Supporting Life-Long Learning with Constructivist Web-based Instruction

Ron Johnson

Abstract

This paper discusses the issue of lifelong learning and the driving forces behind the current public initiatives to incorporate lifelong learning into the lives of the workforce. The paper also presents the characteristics of constructivism and its support within Web-based learning environments, suggesting that effective, efficient, and meaningful instruction in support of the lifelong learning lifestyle can be achieved with well-designed Web-based instruction.

Introduction

Lifelong learning is recognized as a solution for the growing problem of workplace skill set deficiency caused by technological evolution in the workplace (Gorard and Selwyn 2005). As the pace of change continues to accelerate, workers can no longer rely on their existing skill sets for socioeconomic security (Comings, Reder et al. 2001). To reduce the risk of economic displacement, workers must become proactive in managing their skill sets to acquire new skills to meet the changing needs of their employers (Comings, Reder et al. 2001). Lifelong learning is a lifestyle that integrates learning activities with other life activities, making workers active participants in their learning process (Kerka and Eric Clearinghouse on Adult 1996). In adopting the lifelong learning lifestyle, workers become proactive in the process of managing their skill sets to maintain and enhance their workplace competence and socioeconomic status. However, current methods of adult education do not fully support the activities associated with the lifelong learning approach (Gorard and Selwyn 2005). In response to these shortcomings, many Western cultures are supporting lifelong learning initiatives to meet the challenges of maintaining and enhancing the socioeconomic opportunities for their members.

Lifelong learning is no longer optional in our ever-changing economy where new technology constantly changes the skill sets required by employers. To be effective, any instructional approach supporting lifelong learning must recognize that adult learners have distinct characteristics and learning styles (Holmes 2002). An adult learner brings existing knowledge and experience to the adult education environment which must be leveraged to create an efficient and meaningful instructional experience for the learner. An approach for connecting instruction with existing knowledge suggests that an adult learner acquires skills and knowledge through social interaction, reflection, connection with existing experience, and real-world problem solving opportunities. Supporting these characteristics with effective, efficient, and meaningful adult education is the goal of lifelong learning initiatives.

Constructivist learning theory provides a foundation which supports the learning characteristics of adult learners. As a theory, constructivism does not espouse any specific learning approaches; however, the principles of constructivism support lifelong learning by recognizing the distinct characteristics of adult learners (Fosnot 2005). Constructivism emphasizes social interaction, reflection, and incorporates existing experiences in the learner's construction of meaning (Steffe and Gale 1995). A central tenet of constructivism is

the use of meaningful and relevant real-world problem–solving in a collaborative environment as a tool for connecting existing knowledge and experience while providing for social construction of knowledge. The principles of constructivism support the learning characteristics of adult learners, but provide no well-defined approaches for implementation.

The advance of technology as the driving force for change also provides the solution to one of the primary issues associated with adult education: participation. With the emergence of widespread use of high-speed Internet connections, the issue of access as a barrier to participation in adult education is being resolved (Beldarrain 2006). Web-based instructional systems provide for ease of access, multimedia presentation of information, and communication for the adult learner, characteristics that promote Web-based instruction as a leading approach for adult education (Steffe and Gale 1995; Maddux, Ewing-Taylor et al. 2002). The remaining challenge is in the identification of effective, efficient approaches for instructional development on the Internet.

This paper discusses the issue of lifelong learning and the driving forces behind the current public initiatives to incorporate lifelong learning into the lives of the workforce. The paper also presents the characteristics of constructivism and its support within Web-based learning environments, suggesting that effective, efficient, and meaningful instruction in support of the lifelong learning lifestyle can be achieved with well-designed Web-based instruction.

Lifelong Learning

Lifelong learning initiatives are being actively pursued in many Western cultures in response to changing socioeconomic trends (Gorard and Selwyn 2005). R. H. Dave defines lifelong learning as "a process of accomplishing personal, social and professional development throughout the life-span of individuals …" (Wain 2004). Lifelong learning is not a new concept. In many cultures, both past and present, including Chinese, Indian, Greek, Roman, and Islamic, the concept of lifelong learning is considered "a value inherent to human life and experience" (Wain 2004, p. 2)(Hiemstra 1976). In Western society, change has become part of everyday life, and the pace of change is accelerating, affecting the whole of society thereby bringing the focus of adult education to lifelong learning (Wain 2004). With renewed initiatives, Western societies are moving to secure the personal, social, and professional success of their members with what has been an historic ideal: lifelong learning.

Lifelong learning has once again come to the forefront of public policy debates as socioeconomic trends have clearly identified the need for continuous adult education that is integrated with other life activities (Parelius 1975; Gorard and Selwyn 2005). In the new world order, workers are faced with increasing pressure to continuously improve and augment their skill sets in order to avoid "occupational obsolescence" (Hiemstra 1976, p. 8). Workers today, in adapting to evolving technology, must learn new skills and retrain for new careers, voluntarily or involuntarily, due to economic displacement. Lifelong learning may insulate workers from the impact of economic displacement caused by the evolution of world

economies by providing opportunities for updating skills and knowledge. (Drago-Severson 2004). Technological evolution in the workplace has refocused government efforts to develop lifelong learning initiatives that are efficient and effective.

It is no longer sufficient for workers to have competency in a narrow field of knowledge. Workers today are expected to boast multiple skill sets or have the training sufficient to develop the skills necessary to adapt to the changing needs of their employers (Comings, Sum et al. 2000; Gorard and Selwyn 2005). According to Comings, et al. (2000), 1.1 million workers face economic displacement because they lack the skills required by their employers. Lifelong learning can provide opportunities for workers to develop new skills and knowledge to contribute to the changing needs of their employers and secure their socioeconomic status.

The rapid pace of workplace change is evident from many perspectives. Workers today receive one to two weeks of training per year; however, workers retain only about 20% of the required knowledge to perform their jobs effectively (Holmes 2002). Additionally, knowledge half-life, the usefulness of new knowledge, is getting shorter, requiring workers to proactively seek to learn new skills to maintain their workplace competence (Holmes 2002). While some workers are offered training, most will find other employment to gain new knowledge and experience, leaving a vacuum of knowledge and experience for their employers. The vacuum created by the departure of workers seeking new skills and experience impacts an employer's productivity and profitability (Holmes 2002).

Lifelong learning is a concept with significant social and economic impact for both workers and employers. According to the U.S. Bureau of Labor Statistics, the shortage of skilled workers will exceed 10 million by 2010 (Thompson 2007). Currently, 40% of employers are reporting skilled worker shortages (Thompson 2007). Workers seeking socioeconomic mobility require new knowledge and skills while employers seeking to maximize productivity and profitability require a skilled and knowledgeable workforce. To meet the goals of both workers and employers a new philosophy of learning that is continuous and active must be adopted.

Prerequisites for lifelong learning success include personal and interpersonal skills that may not be innately characteristic of most workers. Lifelong learning requires self-motivation, reflection, and interpersonal skills. The learner must assume an active role in his education for the construction and the sharing of experience and knowledge (Kerka and Eric Clearinghouse on Adult 1996). The primary skill necessary for lifelong learning is the ability to effectively and to efficiently read materials that provide insight and exposure to new knowledge. The ability to socially interact becomes tantamount because knowledge conceptualized from reading is then filtered through involvement in relevant projects, mentoring, and sharing with peers (Holmes 2002). In addition, the learner must develop reflective skills in order to facilitate deeper understanding of the new knowledge and experience. In general, personal and interpersonal skills required for lifelong learning are not provided by current epistemological approaches (Gorard and Selwyn 2005).

Constructivism: An Overview

Jean Piaget founded the modern constructivist movement about 60 years ago based on the pioneering 18th century work of Giambattista Vico (Fosnot 2005). Piaget distinguished constructivism from other theories of learning with the premise that knowledge is not a representation of reality to be acquired, but rather an individual's interpretation of reality as it pertains to his experiences (Fosnot 2005). Piaget further distinguished constructivism from other learning theories by defining knowledge as an adaptive process requiring the learner to seek to create his own perception of the reality based on his experiences (Fosnot 2005). From a biological perspective, Piaget argued that existing knowledge adapts during the learning process as new knowledge is perceived. Therefore, according to the foundations of constructivist theory as put forth by Piaget, learners constantly construct new knowledge from their perception of reality, incorporating the new knowledge with existing knowledge to construct meaning.

Another pioneer in the constructivist movement, Ernst von Glasersfeld, defined constructivism as an active and participatory learning process whereby the learner builds knowledge through reflection and abstraction (Steffe and Gale 1995). Constructivism does not define learning as a linear process which can be transmitted from teacher to learner, but rather as a complex and non-linear process (Fosnot 2005). Constructivist learning is supported through "active and intentional learning" in an environment in which learners can "share and co-construct knowledge" (Cheung 2006). In contrast to passive, teacher-centered learning, constructivism defines learning as an active and personal journey centered on the learner, during which the learner constructs new knowledge that is personally meaningful and relevant (Dobrovolny 2006).

In support of constructivism, Glasersfeld argues that the definition of knowledge, as the foundation of popular learning theory, is based on an unresolved paradox. According to Glasersfeld, throughout our history, Western epistemological traditions have held that knowledge represents the real-world independent of the learner and that true knowledge reflects the independent world (Larochelle, Bednarz et al. 1998). The "true knowledge" paradox, originally defined in the 5th century BCE, suggests that it is impossible to establish the truth of knowledge because to do so requires comparison with other knowledge that itself cannot be proven true (Steffe and Gale 1995). Constructivism resolves this paradox by holding that there is no "true" knowledge, only an individual's perception of reality which constructs his personal knowledge. As a result, two individuals may experience the same reality yet construct different knowledge from that experience; however, for each, the knowledge is true.

For any constructivist learning environment the primary goal is to assist the learner in constructing his knowledge from his perceptions and his past experiences. In part, this goal is achieved by providing authentic and meaningful context to the learner with opportunities to solve real-world problems. Additionally, learners are encouraged to reflect on the information

presented to them and to discuss their understanding with their peers within the learning environment (Wang, Resta et al. 2001; Liaw 2004). The active and collaborative approach represented by these defining characteristics allows the learner to construct his knowledge within the scope of his current experiences.

Web-based Instruction

In today's economically and socially complex society, workers have little opportunity to maintain or enhance their training using traditional methods of classroom instruction. Attendance at traditional adult education venues is difficult for many workers due to family, economic, or other social factors (Kerka and Eric Clearinghouse on Adult 1996). Web-based instruction is well-suited to address the needs of adult education by providing significant benefits over traditional classroom-based adult education programs. The most prevalent benefits of Web-based instruction for adult learners are the ability to participate in training from geographically disparate locations at times convenient for the learner and to have the instruction tailored to the individual's learning style (Maddux, Ewing-Taylor et al. 2002; Gorard and Selwyn 2005).

Socioeconomic benefits associated with Web-based instruction include increased job opportunities, adaptability to changing workplace requirements through the acquisition of new skills, and the ease of accessibility (Parelius 1975; Kerka and Eric Clearinghouse on Adult 1996). As workplace skill requirements continue to evolve, workers must address their knowledge deficiencies in order to remain competitive and viable in the workplace. The increasing pace of socioeconomic change ensures that workers will face the need to retrain themselves in order to maintain and to enhance participation in the workforce. The advantages of Web-based instruction provide an opportunity for workers to participate in adult education that is convenient, necessary, and individualized, thereby helping to secure their socioeconomic status.

Sociocultural developments and the ubiquity of communication and computing networks are providing dramatic opportunities for Web-based instruction to impact the lives of workers. The recent developments in communication and computing networks have enabled the emergence of Web-based instruction as a viable form of adult education (Beldarrain 2006). Approaches to Web-based instruction include electronic mail, virtual worlds, interactive tutors, hypermedia, and other collaborative learning environments (Kerka and Eric Clearinghouse on Adult 1996). The ubiquity and accessibility of high-speed Internet connections allows anyone at anytime to participate in a learning environment. For workers and their employers, the availability of training to quickly and efficiently adapt to changing needs represents an opportunity to redefine the workplace.

In order for Web-based instruction to meet the needs of adult learners, the design of the instruction must provide flexibility to account for the characteristics and varied learning styles of adult learners. The learning characteristics of adult learners are based on "social

construction of meaning and the importance of reflection, prior experiences, and authentic experiences in the learning process" (Dobrovolny 2006, p. 156). Web-based instruction for adult learners takes these learning characteristics into account by providing in-depth information sources delivered in multimedia format, with interactivity and feedback via e-mail, bulletin boards, and chat facilities, multimodal presentation to suit the learning style of the adult learner, and the use of real-world representations in the learning process (Wonacott and National Dissemination Center for Career and Technical Education 2000). Acknowledging the learning characteristics and styles of adult learners, Web-based instruction can create environments that provide for effective and efficient adult learning.

Effective Web-based learning environments share common characteristics that present the learner with rich, learner-centered, interactive information. The multimedia tools available for developing instructional systems for the Internet support the presentation of information in a variety of formats suited for multiple learning styles with rich and in-depth information easily integrated into a Web-based learning environment (Liaw 2004). In addition, Internet development of instructional materials allows for the use of a variety of tools which promote interactivity, such as video conferencing, chat facilities, e-mail, and bulletin boards (Liaw 2004). Possibly the most beneficial aspect of the Internet is its hardware and software neutrality which allows for instructional development that is not dependent on any hardware or software standard (Liaw 2004). The development of an information-rich, interactive, and multimedia learning environment can be achieved by consideration of these characteristics during the design process.

Conclusion

The issue of workplace skills deficiency has the potential to create a significant economic impact. Workers today face the increasing need to update and augment their skill sets to avoid economic displacement. In order to avoid the negative socioeconomic effects of job loss caused by the lack of necessary skills, workers must adopt a proactive approach in managing their skill sets. The ability to adopt a proactive approach has, in the past, been hampered by educational opportunities that were based on traditional classroom-based instruction. However, the advancement of technology supporting the ubiquitous interconnectivity of computers via the Internet brings with it the opportunity to provide on-demand access to effective and relevant instruction tailored to meet the needs of the adult learner.

Publicly funded initiatives to promote lifelong learning focus on methods to provide the adult learner with easily accessible educational opportunities that are relevant to the maintenance and enhancement of the adult learner's socioeconomic status. The lifelong learning lifestyle requires that the adult learner be actively engaged in the management of his education within the other activities in the adult learner's life. However, the adult learner comes to the instructional environment with skills and experiences developed through prior instruction and life experiences which must be leveraged when presenting new instruction. The lifelong

learning approach has the capacity to redefine the workplace, allowing workers to respond to changing skill set requirements with accessible and meaningful instruction.

Effective instruction for the adult learner must not only leverage existing skills and experience, but must also be designed to provide instruction that complements the learning characteristics and learning styles of the adult learner. Constructivism supports lifelong learning by emphasizing social interaction as a meaningful learning process during which the learner constructs meaning, reflects, incorporates prior experience, and is exposed to relevant new experiences (Dobrovolny 2006). When taking advantage of the accessibility of the Internet as well as the capabilities of meaningful instructional development on the Internet, it is suggested that combining the constructivist approach with Web-based instruction is an effective solution to address the issue of lifelong learning.

The characteristics of Web-based instruction support the principles of lifelong learning as well as provide support for the characteristics of the adult learner. Web-based instruction is founded on the principles of constructivism whereby learners are active participants in the learning process (Kerka and Eric Clearinghouse on Adult 1996). Well-designed Web-based instruction activates and motivates the learner to construct meaning from the learning experience (Kerka and Eric Clearinghouse on Adult 1996; Schroeder and Spannagel 2006). Applying the appropriate tools and design to create constructivist Web-based instruction allows for the development of instructional systems that will leverage the existing skills and the experiences of the learner within a multimedia environment, with facilities for interactivity to provide a relevant and meaningful educational experience for the learner.

Although a growing field, Web-based instruction represents a small percentage of adult education endeavors (Tallent-Runnels, Thomas et al. 2006). The limited utilization of Web-based instruction is driven by distinct demographics. A key factor to utilization of Web-based instruction is access to high-speed Internet connections to support the learning environment. Additionally, sociocultural barriers exist that limit the typical Web-based learner to White males between the ages of 30-35 (Tallent-Runnels, Thomas et al. 2006). Web-based instruction assumes that the learner is computer-literate; however, a third of Web-based learners believed that additional instruction in the use of computer tools was necessary with 61.5% of adult learners saying their computer skills were self-taught (Tallent-Runnels, Thomas et al. 2006). Resolution of the issues of access to high-speed Internet connections and the need for instruction necessary to participate in Web-based instruction will allow the potential of constructivist Web-based adult education to be realized.

References

Beldarrain, Y. (2006). Distance Education Trends: Integrating New Technologies to Foster Student Interaction and Collaboration. Distance Education, 27(2), 139.

Cheung, L. S. (2006). A Constructivist Approach to Designing Computer Supported Concept-Mapping Environment. International Journal of Instructional Media, 33(2), 11.

Comings, J., S. Reder, et al. (2001). Building a level playing field: The need to expand and improve the national and state adult education systems. NCSALL [Occasional Paper]. Boston: World Education.

Comings, J., A. Sum, et al. (2000). New skills for a new economy: Adult education's key role in sustaining economic growth and expanding opporunity. Boston: The Massachusetts Institute for a New Commonwealth.

Dobrovolny, J. (2006). How Adults Learn from Self-Paced, Technology-Based Corporate Training: New Focus for Learners, New Focus for Designers. Distance Education, 27(2), 155.

Drago-Severson, E. (2004). Becoming adult learners : principles and practices for effective development. New York: Teachers College Press.

Fosnot, C. T. (2005). Constructivism : theory, perspectives, and practice. New York: Teachers College Press.

Gorard, S. and N. Selwyn (2005). What Makes a Lifelong Learner? Teachers College Record, 107(6), 1193.

Hiemstra, R. (1976). Lifelong learning. Lincoln, Neb.: Professional Educators Publications.

Holmes, A. (2002). Lifelong Learning. Oxford, U.K.: Capstone Publishing.

Kerka, S. and C. a. V. E. C. O. H. Eric Clearinghouse on Adult (1996). Distance Learning, the Internet, and the World Wide Web. ERIC Digest. Columbus, OH.: ERIC Publications.

Larochelle, M., N. Bednarz, et al. (1998). Constructivism and education. Cambridge, U.K.; New York: Cambridge University Press.

Liaw, S.-S. (2004). Considerations for Developing Constructivist Web-Based Learning. International Journal of Instructional Media, 31(3).

Maddux, C. D., J. Ewing-Taylor, et al. (2002). Computers in the schools. Distance education : issues and concerns. New York: Haworth Press.

Parelius, A. P. (1975). Lifelong education and age stratification: Some unexplored relationships. American Behavioral Scientist, 19(2), 206-223.

Schroeder, U. and C. Spannagel (2006). Supporting the Active Learning Process. International Journal on E-Learning, 5(2), 245.

Steffe, L. P. and J. E. Gale (1995). Constructivism in education. Hillsdale, N.J.: Lawrence Erlbaum.

Tallent-Runnels, M. K., J. A. Thomas, et al. (2006). Teaching Courses Online: A Review of the Research. Review of Educational Research, 76(1), 42.

Thompson, V. (2007). "talent shortage? How to win with what you've got." SuperVision, 68(2).

Wain, K. (2004). The learning society in a postmodern world : the education crisis. New York: P. Lang.

Wang, C. Y. J., P. E. Resta, et al. (2001). The Medium Is the Message--The Design of an Online Collaborative Learning Community. Annual Proceedings of Selected Research and

Development [and] Practice Papers Presented at the National Convention of the Association for Educational Communications and Technology.
Wonacott, M. E. and C. O. H. National Dissemination Center for Career and Technical Education (2000). Web-Based Training and Constructivism. In Brief: Fast Facts for Policy and Practice, No. 2.