Technology and the Adult Learner:

Then and Now

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Abstract

The advances in technology are having a major impact on society. Faced with economic instability and the question of future job security, adult learners are returning to the classroom more than ever. Yet, the classroom as a four-walled institution is changing. This paper will address the impact technology has on the educational system and the adult learner.

*Keywords*: technology, adult learner, individual change, education, andragogy
Technology and the Adult Learner: Then and Now

The depth and breadth of technological advances in the marketplace is increasing at an extremely rapid pace. This proliferation is making its mark felt throughout the business and academic communities. For example, look at the fundamentally accepted tool of the cell phone. As a result of technological advances and subsequent marketing, the cell phone has replaced pay phones and some residential phone lines. According to the Federal Trade Commission, there were slightly over 2.1 million payphones in the United States in 1998. At the end of 2008, the number has been reduced to slightly over 830,000, with AT&T deciding to leave the market with their 60,000 payphones (FTC, 2010). According to Innovative Design for Education, in 2005 only 15 percent of all Americans had cell phones. Today that figure is exceeding 85 percent of all Americans. At the same time according to the report, as new computers are rolling off the manufacturing process and onto stores shelves, the next model is coming off the design process (IDE, 2010). So how does one maintain the balance between when to buy, when to use, and when to learn how to use this equipment? During these tough economic times, we see more and more adults attempting to gain knowledge either through formal or informal classes. According to the U. S. Department of Education, adult students are the fastest growing educational demographic, and these numbers are steadily increasing. For example back in 1970, 28 percent of all college students were 25 years of age or older. In 1998, the number of adult learners had increased to 41 percent (ED.gov, 2010). Today, according to the Association for Nontraditional Students in Higher Education, students who are over 25 make up 47 percent of the new and returning student population on many of today's college campuses (ANTSHE, 2010). The reasoning for this, according to the American Council of Education, is due to increased longevity and an unstable economic future. The American Council on Education report, Framing New
Terrain: Older Adults & Higher Education, shows more older adults are starting to return to college, pursue new career directions, start new businesses, and realize lifelong dreams (ACE, 2010). So how does the combination of technology, the adult learner, and education cohesively work together? In order to answer that question, this paper will review available literature on the relationship between the topics and an exploration of the overall effects will be explored.

In reviewing the literature, this paper will concentrate on answering three questions. Does technology have an impact on education? How does technology specifically affect the adult learner? What does the future hold for technology and the adult learner?

Technology and Education

The question reverberating throughout the halls of school, colleges, and universities is how can technology enhance our educational system? In an article, written by Constance Mellon about technology and education, Mellon refers to the technological geniuses developing the technology as zealots (Mellon, 2000, 2003). As the number of users increased throughout the end of the 20th century into the 21st century, technology was beginning to be equated in speed of computing. As noted by Mellon, “strange words and phrases like “gigabytes, megahertz, ROM, RAM, and synchronous communication” (Mellon, 2000) became the guru’s buzz words. In other words, technology is defined as meaning to be faster, meaner, and leaner. In her article, she cites two references that articulate the motivation of educational zealots. The first is “in 10 years” say technology zealots “books will be obsolete. In 10 years, libraries and schools as physical entities will vanish” (Mellon, 2000). She goes on to cite a reference from a work on Thomas Edison, when in 1913 he states an opinion after the introduction of the motion picture, "Books will soon be obsolete in the schools. Scholars will be instructed through the eye. It is
possible to teach every branch of human knowledge with the motion picture. Our school system will be completely changed in 10 years” (Mellon, 2000). Yet, here we are today, and the books are still among us. Libraries and schools are still intact, and scholars are still being taught in the classroom. Based on these two citations, it would be fair to say that popular opinion concerning technology does indeed influence education. However, to what extent does technology influences the educational process and more specifically adult learning?

To address this question, it would be prudent to review what learning is. Dorothy Mackeracher describes learning as “a normal physiological and psychological activity that does not require external pressure or encouragement to begin and that proceeds out of inner drive fuelled by interpersonal energy rather than out of external pressure fuelled by rewards and punishment” (Mackeracher, 2008, p. 7). Exploring this concept further, as it relates to adults, our attention is turned to the work of Malcolm Knowles. In the work by Daniel Pratt & Associates, the authors refer to the work of Knowles, which they acknowledged is the modern day father of andragogy. Taking a reference from Knowles 1980 work, the authors define “andragogy as the science and art of teaching adults” (Pratt & Associates, 2005, p. 13). They go on to say “it is built upon two central, defining attributes: First, a conception of learners as self-directed and autonomous; and second, a conception of the role of teacher as facilitator of learning rather than presentor of content” (Pratt & Associates, 2005, p. 13). According to Conlan, Grabowski, and Smith (2003), the authors acknowledged that Knowles “proposed there are five factors involved in adult learning” (Conlan et al, 2003). The authors go on and address the five assumptions underlying andragogy, describing the adult learner as someone who is independent, has a wealth of knowledge, has specific learning needs, problem centered, and motivated (Merriam 2001, Conlan et al, 2003). The authors, in addition, refer to a statement
taken from the work of Sharan Merriam (2001) when they state, “the [curriculum] designer should involve learners in as many aspects of their education as possible and in the creation of a climate in which they can most fruitfully learn” (Conlan et al, 2003). Now that there is working definition of what an adult learner is, this paper will now address what exactly is technology. In doing an online search, the website from the European Space Agency has a clearly defined definition of technology.

“Technology is the practical application of knowledge so that something entirely new can be done, or so that something can be done in a completely new way.” For an even shorter answer, try the single attribute that defines Homo sapiens as a species: our ability to make and use new tools (ESA, 2010).

To go one step further, in an article by Mehlenbacher, Bennett, Byrd, Ivey, Lucas, Morton, & Whitman (2005), they write “understanding humans as technology users necessitates an understanding of humans as audience, where audience is understood in the postmodern sense as actively engaged information producers and consumers” (Mehlenbacher et al, 2005). It will be this balance of the understanding of who are our customers. What technology is; and the implications of both to the technology users will define integrating technology into education.

Technology and the Adult Learner

One of the most difficult tasks that curriculum designers have is the integration of technology with the adult learner. In order to identify the relationship, it is best to approach the task by breaking technology down into four approaches as it relates to education: as a curriculum, as a delivery mechanism, as a complement to instruction, and as an instructional tool.
The first approach, technology as curriculum, is a sound approach as a fundamental introduction to the world of technology. Yet, there has to be a direct tie-in for the adult learner. According to a statement made by Dr. Daniel Amen, a noted physician and psychologist, he believes that you have about two minutes to capture an adult learner before they tune you off. While he has done considerable research on this subject in his book *Change Your Brain, Change your Life*, the idea of involving the adult learner is part of the shift in pedagogy (Amen, 1998). Adults are life-centered. As mentioned previously, this is one of the fundamental reasons there is such a boom in the enrollment in colleges and universities across the United States. The fact that adults over the age of 25 are returning to school to add to their knowledge base, to learn things that they can apply to life immediately, to either get a promotion or change their career. If you were to look up the *Wake Technical Community College* website and review their mission statement, you will note the focus of the College is in “providing support services, resources, community outreach, and partnerships; programs in basic skills development; vocational, technical, and occupational training; and college/university transfer preparation” (Wake Technical, 2010). It is from this sound foundation, that technology as a curriculum meets this objective.

The next approach is technology as delivery mechanism. The mechanism for the delivery of information, either for business or in the academic classroom, is a matter of choice. The first and foremost question that needs to be addressed concerning the platform for delivery is based on needs and cost. Technology used as a delivery mechanism has been around since the late 70s but did not begin to gain popularity until the latter part of the 1990s. As technological advances became available, the learning management systems also evolve. Today, according to the *American Society for Training & Development*, there are approximately 100 major software
delivery systems in use today (ASTD, 2010). Learning management systems (LMS) are not exclusive to academia; over 79.5 percent of organizations with over 5,000 employees utilized some form of LMS (The eLearning Guild, 2010). The evolution of LMS has made way to new course management systems (CMS) or virtual learning environments (VLE), which are open-source software which are free. This evolution is gaining more and more acceptance in both business and academic communities according to The Sloan Consortium. Yet, it will be up to the respective end-user to decide which program or platform will best serve their needs. For example take Moodle; according to the ASTD, in 2006, Moodle, an open-source software had over 22,000 registered websites, offering close to 900,000 courses, to over 9 million users. At the end of 2009, the number of registered websites increased to 47,503, with 26,385,046 users. The design and development of Moodle is guided by what is termed as "social constructionist pedagogy" (Sloan-C, 2010; ATSD, 2010).

The third approach is technology as a complement to instruction. To effectively incorporate technology you need to include these five elements: access, connectivity, resources, integration, and guidance (Paoletti, 2006). Once all the elements are in place, you will have to decide on a learning process. Utilizing the following the ASSURE model for instruction (which is an Instructional Design System (ISD))

- Analyze learners
- State objectives
- Select instructional methods, media, and materials
- Utilize media and materials
- Require learner participation
- Evaluate and revise
and coupling it with the five elements mentioned above you will in effect put Robert Gagne’s *Condition of Learning* theory into practice (Heinich, Molenda, Russell, Smaldino, 2002). While this is just an example of one complement there are many more ISDs to choose.

The final approach is technology as an instructional tool. Instructional technology is now synonymous with learning technology, educational technology, and e-learning. According to the *Educational Insight*, the use of technology is to support the learning process. The medium for the learning technology can refer to all kinds of analog technologies, i.e. photographs, film, video, audio recordings etc. However, learning technology is usually used specifically when identifying digital computer technology (Educational Insight, 2010). And e-learning is not limited to the classroom. Corporate America recognizes that there is great strength in the organization if it educates its employees (Cross, 2004). Learning technology places the control of learning in the individuals hands, having the ability to learn at their own pace.

In order to evaluate these technology perspectives, it is prudent to discuss the benefits and limitations of each. The first approach of technology as a curriculum has a benefit to the adult learner. While it would not be considered feasible to introduce all types of technology to the learner at one time, it would be wise to build into the course curriculum an opportunity to have hands on and instructional experience with the applied technology. While most colleges and university have a pre-curriculum computer course, this is just one part of the digital world that is being implemented in schools throughout the United States. Secondly, since a large number of adult learners are non-degree learners, any technology being introduced in the course may not have the prerequisite of prior training. Due to limitations, technology as a curriculum would at least need to offer all students the additional training and exposure to the technology being utilized. An excellent example of this is Wake Technical Community College in
conjunction with the State of North Carolina and the Office of State Personnel offers individuals the opportunity to take a 1 or 2 day workshop on technology. According to the course description, the Noncredit and Weekend Computer Education program provides computer courses that help adults develop new hardware and software skills and enhance existing technology skills (Wake Technical, 2010). In addition, to help students achieve and have the best available access to the technology being utilized on campus is the Meredith College Notebook program. As part of the tuition for full time students, Meredith College issues the students a laptop loaded with all the current software and programs enabling students to have the latest technology readily available (Meredith, 2010).

The next approach is technology as a delivery mechanism, which is a major area for discussion, and includes program developers, system designers, educators, and administrators. The benefit of this approach is that it utilizes an individualized learning system (ILS) whereby the learner is given an individualized and structured approach to learning, utilizing prior knowledge or mastery, and developing new knowledge or skills. The limitation on this approach is the learner is isolated in their learning environment. These limitations can be overcome. In addition, the question of accountability and cost become a factor not only for the student but also for the institution. The fact that more and more universities are able to offer classes using a delivery mechanism such as Blackboard or Moodle, for example, or any of the over 100 management systems available, the enrollment at colleges and universities has escalated. According to a report on the North Carolina Community College System, in the 2006 – 2007, distance learning course registration totaled 328,621, a 25 percent increase over the previous year (NCCCA, 2009). The majority of the classes were taken over the Internet. Since more and more institutions are turning to ILS course structure the enrollment numbers are at all time high.
According to a report from The Sloan Consortium, in the fall of 2008, more than 4.6 million students took at least one online course – a 17 percent increase over the previous year. According to other estimates and reports, this trend will continue (Sloan-C, 2010).

The third approach is technology as a complement to instruction. In the early days before the major expansion in the use of technology in the classroom, Susan Imel wrote, “technology to complement instruction extends the instruction beyond the knowledge and experiences of the teacher and can also provide opportunities for the teacher to learn. This approach also provides learners the opportunity to practice skills in private, and it can promote self-direction by allowing learners to supplement instruction in ways that meet their individual needs” (Imel, 1998). It is from this basis that all online learning should inherently be directed. In response to a question posed to the National Council of Teachers of Mathematics, concerning the use of technology in the classroom as a complement to instruction, the Council stated, “the use of technology cannot replace conceptual understanding, computational fluency, or problem-solving skills. In a balanced mathematics program, the strategic use of technology enhances mathematics teaching and learning” (NCTM, 2008). Their position statement went on to say, “Teachers must be knowledgeable decision makers in determining when and how their students can use technology most effectively. Curricula and courses of study should incorporate instructional technology in learning outcomes, lesson plans, and assessments of students’ progress (NCTM, 2008). If all business and academic organization utilize this foresight, it will enhance the learning experience for their most valuable assets, their personnel, and students.

Finally, the approach of technology as an instructional tool is simply the integration of technology within the instructional activity. While this approach is very closely related to the use of technology as a complement, the issue here relies on using technology in a particular field
of study not only enhances the course but the residual benefits that apply. For example, in most universities and colleges, there is a requirement for a basic level of composition. More and more institutions are utilizing the use of computers or word processors as a tool to implement the curricula of the class. Using current technology for the composition course, the student has a twofold benefit, the use of computers to aid in their writing, and developing skills in word processing. Yet, the technology tool needs to have certain components for it to be useful. In an article by Mehlenbacher, et al (2005), they reference that technology needs to be useful: it does what we want it to do. The technology needs to be effective: it allows us to perform our tasks quickly and proficiently. In addition, it needs to be learnable: it enables us to learn how to our tasks. It has to have flexibility: it has system integrity and tolerates our errors. Finally, it has to be satisfying: it encourages us to continue using the interface. Failure to incorporate these components into the technology can make the utilization of the technology fail the desired outcome (Mehlenbacher et al, 2005)

The Adult Learner

In order to understand the relationship between education, technology, and the adult learner, it is necessary to provide discourse on what are the underlying factors are for introducing technology into the world of the adult learner. As mentioned earlier in this paper, the adult learner, as defined by Knowles, has five major characteristics: one who is independent, has a wealth of knowledge, problem centered, has specific learning needs, and is motivated. The use of technology in a particular application will invariably bring advantages and disadvantages. The advantages include flexibility, easy access to expertise, and creating an environment for discussion outside the classroom. In addition, utilization of technology can reduce the feeling of isolation often experienced by nontraditional adult learners, while increasing the adult learner’s
autonomy, and by supporting and promoting constructivist and collaborative learning. While there are many proponents for utilizing technology in the classroom, there are certain disadvantages for the adult learner. Not all adults learn the same. Some adult learners have the need for face-to-face learning with the instructors. Some adult learners need to have the on-campus interactions to feel a part of the institution. While other adult learners miss the immediate classroom response during online interactions. Yet, the advantages outweigh the disadvantages. In addition, one of the foremost reasons for introducing technology into an adult learner’s world is that it opens more doors and opportunities for the active adult learners to gain new knowledge. By colleges and universities utilizing new technology they can deliver to the adult learner, who typically has family and work responsibilities, the opportunity to maintain self-discipline while studying and working, and time management to balance their work and academic commitments. Couple these sentiments with the leading factor of why adults are returning to school, and you have a formula for success.

Impact

At the beginning of the paper there were three questions posed which this paper would address. Does technology have an impact on education? How does technology specifically affect the adult learner? What does the future hold for technology and the adult learner?

The answer to the first question is yes! Technological changes today are influencing education for all students not just the adult learners. The world of technology incorporated into education has made learning a new and challenging way. What once was either a synchronous or an asynchronous world of learning has now been combined to offer the learner the best of both worlds. In addition, while there has been a major adjustment for colleges and universities to
stay current, technological advances have kept pace for these institutions to deliver a platform to handle the need of the learners. Unfortunately, like most things in today’s world, progress comes with a price tag. These costs can be related to the start-up for software, the cost related to hiring new staff to develop and convert the current curriculum to e-learning platform, and the cost related to training and developing the necessary skills of current educators and future educators to facilitate the learning. While these advances have a cost, the long-term visionaries see the ROI (return on investment) by the increase in enrollment, building stronger communities, and developing the future leaders of our country and businesses, as the best investment in one of our most valuable assets: people.

Question two, how does technology specifically affect the adult learner? As previously discussed, the adult learner is highly vulnerable when it comes to technology. Change is something that is not always easily agreed upon. Depending on the particular circumstances, the adult learner can be classified as a “digital native” or a “digital immigrant”. While this paper will not argue the validity of these terms, this paper will acknowledge that there are those adult learners who are digital experience and knowledgeable and those who are digitally deficient.
Those with deficiencies will experience the most stress of change.

The above Individual Change Transition Model, which was adopted from the presentation on Individual Change by Dr. Tim Hatcher, NCSU, was first presented in an article by French & Delahaye, which gives visualization of the phases that an adult learner could experience during the introduction to new technological advances in education. This model holds similar cyclical changes as presented by the George & Jones 2001 model. In this model by French & Delahaye, the individual goes through cycles or phases during the process. Phase one: Security, where the individual is prior to change. Phase two: Anxiety, which presents itself by creative forces being introduced, which are unfamiliar. Phase three: Discovery, where learning offers an avenue for developing new understandings. Then finally through the cycle is phase four: Integration, where testing, evaluation, and measuring the new understandings become accepted practices (French & Delahaye, 1996). While this model may over simplify the
transition, this particular model deemed appropriate for the change cycle experience of an adult learner and education.

The Future

Question three, what does the future hold for technology and the adult learner? In an article by Karen Brown, she reminds us “mobile phones in the early days were simple portable versions of the traditional landline” (Brown, 2009). However, she continues, “If you ask a group of teens today about their use of mobile phones, a two person voice conversation is likely to be just one of a multitude of uses. In fact, text messaging, IM, music sharing, photo exchange, Facebook access, and Twitter may account for some of the prevalent uses” (Brown, 2009). So where do educators go from here? The answer lies in the discussion of what Mehlenbacher et al (2005) stated, “understanding humans as technology users necessitates an understanding of humans as audience, where audience is understood in the postmodern sense as actively engaged information producers and consumers” (Mehlenbacher et al 2005). Therefore, the question is not where do educators go from here; but more importantly where do they see their course work evolving to deliver the product to actively engage the information producers and consumers!
References


