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# Constructivism in online learning : a literature review

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# Constructivism in online learning : a literature review

## **Abstract**

The purpose of this paper is to look at the interaction of constructivist-based approaches, adult learning characteristics and six online learning issues. Constructivist learning environments allow learners to build their own meaning and understanding from learning resources and circumstances. Constructivists claim that learners accumulate new knowledge by themselves and use this to pile up previous knowledge and experiences. The learner is the learning focus, and the instructors act as facilitators or guides, which provide appropriate and enriching supplies. This theory supports well the adult style of learning. Based on constructivism, the online instructor is a facilitator to monitor and provide a safe, positive, and motivating online learning environment, and a tutor to provide the supporting skills and knowledge to each individual.

Compared to traditional education, online learning has some outstanding features, such as the setting overcomes geographic problems and the learners could go to the virtual classroom anytime and anywhere if they have the accesses to the Internet. This paper focuses on the adult learning group, along with the online learning benefits and some issues that occur among the technologies and human subjects.

Constructivism in Online Learning: A Literature Review

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## Abstract

The purpose of this paper is to look at the interaction of constructivist-based approaches, adult learning characteristics and six online learning issues. Constructivist learning environments allow learners to build their own meaning and understanding from learning resources and circumstances. Constructivists claim that learners accumulate new knowledge by themselves and use this to pile up previous knowledge and experiences. The learner is the learning focus, and the instructors act as facilitators or guides, which provide appropriate and enriching supplies. This theory supports well the adult style of learning. Based on constructivism, the online instructor is a facilitator to monitor and provide a safe, positive, and motivating online learning environment, and a tutor to provide the supporting skills and knowledge to each individual.

Online educators who want to manage an online course well must first understand the online adult learning characteristics. Knowles' and Brookfield's provide summarizations of adult learners. From their works, it can see that adult learners are responsible for their learning and lives. It is significant for adults to know the reason to devote themselves into the situations. For online educators, knowing the learner better can ensure the online courses to be more successful.

Compared to traditional education, online learning has some outstanding features, such as the setting overcomes geographic problems and the learners could go to the virtual classroom anytime and anywhere if they have the accesses to the Internet. This paper focuses on the adult learning group, along with the online learning benefits and some issues that occur among the technologies and human subjects.

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## Introduction

Simonson, Smaldino, Albright, and Zvacek (2000) stated that today, distance education is defined as “institution-based, formal education where the learning group is separated geographically, and where interactive telecommunications systems are used to connect learners, resources, and instructors” (p. 7). With their various flexibilities, more learners choose to learn in distance learning models. According to Thomas, there were approximately 13 million people enrolled in distance education in the year of 1999 (as cited in Tucker, 2000). This number should increase in the 21<sup>st</sup> century.

Distance education provides an alternative option of course delivery for community colleges and colleges. It meets those students’ needs, who are working and carry family responsibilities. Distance education helps those students who cannot attend the specific place and schedule. Distance education happens when the teachers and students do not actually sit in the same locations, and meet through technology as the communication bridge. Distance education might be seen as an acceptable alternative method to tradition education, but it would not be appropriate to indicate that distance education is better than tradition education (Tucker, 2000). Parke and Tracy (2000) supported that distance education can be as effective as a traditional face-to-face classroom, when (a) the technologies are used in an appropriated way, (b) the learning and instructing methods are appropriated to learning objectives, and (c) the interaction among students to students and students to teachers are used in the program, such as through chat room, bulletin boards, private mail, or a combination.

Moore and Kearsely (1996) stated that in the United States, and the world, most distance education students is adults in the age 25 and 50. Although Tucker (2000) claimed the average age of distance education students is thirty-eight years old,

they all supported the idea that the target audiences of distance education are adults. Since the major learners of distance education are adults, this paper discusses the learning characteristics of adult learners.

Parke and Tracy (2000) stated that most successful distance learners are highly motivated and self-disciplined; they know when to ask the assistance from instructors; they take a serious commitment to learning; and they have a willingness to follow through. Those successful characteristics meet the assumptions that Knowles (1989) provided about how adults learn.

There are many models of distance education, such as (a) correspondence study, (b) one-way audio and one-way video, (c) two-way audio and two-way video, (d) telecommunication network, and (e) online learning. Online learning, desktop computer systems utilizing a camera microphone and high speed Internet connection, is one model of distance education (Simonson et al., 2000). Due to the interests of the author of this paper, this paper focuses on on-line learning only.

Online learning uses the Internet to deliver course materials and facilitate the interactions between teacher and students. Online courses rely on e-mail, message boards, chat rooms, and desktop video or computer conferencing to deliver instructional material and communication. Some courses are synchronous, such as chat rooms and videoconferencing, which require the participators to go to class and interact with each other at the same time. Other courses are asynchronous, such as the World Wide Web and listservs, in which the learners and instructors do not have to participate at the same time. Many courses combine both synchronous and asynchronous components (Classes USA, 2003).

Flexibility and convenience are two major benefits of online learning. University of Maryland University College (UMUC) claimed it is “The university

with the most choices for busy adults,” and one primary mission is to “Make higher education more accessible, convenient, and rewarding for busy adults” (§ 1). UMUC stated “You can learn online any time of day, from any place you choose” (§ 2).

Although the learners still have assignment deadlines and some synchronous courses, which require the learners to be at the class at certain time, online learning still contains much more flexibility than conventional learning methods. Convenience is another benefit. Students can read the lecture notes online, the class chats and recorded discussions can be reviewed on line when the learners need (Classes USA, 2003).

“It is predicted that by 2005, 90 percent of American universities will offer at least one course online” (Charp, 2002, p.10). The future of online education is promising. Many education organizations choose to embrace on-line learning as one of their instruction delivery methods. Twenty three schools are found that offer on-line course in the page of online degree of the Classes USA website (2003), such as University of Maryland University College, New York University's School of Continuing and Professional Studies (NYU-SCPS), and University of Phoenix Online. The courses offered through on-line education are various and extended. For example, University of Phoenix Online (2003) offers eleven undergraduate degree programs, such as Associate of Arts in General Studies, Bachelor of Science in Business/Accounting, and Bachelor of Science in Information Technology; nineteen graduate degree programs, such as Master of Arts in Education/Curriculum and Instruction, Master of Science in Nursing, and Master of Science in Computer Information Systems; and three doctoral degree programs, Doctor of Business Administration, Doctor of Education in Educational Leadership, and Doctor of Management in Organizational Lead.

Simonson et al. (2000) stated that the distance learner is the crucial and essential member of the distance instructional system. Therefore, the author of this paper intends to focus on the learner, human aspects among these online learning issues. The human issues, such as the learners' isolative feelings (Killion, 2002; Mannix, 2000), the role of students (Petrides, 2002; Sanchez, Stuckey, & Morris, 1998), the role of the instructor (Foegen, Howe, & Deno, 1998; Sandberg, Christoph, & Emans, 2001), authentic learning (Huang, 2002; Squire & Johnson, 2000), collaborative learning (Hannafin, Hill, & Land, 1997), and the assessment of learning (Deal, 2002; Robles & Braathen, 2002) are the most popular aspects that the researchers are discuss on online learning. Owing to the unique adult learners' characteristics and the course environment of online learning, many researchers (Deal, 2002; Gallini & Barron, 2001; Hargis, 2001; Huang, 2002; Hurley, Proctor & Ford, 1999; Wilson & Lowry, 2000) suggested that constructivism as one of many theories to support online learning.

This paper is a review of a constructivist-based online learning environment. It is displayed in eight sections, Introduction, Methods, Constructivism, Adult's Learning Nature, Online Technology, Human Issues in Online Education, Constructivism in Online Learning, and Human Issues in Online Education Conclusion. The flow of this paper is based on four questions: (a) What is the learning nature of adult? (b) What is constructivism? (c) What are the human issues of online learning? (d) How can constructivism provide the solutions to these issues?

## Methodology

The topic of this paper is constructivism in online learning. The purpose of this paper is to identify the human issues of online learning and provide the solutions based on constructivist-based approaches. Searching for relative topics and content analysis are two major methods of this paper. Books, journal articles, and online articles are used as sources. The resources are from Education Full Text, ERIC (Educational Resources Information Center), and UNISTAR, all available through the University of Northern Iowa Rod Library. Education Full Text is a journal database, which has some full text journal articles. ERIC is also a journal database, also lists unpublished ERIC documents. UNISTAR is the Rod Library catalog, which shows all materials, such as CDs, books, and journals in the Rod Library. The author used Education Full Text and ERIC for searching for journals and online journals, and used UNISTAR for looking for books used in this paper. The major terms used to search the databases were as following: (a) adult learning, (b) constructivism, (c) online learning, (d) distance education, and (e) issues of online learning.

There were four criteria for selecting sources. First, the journal articles are PEI, which means the articles have been reviewed by juries. This criterion assures the quality of the articles. The next criterion is if the researcher published more than two articles, which convinced the author that he or she is dedicated in the areas that his or her articles are published. The third criterion is if the researcher has enough experience and authority on related topics, such as a teacher teaches online courses, a professor's focus area is online learning or constructivism. The fourth criterion is to limit the publish years of the resources to less than one decade from the year 2003. The theories and technologies are changing so fast if the articles are too old may not suitable for today's environment.

## Analysis and Discussion

### *Adult Learning*

Researchers stated that although some distance education is provided to schoolchildren, most distance education students are adults. But why do these adults go back to school to learn? Researchers found several reasons which lead adults back to school: some adults want to complete their unfinished high school education; some look for credit courses in college; some take noncredit courses for improving their knowledge or for fun; and some seek practical knowledge for their life needs, such as parents, home keepers, or school board members. Although the subjects are various for these adult learners, it is certain that adult distance students are always serious, committed and highly motivated about what they are doing (Moore & Kearsely, 1996). Furthermore, Merriam and Brockett (1997) suggested that educators need to understand who adult learners are and how they learn in order to work successfully with adult learners. Moore and Kearsely (1996) recommended Malcolm Knowles's theory of andragogy as a sound basis for the design and teaching of distance education courses.

Since this paper focuses its learning group on adults, it is necessary to look at the adult learning principles in order to know who adults are and how adults learn. This paper will address both Knowles (1989) and Brookfield's (1986) ideas of adult learning principles. The essential meaning of andragogy is "a way of thinking about working with adult learners" (p135). Knowles (1989) described the theory andragogy as totally contrary to pedagogy. He saw pedagogy as a method focused on childhood learning that is unsuitable for adults and it should be used only with children (as cited in Merriam & Brockett, 1997).

*Knowles' adult learning principles.* Knowles (1989) provided six assumptions of andragogy in his work to clarify where he stands:

1. Regarding the need to know: Adults need to know why they need to learn something before undertaking to learning it.
2. Regarding the learner's self-concept: Adults have a self-concept of being responsible for their own lives...They develop a deep psychological need to be seen and treated by others as being capable of self-direction.
3. Regarding the role of the learner's experience: Adults come into an educational activity with both a greater volume and a different quality of experience from youths.
4. Regarding readiness to learn: Adults become ready to learn those things they need to know or to be able to do in order to cope effectively with their real-life situations.
5. Regarding orientation to learning: In contrast to children's and youths' subject-centered orientation to learning, adults are life centered in their orientation to learning.
6. Regarding motivation to learn: While adults are responsive to some extrinsic motivators (better jobs, promotions, salary increases, and the like), the more potent motivators are intrinsic motivators (the desire for increased self-esteem, quality of life, responsibility, job satisfaction, and the like) (p. 83-84).

*Brookfield's adult learning principles.* Brookfield (1986) summarized the specification of principles of adult learning, which have some similar and different findings from Knowles. Brookfield (1986) lists the following principles:

1. Adults learn from their daily lives, “with the negotiations of the transitional stages in the life-span being the immediate causes and motives for much of this learning.”
2. The adult learning styles are diverse, “strategies for coding information, cognitive procedures, mental sets, and learn in different ways, at different times, for different purposes.”
3. As a rule, adult learners are problem-centered oriented and they like to learn relating to their life situation, and they prefer that their learning results can have “immediacy of application.”
4. Adults’ current learning is influenced by past experiences, which serve as “an enhancement” or as “a hindrance.”
5. “Effective learning is also linked to the adult’s subscription to a self-concept of himself or herself as a learner. Finally, adults exhibit a tendency toward self-directedness in their learning.” (p 31).

Comparing Knowles’ assumptions and Brookfield’s summarization, similarities include that adults are self-responsible and self-directed to their life and learning; adults learn throughout their life experiences, which can be the motivation or hindrance to adults’ learning; adults tend to be life-leading or task-leading or problem-leading orientated learners; adults like to apply what they learn to life immediately, which is related to the readiness to learn the necessary skills and knowledge for life problems. Two things that Brookfield did not point out are that adults need to know why they learn something before they jump into it, and the extrinsic motivators will become the intrinsic motivators for adults. One thing that Knowles did not see is that adults are all different in their learning styles, strategies, ways, times, and purposes. These six assumptions of Knowles’ andragogy, and the

five adult learning principles summarized by Brookfield provide an overall view of adults' learning characteristics for this paper. Based upon the findings, constructivism may be an ideal strategy, for addressing adult learners' needs.

### *Constructivism*

Constructivism is a theory about knowledge and learning; it describes both what "knowing" is and how one "comes to know." Based on work in psychology, philosophy, and anthropology, the theory describes knowledge as temporary, developmental, nonobjective, internally constructed, and socially and culturally mediated. Learning from this perspective is viewed as a self-regulatory process of struggling with the conflict between existing personal models of the world and discrepant new insights, constructing new representations and models of reality as a human meaning-making venture with culturally developed tools and symbols, and further negotiating such meaning through cooperative social activity, discourse, and debate (Fosnot, 1996, p. ix).

Constructivism became a well-known term in the early 1990s, but its theoretical origins can be traced back to the early twentieth century. Among many, Lev Vygotsky and Jean Piaget are the two most often mentioned people who are attributed to constructivism (Maddux & Cummings, 1999). Constructivism embodies two major perspectives, cognitive constructivism and social constructivism. Cognitive constructivism, influenced by Piaget's theory, approaches learning and knowing through the individual's perspective. Cognitive constructivists pay more attention to the individual mind and have restricted their domain to the individual's head. On the other hand, social constructivism, influenced by Vygotsky's theory, studies the mind from the actions between the individual and society. Learning becomes a process of enculturation into a society of performance (Chen, n.d.b).

*Cognitive constructivism.* Cognitive constructivism is based on the observation, and the study of Piaget's theory. Cognitive constructivism is about how people learn. Piaget proposed that individuals cannot be given information, which they immediately comprehend and apply. For Piaget, experiencing things and reflecting on those experiences is how people construct their understanding and knowledge of the world. If people encounter new situations, they will compare them with their previous perspectives and experiences and finally construct their own knowledge (Lycos, 2003). Piagetians use Piaget's cognitive theories as the pedestal for discovering learning models. In this model, the teacher plays a limited role. A teacher is responsible for providing a rich and motivating environment to encourage students to explore. Then, the students can construct their knowledge actively with the experiences, which can encourage assimilation and accommodation (Chen, n.d.a).

*Social constructivism.* Based on the theory of Vygotsky, social constructivism highlights the significance of culture and social context. Individuals construct their knowledge anchored in their understanding of the society environments surrounding them (Kim, 2001). In Vygotsky's theories, both instructors and older children or children with more experiences play very vital roles in learning. For Vygotsky, the culture gives the cognitive tools for children's development needs, which has more span than the cognitive tools do in Piaget's theory. The nature and quality of those tools affects the pattern and rate of development. Teachers and parents are conduits for the tools of the culture, which include cultural history, social context, language, as well as electronic information access today. In addition, Vygotsky's Zone of Proximal Development (ZPD) is renown (Chen, n.d.c).

A difference takes place between the things that children can do by themselves and the things that the children can perform with certain degrees of help. Vygotskians

named this difference the Zone of Proximal Development (Vygotsky and social cognition, n.d.). The ZPD argues that with the assistance of adults or children with more experience, students can master the knowledge and information that they cannot comprehend by themselves (Chen, n.d.c).

An example of the application of the concept of ZPD is Guerrero and Villamil's (2000) study of mutual scaffolding in L2 peer revision. Those authors' purpose was to "observe the mechanisms by which strategies of revision take shape and develop in the interpsychological space created when 2 learners are working in their respective ZPDs" (p. 51). The data for this study were one part of a large research project which including 40 dyadic interactions. This project was published in Guerrero and Villamil in 1994, 1996, and 1998 (as cited in Guerrero and Villamil, 2000). The participants were 2 intermediate English as Second Language (ESL) college learners, whose native speech was Spanish. Both enrolled in an ESL communication skills course. The objective of the task was to revise a written composition. Participants were given roles as a writer and a reader. They were informed to revise the draft and to record their comments on a tape recorder. They also had a revision sheet to take notes or comments. The writer was asked to read his composition aloud before the revision process. After the revision process, the writer worked on his final draft at home and submitted it one week later. To analyze the data, the researchers used a microgenetic approach. They examined the participant interactions to observe that "(a) moment-to-moment changes in behavior that might signal development of revision skills through mediated assistance and (b) the scaffolding mechanisms employed by the students in helping each other revise the composition"(p. 56). In the results, the researchers claimed that both participants became active partners in the revision process. They also stated that "in second

language (L2) peer revision scaffolding may be mutual rather than unidirectional (p. 51).” In addition, they claimed that the learner ZPD may be activated, for example, the collaboration of participants in the revision process. Movement within the ZPD was shown both in the actions that happened during the revision process and in the writer’s independent performance of his final draft.

In their reports, the researchers analyzed the reader as a mediator and the writer was motivated by his partner. Additionally, the reader worked to (a) keep the writer’s interest during the revision process, (b) find the critical aspects and discrepancies in his partner text, and (c) help the writer clarify grammar and mechanics. Further more, the writer became other-regulated but not passive writing his assignment, and was stimulated by his partner’s scaffolding efforts.

Guerrero and Villamil (2000) found that due to the assistance from his peer, both the reader and writer reached a different level of knowledge, which neither of them could comprehend by themselves. Such as the researchers stated in the results that the writer’s self-regulation emerged and he became a more independent writer and reviser. Although the helper in the study of Guerrero and Villamil (2000) was a peer in the same knowledge level, not adult or peer with more experiences, the idea of ZPD still applied. “Both reader and writer consolidate and reorganize knowledge of the L2 in structural and rhetorical aspects and to make this knowledge explicit for each other’s benefit” (p.65).

*Constructivist learning environment characteristics.* Although cognitive constructivism and social constructivism have different stresses, they still have the communal perspectives of teaching and learning (Chen, n.d.b). Jonassen's (1994) work provided a concise summary of the constructivist perspective. The eight constructivist learning environment characteristics recommended by Jonassen are:

1. Multiple representations of reality are provided by constructivist learning environments.
2. Multiple representations not only avoid oversimplification but also represent the complexity of the real world.
3. Constructivist learning environments emphasize knowledge construction and not knowledge reproduction.
4. Constructivist learning environments emphasize that the learners perform in their tasks authentically in a meaningful context rather than the abstract instruction from the instructor.
5. Constructivist learning environments such as real-life settings or case-based studies are different from the traditional predetermined teaching sequences.
6. Constructivist learning environments encourage students to have reflection based on their experiences.
7. Constructivist learning environments "enable context- and content dependent knowledge construction." (p. 35)
8. Constructivist learning environments provide "collaborative construction of knowledge through social negotiation, not competition among learners for recognition." (p. 35)

Through reviewing these characteristics, it can be found that these characteristics cross over both cognitive and social constructivism.

As previously noted, constructivism is a theory about what knowing is and how people come to know. Two leading trends of constructivism are cognitive constructivism and social constructivism. Each of them derived from and influenced by the works of Piaget and Vygotsky. The easy way to describe cognitive constructivism and social constructivism is that the former looks at knowing and

learning from the individual's side, and the later examines knowing and learning from the relationships between society and individual. The role of the teacher is limited in cognitive constructivism since Piagetians support the idea that individuals construct their knowledge based on personal experiences and individual reflections of their experiences. On the other hand, a teacher has a more active role in social constructivism. A teacher acts as a cultural conduit for supporting a student's knowledge construction process. ZPD is a good example of how Vygotskians place the role of teachers in the individual learning process. Although there are different emphases on cognitive and social constructivism, they still share the communal views of teaching and learning. Jonassen's eight characteristics support both social and cognitive constructivists. In short, constructivist learning environments allow learners to build their own meaning and understanding from learning resources and circumstances. Constructivists claim that learners accumulate new knowledge by themselves and use this to pile up previous knowledge and experiences. The learner is the learning focus, and the instructors act as facilitators or guides, which provide appropriate and enriching supplies. The learning experience is a request of students and it prefers real-life experiences (Macor, 2001). After addressing constructivism, this paper will briefly provide a description of online technology.

### *Online Technology*

Researchers stated that distance education depends on interactive telecommunication systems to connect the learning groups, instructor, and learning contents (Simonson et al., 2000). For the purpose of this paper, distance education will be reviewed as online learning and interprets the interactive telecommunications systems as online technologies, also provided will be general concepts of what and how technologies are used in online learning.

*Roles of technology.* The term, technology, has been offered in multiple roles and diverse functions. The role of technology can be viewed in different ways. Chen (1997) stated that varied technologies meet different individual needs and each technology has its own strengths. Hargis (2001) saw that technology could assist the learners for easy and effective learning. Bruner (1990) saw technology as a powerful tool for instruction. To be more specific, Jonassen (2000) claimed that technologies can be used as cognitive tools and intellectual partners. As cognitive tools, technologies can be used to engage the learners in meaningful learning. As cognitive tools, technologies can be used as: “(a) Semantic organization tools for organizing knowledge; (b) dynamic modeling tools for building simulations and representing mental models; (c) synchronous and asynchronous conferencing environments for co-constructing meaning; and (d) information interpretation tools for better understanding information encountered” (p. 24). As intellectual partners, technologies can be used to by a learner: “(a) Articulate what they know; (b) reflect on what they have learned; (c) support the internal negotiation of meaning making; (d) construct personal representations of meaning; and (e) support intentional, mindful thinking” (p. 24). The role of technology will vary based on the learner’s needs and technical capabilities. This paper applies Jonassen’s ideas of the role of technology to online technologies. The role of online technology into serves as a cognitive tool and intellectual partner for online learners.

*Online technology.* The World Wide Web, online resources, online discussion groups, and online courseware are usually the online technologies that support the users in online learning environments. As Huang (2002) stated, the World Wide Web (Web) offers hypertext links and hypermedia to support educational instruction. Wilson and Lowry (2000) also mentioned that the Web not only enables the

documents and texts to be shared by hypertext worldwide, but also it becomes a means of meaning-centered learning and teaching. With the quality and quantity of information on the Web, the learners have the opportunity to construct meaning through active participation and self-directed inquiry. Due to the abundance of data spread in the Internet, students are forced to become more organized in their searching and learning (Hargis, 2001). The Web, therefore, becomes a cognitive tool and an intellectual partner for the online learners.

Computer-mediated communication (CMC) such as e-mail and voice mail, listservs, chat rooms, video and group conferencing, newsgroup or Bulletin Board System (BBS) overcomes the geographical difficulties between the individuals and empowers the commonsense of online communities (Huang, 2002; Hurley et al.1999). The members share, exchange, debate, and construct their own meanings inside of their communities. They reach a consensus which is based on group agreement and each individual contributes their knowledge and absorbs different perspectives of others (Hurley et al., 1999). Not only does the knowledge-develop in groups from a consensus, but also every member's communication, interaction, and social skills are improved during the learning process (Mioduser, Nachmias, & Lahav, 2000). Therefore, using the CMC technologies, the learners are able to share and discuss their ideas and experiences with other learners, which is meaningful learning for the learners. During the sharing and discussing, the learner's internal negotiation process occurs and new knowledge generates. Thus, the CMC technologies are used by the online learners as cognitive tools for the meaningful learning of the online communities and individuals. The CMC technologies also function as intellectual partners of technologies that Jonassen (2000) stated in his work.

Technology may help learners in different ways, but the role of technology should be the same as the instructor's role as a facilitator, and leave the learning-center to the learner himself or herself (Chen, 1997). Technologies should be used as cognitive tools and intellectual partners to assist the learners' meaningful learning and knowledge construction (Jonassen, 2000). Next, this paper will address six human issues in online education that attract most researchers' attentions.

### *Human Issues in Online Education*

A researcher claimed, "Thousands of colleges, universities and corporations around the world offer online courses and degrees" (Charp, 2002, p. 10). Very often, the description of online learning is similar to what Charp (2002) stated: "Education is available anywhere, anytime" (p. 10) There are, however, several downsides which occur in online education and issues that require the online educators and researchers to find solutions or improve online education.

Why does the author choose these six human issues among many online learning issues? First, the learner is the center of learning process. As Simonson et al. (2000) claimed, the learner is the crucial and essential component of the distance instructional system. Therefore, the author of this paper chose human issues instead of other issues, such as technology issues. Second, the online learning settings are different from conventional education (Huang, 2002). Simonson et al. described that (a) online learning uses media to connect the teacher, students, and course content; (b) the learner and the instructors are separated throughout the instructional process; and (c) due to the absence of the learning group throughout the learning process, the learners are taught as individuals instead of a learning group. Thus, student isolation becomes one of the unpreventable issues of online learning. The interaction and relationship between the learner and the instructor change. The learning methods for

adult learners in online learning environments also differ from the methods of face-to-face traditional learning environments. Literature shows that student-centered learning, authentic learning, and collaborative learning can be used for online learning, but the adult learners come from different backgrounds and have different knowledge. Does that conflict with the collaborative learning of adults? Since the learning settings are different from the conventional learning settings, how do student assessments change to suit the online learning? All those concerns affect the success of online learning. From these concerns, the author includes six human issues in this paper. These six human issues are isolation, student-centered learning, instructor's role, authentic learning, collaborative learning conflicts, and students' assessments. This section provided the general literature reviews of these six human issues, and which will be discussed by constructivist-based perspectives in the next section. Since the main online learning audience of this paper focuses on adult learning groups, the discussion of these six human issues will be based on adult learners.

*Isolation.* Without being in face-to-face space, students can feel isolated, which becomes one of the most popular issues of online learning. Isolation triggers the lacking of direction and motivation, which makes it become a leading cause of students' dropping out of online learning courses (Killion, 2002). Furthermore, advanced technologies such as teleconferencing, the Internet and video conferencing are used to promote interaction, the learners still feel isolated in online learning (Huang, 2002). Several authors (Foegen et al., 1998; Kearsley, 1998; Sanchez et al., 1998) noted that the cause of the learner's isolation is due to too much focus on technology and it ignores the human elements. Sandberg et al. (2001) argued that some teachers do not realize that online learning needs to have different course setups from traditional course setups and it requires highly social communications. These

teachers only use the technology as another delivery mode. The teacher-student and student-student interactions are missing.

*Student-centered learning.* Several researchers (Hannafin et al., 1997; Huang, 2002; Ornstein and Hunkins, 1998; Petrides, 2002; Sanchez et al., 1998) suggested that the learning orientation should be shifted from teacher-centered to student-centered in online learning. Part of the reason is different people have different learning styles (Sanchez et al.). Another part of the reason is that the major learners of online learning are adults; there are different reasons for these learners to come back to education for lifelong learning. The adult learners know what knowledge and skills they need and where to find the resources and tools (Hannafin et al., 1997; Petrides, 2002). It is hard for the instructor to design the same curricula for the people from diverse backgrounds, life experiences, and knowledge (Huang, 2002; Ornstein and Hunkins, 1998). Further, Sanchez et al. (1998) stated student-centered learning is the ultimate result of the fact that with no common classroom and no geographically communal space for the learning to happen; the instructor of the online learning should release the power into each individual adult student. On the other hand, the learners should determine the learning quality and they should be responsible for their own learning outcomes.

*Instructor's role.* The third implication is the role of instructors in online learning. Foegen et al. (1998) said that the role of an instructor has been ignored and it was less important than technology in the early online education. Sandberg et al. (2001) pointed that there was little notice about if those teachers who are trained to teach in a conventional education environment would have a hard time adjusting themselves into an online learning environment. Because the adult learners tend not to be the passive receivers as the learners are in traditional classrooms, they are much

more responsible for their learning. Researchers suggested that the instructor plays roles as a guide, resource provider, motivator, and cheerleader (Egbert & Thomas, 2001; Sanchez et al., 1998).

*Authentic learning.* The fourth issue is authentic learning. Huang (2002) pointed out that most teachers tend to pre-determine what is authentic for the students' learning. However, the information and environment that the learners could learn from are not provided by the real world; they are what the teacher's conception of what the real world is (Squire and Johnson, 2000). The teacher's perception of the world may not agree with the students', since everyone has different perspectives. Therefore, the teacher may teach the students to see the world but cannot interpret the world for them (Huang, 2002).

*Collaborative learning conflicts.* Since adult learners have less in common living environments, working experiences, and cultivating knowledge, it seems inappropriate, that collaborative learning is used by those learners. On the other hand, because the adult learners have different talents in their special areas, they can learn and help each other. That is why collaborative learning can be used in those adults (Huang, 2002). However, as researchers (Hannafin et al., 1997; Petrides, 2002) pointed out, each individual has different objectives, preferences, and skills so it might be difficult for the instructor to build a collaborative learning environment for those adult learners.

*Students' assessments.* Educators, such as Deal (2002) believed that having clearly identified appropriate rubric assessments is significant. Zvacek (1999) stated that with clear criteria in mind, the students can control learning and take their own responsibility. Robles and Braathen (2002) argued that graded tests alone are not enough. Educators have to avoid the trap of simply using tests for adult learners, and

the material must fit into a real-world and higher-order thinking application. Further, Huang (2002) emphasized that for adult online learning students, learning to learn and the qualities of learning are more important than results. Therefore, the assessments of online courses should be clearly stated, authentic, performance-based, and constructivist evaluating approaches (Zvacek, 1999).

In conclusion, it can be said that educators are becoming aware of the need of teacher-student and student-student interactions and the need of shifting the learning center from an instructor to students to prevent the online learner from feeling isolated and suit to the online special learning environment which lacks of geographically communal space. Since students are the learning center, the instructor's role changes into a guide, resource provider, motivator, and cheerleader to facilitate the learners. Because the learners are adults who have an abundance of life experiences and different needs from the courses, the instructor should not try to pre-determine what is authentic for the adult learners' learning. If these adults, with different strengths, can work collaboratively, they will all benefit from one another. The online instructor needs to construct a collaborative learning environment for online learners. Furthermore, clearly stated, authentic, performance-based, and constructivist evaluation approaches to assessment are vital for a well-conducted online learning course. The literature in this section pointed out the events that occur in online education. Although those educators provided the solutions for those issues, the author of this paper thinks it is necessary to have much more grounded reasons to support the solutions. Therefore, the next section will address constructivist-based perspectives of these six human issues.

### *Constructivism in Online Learning*

After the general reviews of the six human issues, (a) isolation, (b) student-centered learning, (c) instructor's role, (d) authentic learning, (e) collaborative learning conflicts, and (f) students' assessments, this section will discuss the application of constructivist-based perspectives, (a) interactive learning, (b) student-centered learning, (c) facilitating learning, (d) authentic learning, (e) collaborative learning, and (f) high quality learning to the previous six human issues. The discussion will place the major focus on the constructivist-based approach analysis, online learning application, adult learners, and the instructor.

*Interactive learning.* Both Piaget and Vygotsky emphasized the importance of social interactions, although Vygotsky saw social interactions leading to individual cognitive development and Piaget saw that social interactions can help to activate individual mental processes (Maddux & Cummings, 1999). Therefore, the author took their ideas of social interactions and placed them in the online learning environment, which can prevent the learners from feeling isolated. Huang (2002) concurs stating that interactivity could be a means to motivate and stimulate learners. Applying the idea of social interactions, Killion (2002) stated that increased interactivity among participants such as immediate feedback by instructors, shared assignments, and small study teams with classmates will create a cyber-community where the learners learn and work collaboratively. How can online technology facilitate the idea of interactions? Killion (2002) stated that the online technologies support interactivity by synchronous and asynchronous communication tools, which help the learners to construct higher order thinking by supporting dialogue, interaction and sharing of ideas. Huang (2002) also highlighted that the online discussion technologies cause the learners to examine and reflect on the content and process of learning. Sherry,

Fulford, and Zhang, (1998) offered that the synchronous communication could use online chats, online conferences or Multi User Dungeons (MUD) and the asynchronous communication tools could include Listservs, newsgroups, threaded discussions or emails. The interactions between teacher-student and student-student can become the motivation and stimulation for the online learners. Furthermore, synchronous and asynchronous communication tools make the interactions possible.

*Student-centered learning.* Piaget believed that people construct their understanding and knowledge by experiencing things and reflecting on those experiences. People search and compare their previous perspectives and experiences, and finally construct their own knowledge when they meet new difficulties (Lycos, 2003). Rooted on Vygotsky's theory, social constructivism emphasizes the significance of culture and social context. Individuals construct their knowledge founded on their understanding of the society environments surrounding them (Kim, 2001). The learning or meaning-making of constructivism is based on the concept that learners construct their own understandings or knowledge through the interaction of their existing knowledge and their environments (Dare, 2001). Thus, constructivism highlighted the learners' ownership of the learning process, which can be the supports of the shift from teacher-centered learning to student-centered learning. The related approaches suggested by researchers include experiential learning and problem-solving approaches to learning (Knowles, Holton, & Swanson, 1998). Furthermore, adult learners are expected to possess high independence, self-direction, and motivation for their lifelong learning (Chen, 1997). Therefore, student-centered learning is more suitable for adults to learn online. According to Tapscott (1999), the shift from teacher-centered to student-centered learning does not imply that the teacher has a less important role. To create and structure class design and activities,

teachers are equally crucial and valuable in the learner-centered context. Along with class discussion, debating, researching, and collaborating on projects, student-centered learning allows student to construct their knowledge actively and not learning isolated.

*Facilitating learning.* Although a teacher plays a limited role in the Piagetians' discovering learning model, teachers still take responsibilities for having a rich and motivating environment to encourage students to explore and construct their knowledge actively (Chen, n.d.a). For Vygotsky, the culture gives the cognitive tools for individual development needs. Teachers are the conduits for the tools of the culture, which include cultural history, social context, language, as well as electronic information access today (Chen, n.d.c). Furthermore, constructivists suggest that the teacher should be able to encourage the students to learn by active, authentic, meaningful, and constructive methods (Hurley et al. 1999). In other words, the teacher's role becomes a facilitator and a tutor when the learner is the center of learning (Tapscott, 1999; Sandberg et al., 2001). As a facilitator, the teacher monitors and provides a safe, positive, and motivating online learning environment to ensure that all learners have the opportunities to join class discussions and activities (Foegen et al., 1998). As a tutor, the teacher has to provide the in-time and on-time skills and knowledge to each individual (Sandberg et al., 2001). It is also critical for the instructor to have the clear directions and fine guidelines for the online learners (Huang, 2002).

*Authentic learning.* Piaget believed individuals learn new information by experiencing things and construct new knowledge by reflecting on those experiences (Lycos, 2003). Similarly, social constructivism claimed that individuals construct their knowledge derived from their understanding of their society and cultural

environments (Kim, 2001). As Jonassen (1994) described “constructivist learning environments emphasize that the learners perform their tasks authentically in a meaningful context rather than the abstract instruction from the instructor (p. 35).” Therefore, constructivist-based learning emphasizes individual knowledge construction and not knowledge reproduction from an instructor. Squire and Johnson (2000) suggested that problem-based learning and anchored instruction are two approaches for engaging learners in authentic tasks; the tasks might actually be performed in the real life, using authentic resources and solving complex problems. Additionally, adults are often encouraged by extrinsic motivators, such as better jobs, and career promotions (Knowles, 1989). Therefore, adult learners tend to look for the skills and knowledge related to their real life or work experience (Huang, 2002). Thus, the online course design should be grounded in adult learners’ experiences and these experiences represent a valuable resource. In order to avoid pre-authentication, instructors could ask learners to participate in the course design, such as objectives, prerequisites, the grading system, and course materials (Huang, 2002).

*Collaborative learning.* Collaborative learning can be defined as team members working together with individuals contributing their intellectual efforts to their group. Individuals inside a group may not have the same goals but they support each other in their objectives (Nyikos & Hashimoto, 1997). Vygotsky believed that isolated learning could not lead to cognitive development; social interaction is a prerequisite to learning and cognitive development (Nyikos & Hashimoto, 1997). Furthermore, collaborative learning enables promoting the communal construction of interpretation and understanding by a critical engagement process and the incorporation with other members (Stage, Muller, & Kinzie, 1998). In a collaborative learning environment, Vygotsky’s individual’s Zone of Proximal Development (ZPD)

is developed into a group ZPD. Nyikos and Hashimoto (1997), proposed the idea of a group ZPD, “a zone of potential growth for the group as a whole, at a point where each individual's zone intersects and is expanded as a result of this collaborative interaction”, or “a zone that could be extended to a group situation (p.507).” A group ZPD allows “an exponential growth due to the social mediation allowed by multiple discussions, points of view, and creative problem solving (p.507).” Through collaboration within each person's zone of potential understanding, the group member may reach “inter-subjectivity or a shared understanding (p.508).” Thus, if collaborative learning is covered by the idea of group ZPD, there will be no conflicts to adults' differences.

Several benefits of collaborative learning stated by researchers are that students can exchange their point of views to problems, help each other to clarify misconceptions, give rise to new ideas, promote critical thinking, and develop interpersonal-negotiation skills (Bostock, 1998; Nyikos & Hashimoto, 1997). According to Dalgarno (2001), technologies that can be used to assist collaborative learning include: asynchronous communication tools, such as Email, mailing lists, news groups and web-based bulletin boards; synchronous communication tools such as Internet Relay Chat (IRC) or ICQ; and virtual environment settings, such as Blaxxun Contact and Multi-User Object Oriented Domains (MOOs). Beside the benefits, group members need to take individual responsibility. That is the key to determine if the collective learning is successful or not, therefore, the instructor needs to set up the clear rules for course designs (Huang, 2002).

*High quality learning.* Adult learners tend to have the high motivations of their learning and they are able to control and take responsibility for their own learning (Chen, 1997). The online learning environment offers the adult learners

abundant real-life information and knowledge (Petrides, 2002). The instructor needs to provide the class with a clear and appropriate rubric assessment, which enables the online learners to know what the expectations and tasks involve (Deal, 2002; Zvacek, 1999).

On the upper level, the learners should actively absorb external information and construct meaningful knowledge by critical thinking skills (Robles and Braathen, 2002). The learning should involve high-order thinking skills, which let the learners to determine the authenticity and quality of information. That is, the learners are able to assess the authority of the source and validate it from other sources. Furthermore, the learners have to learn the skills to manage, analyze, critique, cross-reference, and transform information into useful knowledge (Lundin, 1998). This is what the constructivists emphasize that constructivist-approach learning should contain. The author believes that the characteristics of adult learners, well-designed course materials for instructors, and the rich environment of online learning enables high quality learning to happen. Educators should be aware that the traditional learning environment is different from the online learning environment. The course setups, learning groups, and learners' needs are merely similar; therefore, the instructors need to have different instruction strategies for online learning courses. As many researchers (Deal, 2002; Hargis, 2001; Wilson & Lowry, 2000) believe, a good online learning environment can be supported by constructivist-based approaches. The six issues that have been mentioned in this paper are good evidence that online educators are paying attention to the differences of conventional education and online education. From the general literature reviews of the six issues, it shows that some online educators are aware of these issues already and they try to find the solutions for them. Moving forward, some educators examine these issues through constructivist-based

perspectives. Constructivism provides solid foundations and solutions for these six issues.

## Conclusion and Recommendations

Compared to the same-time and same-place conventional education model, highly flexible time and space learning environments of online learning offers busy adults a better chance to receive advanced learning. Although the online adult learners are driven by different motivations to advance their higher education, they have similar learning natures, and they all choose online courses as their prior learning environments. Therefore, online educators who want to manage an online course well must first understand the online adult learning characteristics. This paper briefly reviewed Knowles' assumptions and Brookfield's summarizations of adult learners. From their works, one can see that adult learners are responsible for their learning and lives. They take real lessons from their life experiences, which make them become life-leading, task-leading, or problem-leading orientated learners. Adults also learn in instant knowledge and skills for instant needs in their lives. It is significant for adults to know the reason to devote themselves into the situations. Often, the extrinsic motivators will become the intrinsic motivators for adults. Furthermore, adults have different learning styles, strategies, ways, times, and purposes. For online educators, knowing the learner better can ensure the online courses to be more successful.

As many researchers suggested, if scaffolding learning through constructivist-based approaches can make online education better. Constructivism is a post-psychological theory about knowledge and learning, derived from the theories of Vygotsky and Piaget. Constructivism embodies two major trends, cognitive constructivism and social constructivism. Cognitive constructivism, influenced by Piaget's theory, studies starts from the end of an individual to approach the learning and knowing; social constructivism, influenced by Vygotsky's theory, studies starts from the mind from the action between the individual and society. Although cognitive

constructivism and social constructivism have different emphasis points, they share communal perspectives of teaching and learning. Jonassen (1994) provided eight concise constructivist learning environment characteristics, which can be a basis for the online instructor to conduct a constructivist-based online learning environment. The learner is the learning focus of constructivist learning environments, and the instructors act as facilitators or guides. The learners' knowledge is accumulated by themselves, and it is built on previous knowledge and experiences.

Online education depends on interactive telecommunication systems to connect the learning groups, instructor, and learning contents. Therefore, online technologies play an important role in online learning. It is hoped by the author that online technologies, such as The World Wide Web, online resources, online discussion groups, and online courseware, can be used as cognitive tools and intellectual partners to facilitate the adults learning as Jonassen's work was cited earlier in this paper.

Isolation, student-centered learning, instructor's role, authentic learning, collaborative learning conflicts, and students' assessments are the six human issues addressed in this paper. Comparing the six issues from the general literature reviews and the constructivist-based perspectives, it can be found that constructivism provided a solid foundation for online education of adult learners. Since constructivism highlights the importance of social interaction, isolation can be reduced by the interaction with other learners and instructor. The meaning making of constructivists is rooted in that the learners interact with their existing knowledge and environments. Thus, adults, the self-responsible and self-directed learners should be the center of their lifelong learning. Since the learner is the center of the learning, the role of an instructor changes. Based on constructivism, the online instructor is a facilitator to

monitor and provide a safe, positive, and motivating online learning environment, and a tutor to provide the supporting skills and knowledge to each individual.

Constructivist-based learning emphasizes individual knowledge construction, which means that individuals are learning by authentic methods. For the characteristics of adults, the online course should be grounded in adult learners' experiences. The idea of group ZPD solves the puzzle of the collaborative learning conflicts in the individual differences. A group ZPD allows the different individuals to work for a group goal and for their own goal; therefore, people with different needs still can work collaboratively. Jumping out of the zone of typical assessments, constructivists offer an extent of high quality learning for self-regulative adult learners. Since the adults are the center for their learning, they should be their own judges for the learning outcomes.

A successful online learning course is determined by the human elements more than the technology factors. In order to make online learning better, contributions of human concerns are critical. This paper has presented several issues dealing with the human side of on-line learning. For the author, these six issues are only portions of the entire issues of online learning of distance education of education systems, when people are exultant to apply new technology, it is necessary to pause to think about the issues that could bring down the new technology.

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