Theory to Practice

Adult Learners: Improving Persistence and Performance in Online Learning Environments

Megan Paxton Wuebker

University of Cincinnati

ABSTRACT

With the increase in the availability of technology, online learning has become a viable alternative to traditional classroom learning. The flexibility of online courses has made them especially appealing to adult learners. However, it is important to design and conduct online courses to meet the particular needs of adult learners in order to promote academic success. This article begins by proposing a useful framework through which the subject of adult online learning can be viewed. Next, three considerations specific to the design of online learning environments and essential to the success of adult online learners are provided: (1) accounting for the individual learning styles of adult students, (2) promoting the formation of community in online classes, and (3) expanding adult learners' information technology skills. The article concludes with two sets of recommendations, one for classroom practices and one for future research.

An increase in the availability of technology has led to the development of online courses that are widely available for postsecondary education, graduate degrees, and other professional development options (Lotti, 2011; Heilman, 2011). These courses have increased in popularity, especially among adult learners, because of their flexibility (Mason, 2006; Park, 2007). Adult learners, sometimes referred to as non-traditional learners, are defined as older learners who return to the academic arena after an absence and are often gainfully employed (Turner & Reed, 2004). Online learning provides adult learners with a unique prospect: The opportunity to acquire new knowledge that may lead to workplace or social advancement within a learning environment that allows them to participate on their own time. This feature helps make online learning environments an attractive and viable option for adult learners.

Researchers have suggested that adult learners may have different needs than traditional college learners due to the fact that they often have professional and familial commitments outside of the classroom (Cercone, 2008; Knowles, 1973). Motivations of adult learners in a learning situation also typically vary from those of traditional college learners because they often come to the university with the purpose of acquiring specific skills and knowledge that are expected to improve their current position in life (Cercone, 2008). These motivations drive the potential for success of adult learners in online courses (Zaharias, 2009).

This article asserts that adult online learners – adults who participate in online courses – are primed for success when taking online courses designed to meet their needs as students, with success defined as course completion. By understanding what factors play a role in the success of adult online learners, future online courses can be developed specifically for adult students that will meet the needs of those students and increase their potential for success. Drawing from the theoretical perspective of andragogy, a theory of adult learning (Knowles, 1973), and two motivational models, Motivating Opportunities Model (Hardre, 2009) and Model of Motivational Design (Keller, 1983), this article begins by proposing a useful framework through which the subject of adult online learning can be viewed. Next, I discuss three considerations specific to the design of online learning environments essential to the success of adult online learners: (1) accounting for the individual learning styles of adult students, (2) promoting the formation of community in online classes, and (3) expanding adult learners' information technology skills. Finally, the article concludes with two sets of recommendations, one set for improved classroom practices that can be implemented by an online course instructor and another set for future researchers who are interested in gaining a more accurate picture of the influences, both internal and external, on adult online learners.

What makes adult learners different?

Eckel and King (2004) have provided a comprehensive definition of adult learners: Individuals who are "25 or older, have delayed entry into higher education after completing high school, did not earn a traditional high school diploma, are married, attend part time, work full time, or have children" (p. 7). The National Center for Educational Statistics (2002) adds that these students are also considered to be independent by financial aid eligibility standards. Conversely, these researchers describe traditional college learners are those who are younger, move into college directly from high

school, and attend postsecondary education full-time, and are considered to be dependent from a financial aid perspective. The differences between adult and traditional learners illustrate some of the challenges faced by adult online learners from both academic and personal perspectives. The following sections review adult learning theory, models of motivation, and motivating adult learners to begin to address the unique needs of this group.

Andragogy

Andragogy is the theory of how adults acquire knowledge (Knowles, 1973). This theory is grounded in the premise that adults have different ways of learning, and that these ways of learning are not necessarily compatible with the existing pedagogical approaches for traditional learners. Knowles (1973, pp. 57-61) proposed four premises regarding the special needs of adult learners. The first premise is that adults are typically self-directed learners and can take control of their own learning situations. The second is that adult learners generally have life experiences beyond classroom knowledge, which can drive or be applied to the acquisition of new knowledge. The third premise asserts that adults' learning is often specifically related to their role in life, whether social or professional, and that there is an internal, or intrinsic, motivation that drives adult learners to develop new knowledge. Lastly, adult learners frequently desire an immediate application for the new knowledge, which means that the learning process must be timely and relevant to their needs (Knowles, 1973; Merriam, 2001; Edmunds, Lowe, Murray, & Seymour, 2002). These premises can be further consolidated into one overarching difference between adult and traditional learners: The desire to continue learning is driven by the role of education in their lives (Edmunds et al., 2002).

Motivational Models

Factors outside of the academic setting often influence the performance of adult learners in ways different from traditional college students, including, but not limited to, their families and full-time jobs (Cercone, 2008). Knowles (1973) referred to these as the

"life problems of American adults" (p. 143). These responsibilities can influence both the performance of adult learners and their motivation to persist or drop out of online courses (O'Connor et al., 2003). Two motivational models can aid with persistence in adult online learning situations.

The first model, the Motivating Opportunities Model (MOM), provides instructional designers with seven components that spell "success" (Hardre, 2009, p. 21). These components are: *S*ituational context, access, and resources; *U*tilization and transfer of knowledge; *C*ompetence, both current and future; *C*ontent knowledge and transfer of information; *E*motional, affective, and personal issues contributing to motivation; *S*ocial group, interpersonal interactions, and relationship issues; and the *S*ystem and organization in which instruction occurs. All of these components correspond to the assumptions asserted in adult learning theory, making them ideal motivators for adult students (Knowles, 1973). Hardre further argues that these components are essential to creating a self-directed learning environment, such as an online environment, that motivates adult learners to succeed.

The second model, Keller's (1983) Model of Motivational Design (MMD), asserts that the amount of effort that a learner puts forth is directly related to his/her motivation in a given class. In order to ensure that students are putting forth effort, Keller recommends that courses be designed to capture learners' attention, keep the course material relevant to learners' needs, bolster learners' perceptions of self-efficacy, and ensure that learners are provided with positive reinforcement for their effort (p. 396). Zaharias (2009) asserted that Keller's MMD should be utilized when designing online courses so to ensure that online learners are not only engaged but also to increase their potential for success in the course. Similarly to Hardre's (2009) model, the components of this model also align with Knowles' (1973) assumptions of adult learners. In order to motivate adult online learners, online course designers must ensure that the course and the facilitation meet the needs of the students.

Motivating Adult Learners

Adult learning theory, the Motivating Opportunities Model, and the Model of Motivational Design provide a new perspective on adult learners, their motivations for taking online courses, and the factors that encourage success in an online environment. Both internal and external factors contribute to adult learners' motivations. In addition to these motivating factors, adult learners expect the knowledge they are acquiring to be relevant and applicable to their needs. Interpersonal interactions also contribute to a positive learning experience. When these motivating factors are taken into account, there is an increased chance that students will be successful in online learning endeavors.

One important motivating factor for adult learners is career development. Many adult online learners are enrolled in courses to enhance their careers. Once the course or degree program is completed, they stand to reap the professional benefits (Song & Hill, 2009). The anticipated professional success often fosters individual motivation and persistence to complete of the course. Additionally, when the adult online learners are able to directly apply class information to their everyday experiences, their motivational level increases and they are more likely to stay in the course (Cercone, 2008; Coryell & Chlup, 2007; Ruey, 2010). Furthermore, if the goals of the online course community can be aligned with individual goals, such as professional development, the entire community is more likely to succeed because of increased motivation (Guldberg, 2008).

Support from external relationships, such as families and employers, also plays a significant role in motivating a positive online learning experience for the adult learner. Support from employers can be particularly vital, especially if the adult learner is pursuing job-related education. Ultimately, without the support of these relationships, adult learners in online courses are

less likely to complete the course (O'Connor et al., 2003; Park & Choi, 2009). Thus, it follows that when adult learners receive support from the people who they encounter on a regular basis, their chances for success in the online course increases significantly (Park & Choi, 2009).

Overall, in order for adult learners to be motivated to learn in online and other learning environments, it is vital that the course be relevant to their needs. In being relevant, the course will capture and maintain the attention of the learners, providing an environment in which both content and competence in the subject matter can grow. Additionally, an environment in which social interaction can take place among peers will also contribute to motivating the adult learner. Lastly, the course must take into consideration factors external to the course as these will also affect adult learners' motivation and success. In the next section, I discuss factors that must be considered when designing an online learning environment for adult learners that can build on these motivations.

Considerations in Online Learning Environment Design

Current research suggests three important factors should be taken into consideration when designing online learning environments for adult learners (Mason, 2006; O'Connor et al., 2003; Rakap, 2010). The first factor is the students' individual learning styles. While adults are generally self-directed learners (Knowles, 1973), approaches to individual learning styles should be addressed to tailor the learning environment to the needs of the learners. The second factor, community formation and social interaction, promotes collaboration in the learning environment and increases the potential for success in the course. As previously mentioned, Hardre (2009) asserted the importance of social and interpersonal interactions in motivating adult learners. Bolstering adult learners' information technology skills is the third critical factor; specifically, this factor addresses learners' ability to participate in the online environment from a technological aspect.

Individual Learning Styles

Knowles (1973) asserted that adult learners are self-directed learners. Indeed, Mason (2006) identified the self-directed approach as one of the primary reasons adult learners have turned toward online courses in recent years. Within self-directed learning, however, there is an emphasis placed on the individual's style of learning. The primary idea is that while adult learners, as a whole, generally meet the assumptions grounded in andragogy, each individual student has a specific learning style and needs that may differ from other adult learners (Ausburn, 2004; Knowles, 1973). O'Connor et al. (2003) found that incompatibilities between an adult online learner's learning style and the design of the course instruction can lead to student dropout from the course. One reason could be a diminished acquisition of knowledge in the class: If the course does not meet the expectation that it will be self-directed and is not compatible with an individual's learning style, then, by comparison, the amount of knowledge gained is less than that of a student whose learning style is compatible with the instructional design (Rakap, 2010).

To identify and address different learning styles, Lynch (2001) suggested providing adult online learners with a learning style survey not only helps individuals determine what their personal learning style is, but also aids instructors when they are developing or modifying a course to best meet the needs of their students. In her study, Lynch showed that a learning style survey could boost students' confidence in their abilities in the online learning environment. Other researchers have also indicated that results of learning style surveys can help teachers create lessons that can be geared toward individual learning needs and promote success within the online course (Ausburn, 2004; Cercone, 2008; Rivera-Nivar & Pomales-Garcia, 2010). While Cercone (2008)

identified weaknesses with learning surveys, including dichotomous grouping and issues with the validity and reliability of the inventories, she also recommended the use of learning inventories with adult online students as a viable option to assess students' needs.

Community Formation and Social Interaction

Building a *community of practice* (Lave & Wenger, 1991) within an online learning environment can be very advantageous with regard to creating increased opportunities for student participation and social interaction (Garrison, Anderson, & Archer, 2000), especially for adult learners who are not full-time students or who are not in the same peer group as their fellow students. Communities of practice are formed when individuals with common goals come together in an effort to learn from each other and improve their own practice (Lave & Wenger, 1991). For adult online learners, dialogue, discussion, and collaboration can promote cohesiveness among classmates and increase the potential for success for everyone in the course (Coryell & Chlup, 2007; Guldberg, 2008; Mason, 2006; O'Connor et al., 2003; Rieck & Crouch, 2007; Slotte & Tynjälä, 2005; Snyder, 2009; Song & Hill, 2009). This effect has led researchers to recommend that within online courses, specifically those with adult learners, communities of practice need to be developed to support and encourage learners over the duration of the course (Blair & Hoy, 2006; Coryell & Clark, 2009; Guldberg, 2008).

Creating a community of practice among adult online learners is challenging. In their model, Garrison et al. (2000) identified three key elements that comprise a community of practice. The first element is *cognitive presence*, which is defined as the individual's ability to learn in a particular setting. The second element is *social presence*, which is understood as a person's ability to project him/herself through a particular form of media. The last element is *teaching presence*, a concept that combines the students' social and cognitive presences and facilitates community formation (Garrison et al., 2000, p. 89). However, in an online environment, both social presence and teaching presence were potential barriers to the creation of such a community due to the absence of physical and social contexts for interactions. Rieck and Crouch (2007) found that there was a moderate rate of negative attitudinal perception among adult students in online courses and a high rate of negative attitudinal perception between students and instructors in an online course. These perceptions were attributed to a lack of social context in the online environment; that is, while there was communication among peers and communication between students and instructors, there were no additional contextual clues to interpret other than the text on the screen. This lack of physical or emotional expression is the primary aspect of social interaction which can lead to perceptions of discourteousness and ultimately inhibit the formation of a cohesive community of practice among adult learners (Slotte & Tynjälä, 2005).

The teaching presence element of Garrison et al.'s (2000) model of a community of practice also presents barriers to success. Instructors can have a positive or negative influence on the individual's completion of an online course, making them an important element in the online learning experience (Eastmond, 2006). Supporting this, Park and Choi (2009) found that instructor feedback to students contributes to the adult student's decision to persist and complete the course. In fact, when students do not receive adequate feedback from instructors, they are more likely to withdraw from the course. Ruey (2010) similarly found that a lack of instructor feedback has a negative impact on learning effort and overall satisfaction with the course. Additionally, learning habits were found to be affected by the facilitator's instructional style (Ruey, 2010). Both Ausburn (2004) and Song and Hill (2009) found that students in an online course relied on instructors to clarify ideas and course requirements, and that this clarification led to an increase in student satisfaction with the course. While clear

communication from the instructor can facilitate a student's success, a lack of feedback can hinder the learning effort of the student and eventually lead to withdrawal from the course.

Information Technology Skills

The last factor featured prominently in the scholarship is to what extent adult learners' information technology (IT) skills influence their success in online courses. While there is some dissent among researchers on this topic, the majority of findings indicated that IT skills are important for online learner success (Mason, 2006; Rakap, 2010; Ruey, 2010). Having the necessary IT skills will facilitate learner success in online courses; conversely, those with insufficient skills are more likely to drop out from the course (O'Connor et al., 2003).

Rakap (2010) found that even having minimal IT skills can increase the success rate of adult online learners. Mason (2006) also suggested familiarity with information and communication technology works to the adult learner's advantage in an online course. A generally positive view of technology among adult learners may also promote skill acquisition and reduce their rate of course dropout (Ruey, 2010). These results indicate that adult learners with the necessary IT skills are more likely to succeed in online courses than those without. Online course facilitators need to be aware of potential issues if adult learners do not have the necessary IT skills. While most of the learning in an online course occurs offline, a lack of technical skills can impede the inability to effectively conduct online research and can also inhibit familiarity with the online learning management service (Ke, 2010). Findings by Slotte and Tynjälä (2005) showed that while technology offers students the ability to participate in class from anywhere with an Internet connection, a deficiency in technical skills can restrict the activity of some learners. This deficiency in technical skills could potentially result in reduced learning in the course (Ruey, 2010). The lack of technical skills

could also impact the perceptions of peers in the online environment, potentially resulting in miscommunication and negative feelings with regard to classmates (Slotte & Tynjälä, 2005).

Conclusion and Recommendations

Adult learners bring a new dimension to online education. Eckel and King (2004) identified characteristics that set adult learners apart from traditional learners, including their time frame for entering higher education, marital status, the presence of children, workload, course load, and how they acquired their high school diploma. These unique needs of adult learners need to be taken into consideration when teaching this population of today's college students, a point that is further buttressed by Knowles' (1973) andragogy framework. The two motivational models, the Motivating Opportunities Model and the Model of Motivational Design, identify factors that contribute to individual motivation in online courses. Both models focus on designing courses that both attract and keep students' attention throughout the course, while taking into account their special needs as adult learners. Combined, these models emphasize critical factors that can contribute to increased motivation for and the likelihood of success for adult learners in online courses.

Three factors were identified as essential components to maximize the online learning experience for adult learners: individual learning styles, community formation and interaction, and information technology skills. Addressing individual learning styles is important to ensure that the needs of the student are being met, though generally, adults are self-directed learners. The formation of an online community that values social interaction helps learners to collaborate within the learning environment. Information technology skills, while not necessarily a barrier to successful completion, can restrict the benefits that learners obtain from the course and may also inhibit participation in the online environment.

Based on the evidence, I have one overarching recommendation to enhance the

practice of adult online learning: Take steps to prepare adult learners prior to starting online courses. Lynch (2001) and Ke and Xie (2009) advised that adult learners may need some preparation prior to enrolling in online courses. This preparation could be in several forms, including an assessment of learner needs, an information technology orientation, and a limited enrollment option.

One way to ensure that the course is developed to address the needs of adult online learners is to conduct a learning style survey. A learning style survey, such as the Index of Learning Styles Questionnaire advocated by Felder and Soloman (2012), is a tool that can be used to identify various learning styles among adult students. The 44-question instrument assesses learning styles on four scales: active and reflective learning, sensing and intuitive learning, visual and verbal learning, and sequential and global learning. Results from this or other learning style surveys could benefit both the facilitator and the students in the course (Felder & Soloman, 2012; Cercone 2008; Lynch, 2001). The facilitator would be able to develop or modify the course based on the types and needs of learners that are enrolled in the course (Rakap, 2010). By taking into account students' learning styles, the potential effectiveness of instruction could also improve (Shinkareva & Benson, 2007). Ensuring that the course is structured around students' individual learning needs would also increase the potential for success (Hardre, 2009; O'Connor et al., 2003).

A second way to prepare adult learners for online courses is to provide them with an information technology orientation. Ensuring that they have the necessary technical abilities would increase the potential for success in the course (Mason, 2006; Rakap, 2010; Ruey, 2010). Topics could include an overview of the course management system used for online course facilitation, using word processing programs, and effective communication in an online environment. Placing technology in the context in which it will be used prior to the start of the course can increase students' self-efficacy (Hardre, 2009). This orientation could take place prior to the start of the learner's first class

and include the administration of the learning style survey as well.

A third way to ease adult learners into online learning is to restrict the number of courses they can initially take. Lynch (2001) suggested that limiting the initial enrollment of adult online learners may increase the potential for success and minimize the influences that could contribute to withdrawal from the course. This limited enrollment proposition would restrict the amount of online courses that adult learners could enroll in at one time. Implementing this strategy would minimize the load on first-time adult online learners, allowing them the opportunity to more effectively balance their school and life commitments (Lynch, 2001). As adult learners successfully complete their online courses, this limited enrollment restriction could be lifted, giving the learners more control over their education.

In addition to recommendations for maximizing adult students' online learning experiences, I also have two recommendations for future research as they relate to practice. The first recommendation is focused on sampling. Ke (2010) recommended that the sample sizes increase in order to provide a more accurate picture of the influences, both internal and external, on adult online learners. In addition, it is important that samples are representative of the adult online learning population, a benefit of larger sampling sizes as well. The second recommendation is that researchers continue to utilize descriptive methods when studying adult online learners (Park, 2007). Older studies emphasized the influence of demographic characteristics because they are easily accessible. Utilizing qualitative approaches, however, has generated more in-depth information on what influences adult learners' success in online courses. The collection of literature reviewed here sought a balance of qualitative and quantitative research. While statistics provide rates of dropout or success, the qualitative studies focus more on why the adult student is succeeding or failing in the course and what can be done to ensure that more adult learners succeed. Addressing the issue of success in adult online learning

environments requires both of these methodological approaches in order to provide course facilitators with a clearer picture of what they can do to better meet their students' needs and academic goals.

The growth of online learning has provided adult learners with an environment that allows them to grow personally and professionally while still being able to accommodate their day-to-day lives. Addressing the learning and motivational needs of adult learners has become an issue that online course developers and facilitators must take into consideration in order for these learners to be successful in this environment. Individual learning styles, online community formation and interaction, and information technology skills are all components that contribute to the success of the adult online learner. In better preparing adult students for their online learning experiences, they are well-positioned for success. JCLL

References

Ausburn, L. J. (2004). Course design elements most valued by adult learners in blended online education environments: An American perspective. *Educational Media International*, *41*(4), 327-337.

Blair, K. & Hoy, C. (2006). Paying attention to adult learners online: The pedagogy and politics of community. *Computers and Composition, 23*(1), 32-48.

Cercone, K. (2008). Characteristics of adult learners with implications for online learning design. *AACE Journal, 16*(2), 137-159.

Chyung, S. Y. (2001). Systematic and systemic approaches to reducing attrition rates in online higher education. *American Journal of Distance Education, 15*(3), 36-49.

Coryell, J. E. & Chlup, D. T. (2007). Implementing e-learning components with adult English language learners: Vital factors and lessons learned. *Computer Assisted Language Learning, 20*(3), 263-278.

Coryell, J. E. & Clark, M. C. (2009). One right way, intercultural participation, and language learning anxiety: A qualitative analysis of adult online heritage and nonheritage language learners. *Foreign Language Annals, 42*(3), 483-504.

Dewey, J. (1916). *Democracy and education.* New York: The Free Press.

Eastmond, D. (2006). Learning resources in a competency-based distance university. *Distance Learning, 3*(2), 23-29.

Eckel, P. D. & King, J. E. (2004). An overview of higher education in the United States: Diversity, access, and the role of the marketplace. Retrieved from American Council of Education: http://www.acenet.edu/bookstore/pdf/2004_higher_ed_overview.pdf.

Edmunds, C., Lowe, K., Murray, M. & Seymour, A. (2002). *The ultimate educator: Achieving maximum adult learning through training and instruction.* NVAA Instructor's Manual: Office for Victims of Crime, Office of Justice Programs, U.S. Department of Justice.

Felder, R. M. & Soloman, B. A. (2012). Index of learning styles. Retrieved from www.engr.ncsu.edu/learningstyles/ilsweb.html.

Garrison, D. R., Anderson, T., & Archer, W. (2000). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The Internet and Higher Education, 2*(2-3), 1-19.

Guldberg, K. (2008). Adult learners and professional development: Peer-to-peer learning in a networked community. *International Journal of Lifelong Education*, *27*(1), 35-49.

Hardre, P. L. (2009). The motivating opportunities model for performance SUCCESS: Design, development, and instructional implications. *Performance Improvement Quarterly, 22*(1), 5-26.

Heilman, D. (2011). Training 3.0. *Sky,* 132-134.

Huang, H. (2002). Toward constructivism for adult learners in online learning environments. *British Journal of Educational Technology*, *33*(1), 27-37.

Jun, J. (2005). Understanding e-dropout. *International Journal of E-Learning, 42*(2), 229-240.

Ke, F. (2010). Examining online teaching, cognitive, and social presence for adult students. *Computers and Education*, *55*(2), 808-820.

Ke, F. & Xie, K. (2009). Toward deep learning for adult students in online courses. *Internet and Higher Education*, *12*, (3-4), 136-145.

Keller, J.M. (1983). Motivational design of instruction. In C.M. Reigeluth (Ed.), *Instructional design theories and models: An overview of their current status*. Hillsdale, NJ: Erlbaum.

Knowles, M. (1973). *The adult learner: A neglected species*. Houston, TX: Gulf Publishing Company.

Lave, J. & Wenger, E. (1991). *Situated learning: Legitimate Peripheral Participation.* New York, NY: Cambridge University Press.

Levy, Y. (2007). Comparing dropouts and persistence in e-learning courses. *Computers & Education, 48*(2), 185-204.

Lotti, M. (2011). Distance learning's moment. *Sky*, 123-127.

Lynch, M. M. (2001). Effective student preparation for online learning. *The Technology Source*, November/December Issue.

Magnussen, L. (2008). Applying the principles of significant learning in the e-learning environment. *Journal of Nursing Education, 47*(2), 82-86.

Mason, R. (2006). Learning technologies for adult continuing education. *Studies in Continuing Education, 28*(2), 121-133.

Merriam, S. B. (2001). Andragogy and self-directed learning: Pillars of adult learning theory. *New Directions for Adult and Continuing Education*, *2001*(89), 3-14.

National Center for Educational Statistics. (2002). Definition of nontraditional students. Retrieved from Department of Education: http://nces.ed.gov/programs/coe/analysis/2002a-sa01.asp.

O'Connor, C., Scieford, E., Wang, G., Foucar-Szocki, D., & Griffin, O. (2003). *Departure, abandonment, and dropout of e-learning: Dilemma and solutions*. Human Resource Development, James Madison University.

Park, J. (2007). Factors related to learner dropout in online learning. *The International Research Conference in the Americas of the Academy of Human Resource Development*. Indianapolis, IN.

Park, J. & Choi, H. J. (2009). Factors influencing adult learners' decision to drop out or persist in online learning. *Educational Technology & Society*, *12*(4), 207-217.

Rakap, S. (2010). Impacts of learning styles and computer skills on adult students' learning online. *The Turkish online Journal of Educational Technology, 9*(2), 108-115.

Rieck, S. & Crouch, L. (2007). Connectiveness and civility in online learning. *Nurse Education in Practice, 7*(6), 425-432.

Rivera-Nivar, M. & Pomales-Garcia, C. (2010). E-training: Can young and older users be accommodated with the same interface? *Computers and Education, 55*(3), 949-960.

Ruey, S. (2010). A case study of constructivist instructional strategies for adult online learning. *British Journal of Educational Technology, 41*(5), 706-720.

Shinkareva, O. N. & Benson, A. D. (2007). The relationship between adult students' instructional technology competency and self-directed learning ability in an online course. *Human Resource Development International, 10*(4), 417-435.

Slotte, V. & Tynjälä, P. (2005). Communication and collaborative learning at work: Views expressed on a cross-cultural e-learning course. *International Journal on ELearning, 4*(2), 191-207.

Snyder, M. M. (2009). Instructional-design theory to guide the creation of online learning communities for adults. *TechTrends*, *53*(1), 48-56.

Song, L. & Hill, J. R. (2009). Understanding adult learners' self regulation in online environments: A qualitative study. *International Journal of Instructional Media*, *36*(3), 263-272.

Turner, J. T. & Reed, P. A. (2004). Creation of a faculty task list for teaching in a televised distance learning environment. *Journal of Industrial Teacher Education, 41*(4).

Vygotsky, L. S. (1978). *Mind in society*. Cambridge: Harvard University Press.

Zacharias, P. (2009). Usability in the context of e-learning: A framework augmenting "traditional" usability constructs with instructional design and motivation to learn. *International Journal of Technology and Human Interaction, 5*(4), 37-59.