quarterly Review of Distance Education 1 (1) 17 –30.
- Clark, R. E. (2000). Evaluating distance education: Strategies and Cautions. Quarterly Review of Distance Education 1 (1) 3 –16.
- Close, R.C., Humphreys, B., Ruttenbur, B.W. (2000). E-Learning & Knowledge Technology: Technology & The Internet are changing the way we learn. SunTrust Equitable Securities.
- Gall, M. D., Borg, W. R., & Gall, J. P. (1996). Educational research. (Sixth ed.). White Plains, NY: Longman Publishers.
- Gotschall, M.. (2000). E-learning strategies for executive education and corporate training. Fortune, 141 (10) S5 – S59.

- Hall, B. (1997). Web-based training cookbook. New York: Wiley.
- Harasim, L., Hiltz, S.R., Teles, L., & Turoff, M. (1996). A field guide to teaching and learning guide: Learning Networks. Cambridge, MA: MIT Press.
- Jonassen, D.H. (1992). Applications and limitations of hypertext technology for distance learning. Invited paper, Distance Learning Workshop, Armstrong Laboratory, San Antonio, TX.
- Karon, R. L. (2000). Bankers go online: Illinois banking company learns benefits of e-training. E-learning, 1 (1) 38-40.
- Karon, R. L. (2000). Bank solves compliance training challenge with internet. E-learning, January-March.
- Magalhaes, M. G. & Schiel, D. (1997). A method for evaluation of a course delivered via the world wide web in Brazil. The American Journal of Distance Education, 11(2), 64 -70.
- McNamarra (2001). Brief overview of contemporary theories in management. <http://www.mapnp.org/library/mgmt/contmpory.htm>
- Matthews, D. (1999). The origins of distance education and its use in the United States. T.H.E Journal 27 (2) 54 –67.
- Moore. M.G., & Thompson, M.M. (1990). The effects of distance learning: A summary of literature. ERIC Document Reproduction Service No. ED330 321.
- Moore. M.G., & Thompson, M.M. (1997). The effects of distance learning. (Rev.ed. ACSDE Research Monograph No. 15). University Park, PA: American Center for the Study of Distance Education, Pennsylvania State University.
- Ponzurick, T.G., France, K., Russo, L., & Cyril, M. (2000). Delivering graduate marketing education: An analysis of face-to-face versus distance education. Journal of Marketing Education 22, (3) 180 –187.
- Rosenberg, M. J. (2001). E-Learning: Strategies for delivering knowledge in the digital age. New York, NY: McGraw Hill.
- Rummler, G. A., & Brache, A.P. (1992). Improving performance: How to manage the white space on the organization chart. San Francisco: Jossey-Bass.
- Saba, F. (1998). Is distance education comparable to “traditional” education? Distance Education Report, sample issue, 3.
- Schutte, J. G. (1996). Virtual teaching in higher education: The new intellectual superhighway or just another traffic jam? Available: <http://www.csum.edu/sociology/virexp.htr>.
- Sherry, L. (1995). Issues in distance learning. International Journal of Educational Telecommunications 1 (4) 337-65.
- Strommen, E.F., & Lincoln, B. (1992). Constructivism, technology, and the future of classroom learning. <http://www.ilt.columbia.edu/k12/livetext/docs/construct.html>
- Swanson, R.A. (1999) Foundations of performance improvement and implications for practice. Advances in Developing Human Resources 1, 1 – 25.
- Thomas, L. (2000). Evaluation of distance education systems [On-line]. Available: <http://www.lucent.com/cedl/evaluaofdes.html>
- Watkins, K. E., & Marsick, V. J. (1993). Sculpting the learning organization: Lessons in the art and science of systemic change. San Francisco: Jossey-Bass.
- Webster, J., & Hackley, P. (1997). Teaching effectiveness in technology-mediated distance learning. Academy of Management 40, (6).
- Wentling, T., Waight, C.L, & Kanfer, A. (2000). E-Learning: A review of literature. (<http://learning.ncsa.uiuc.edu>).

Wentling, T., & Waight, C.L. (2000). The future of e-Learning: A corporate and academic perspective. Knowledge and Learning Systems Group, National Center for Supercomputing Applications. <http://learning.ncsa.uiuc.edu>

Wentling, T., Waight, C.L., King, R. (2002). Foundations of HRD in a networked world. In Human Resource Development and Information Technology: the Global Connection. Boston: Kluwer Academic Publishers.