



An Interaction Model for e-Learning Environments Based on Competency Model and Andragogical Principle การมีปฏิสัมพันธ์ในการเรียนการสอนแบบอีเลิร์นนิ่งโดยยึดรูปแบบสมรรถนะและ ทฤษฎีการเรียนรู้ของผู้ใหญ่

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นพดล พรมณี
ภาควิชาเทคโนโลยีและสื่อสารการศึกษา คณะครุศาสตร์อุตสาหกรรม
มหาวิทยาลัยเทคโนโลยีราชมงคลรัตนบุรี

Abstract

With the rapid acceptance and use of the Internet in e-learning environments, many untrained instructors are being encouraged to develop their course materials for e-learning contexts. This article presents a description and review of a general analytical model for Instructional Design (ID) in e-learning contexts with emphasis on four types of learning interactions (instructor-content, learner-content, learner-instructor, and learner-learner interactions). The description and review of the model concludes with a presentation of various related studies.

Designing effective e-learning instruction for adult learners, opines the author by incorporating competency model, interaction model, and adult education theory with four types of interactions to this study. The first of the four types of learning interaction is instructor-content interaction based on the course syllabus that an e-learning instructor covers in an e-learning course. The second type, learner-content interaction stems from a synthesis of the competency concepts in order to develop the competency of the learners. The third learning interaction, learner-instructor interaction uses model and strategy of interaction in developing learner-instructor interaction. Learner-learner interaction, the last type of learning interaction deals with the preparation of adult learners for career development or self-improvement.

Keywords: Interaction Model, e-learning; Andragogical, Constructivist



บทคัดย่อ

อินเทอร์เน็ตเป็นที่ยอมรับและนำมาประยุกต์ใช้กันอย่างแพร่หลายในการเรียนการสอนผ่านระบบอีเลิร์นนิ่ง ครู อาจารย์จำนวนมากที่ยังไม่มีประสบการณ์การสอนผ่านระบบอีเลิร์นนิ่ง ได้รับการสนับสนุนให้พัฒนาวัสดุ/อุปกรณ์การเรียน การสอนผ่านระบบอีเลิร์นนิ่ง ดังนั้นบทความนี้จึงนำเสนอการวิเคราะห์รูปแบบที่นำไปสู่การออกแบบการเรียนการสอนผ่านระบบอีเลิร์นนิ่งโดยใช้วิธีการทบทวนวรรณกรรม และงานวิจัยที่เกี่ยวข้องรวมทั้งการมีปฏิสัมพันธ์ทั้ง 4 รูปแบบในระบบอีเลิร์นนิ่ง ได้แก่ ปฏิสัมพันธ์ระหว่างผู้สอนกับเนื้อหา ปฏิสัมพันธ์ระหว่างผู้เรียนกับเนื้อหา ปฏิสัมพันธ์ระหว่างผู้เรียนกับผู้สอน และปฏิสัมพันธ์ระหว่างผู้เรียนกับผู้เรียน

เพื่อให้การจัดการเรียนการสอนผ่านระบบอีเลิร์นนิ่งมีประสิทธิภาพยิ่งขึ้น ผู้เขียนได้สังเคราะห์รูปแบบสมรรถนะ รูปแบบการปฏิสัมพันธ์ และทฤษฎีการเรียนรู้ของผู้ใหญ่กับรูปแบบการปฏิสัมพันธ์ทั้ง 4 รูปแบบ ประเภทแรก ได้แก่ ปฏิสัมพันธ์ระหว่างผู้สอนกับเนื้อหา ซึ่งผู้สอนที่สอนผ่านระบบอีเลิร์นนิ่งจะต้องจัดการเรียนการสอนให้ครอบคลุมลักษณะ รายวิชา ประเภทที่สอง ได้แก่ ปฏิสัมพันธ์ระหว่างผู้เรียนกับเนื้อหา ซึ่งเกิดขึ้นจากการสังเคราะห์แนวคิดด้านสมรรถนะเพื่อเป็น แนวทางในการพัฒนาสมรรถนะของผู้เรียน ประเภทที่สาม ได้แก่ ปฏิสัมพันธ์ระหว่างผู้เรียนกับผู้สอน โดยใช้รูปแบบและ ยุทธศาสตร์ในการสร้างปฏิสัมพันธ์ระหว่างผู้เรียนกับผู้สอน ขั้นตอนสุดท้าย ได้แก่ ปฏิสัมพันธ์ระหว่างผู้เรียนกับผู้เรียนซึ่ง เกี่ยวกับการเตรียมความพร้อมของนักศึกษาเป็นผู้ใหญ่เพื่อการพัฒนาอาชีพหรือการปรับปรุงตนเอง

คำสำคัญ: รูปแบบการปฏิสัมพันธ์ อีเลิร์นนิ่ง ทฤษฎีการเรียนรู้ผู้ใหญ่ ทฤษฎีการสร้างสรรค์ความรู้ด้วยตนเอง

Introduction

E-learning or Electronic learning is to deliver instruction for learners via electronic media like computer or smartphone devices. The learners can interact with their instructor and their classmates using e-mail, webboard, and chat. Clark & Mayer (2011) defined e-learning as a “training delivered on a digital device such as a smartphone or a laptop computer that is designed to support individual learning or organizational performance goals”.

E-learning deals with the processes of instruction and learning using several tools such as web-based, computer-assisted instruction, virtual classrooms, digital devices, television, and satellite (Nilsook, 2011). E-learning instructors can deliver instruction using Internet or Intranet. The learners can access to e-learning content and interact with their instructor and their classmates anytime they want via synchronous or asynchronous tools.

E-learning programs have been increasing (Allen & Seaman, 2007; Bishop & Spake, 2003; Kariya, 2003), most of the e-learners are adults between the ages of 25 and 50 (Kuenzi, 2005; Moore & Kearsley, 1996). Moore & Kearsley (1996) noted “...Consequently the more one understands

the nature of adult learning, the better one can understand the nature of distance learning”. Since adult learners have busied schedules, e-learning environments may be appropriate for them (Tweedell, 2000). Thus, e-learning instructors need to understand what are the educational needs as well as adult learners requires. The underlying assumption for successful implementation of this interaction model for e-learning ID is that the target audiences are mature and autonomous enough to benefit from this instructional method by fully engaging and participating in their own learning.

The e-learning interaction model and framework is constructed from the five types of competency characteristics (Spencer & Spencer, 1993), the four types of learning interactions (Moore, 1989; Prammanee, 2005), and the Andragogical Model (Knowles, Holton & Swanson, 2005).

To develop a good competency for adult learners, the author recommends employing five types of competencies for e-learning environment. There are motives, traits, self-concept, knowledge, and skills (Spencer & Spencer, 1993).

In some e-learning courses instructor-learner and learner-learner may or may not meet one another. Therefore, it is necessary to allow interaction in e-learning courses for proper learning to take place. This model uses four types of interactions as follows: (1) encourage interaction, (2) promote critical thinking, (3) collaborative learning, and (4) provide timely feedback (Moore, 1989; Prammanee, 2005).

Andragogy is the art and science of teaching adults or the art and science of helping adults learn. In 1980, Knowles introduced four assumptions about the characteristics of adult learners (Andragogy). In 1984, Knowles added the 5th assumption. The five assumptions of andragogy are (1) self-concept: adults are self-directed learners, (2) adult learner experience: adult learners bring several resources for learning, (3) readiness to learn: adult learners are ready to learn, (4) orientation to learn: adult learners are problem-centered in their learning, and (5) motivation to learn: adult learners are motivated to learn by internal factors (Knowles, 1980; 1984). These concepts allow e-learning instructors to

understand their adult learners before design and deliver course content to learners. In their work, Knowles, Holton & Swanson (2005), introduced andragogical model as follows: (1) motives, (2) traits, (3) self-concept, (4) knowledge, and (5) skill. This study employed the andragogical model to be applied in e-learning model.

Since most adult learners come to school for learning and applying knowledge and skills in their real-life situations, the purpose of this paper is to introduce an interaction model for e-learning environment. This model can assist instructors to plan e-learning lesson systematically and effectively because it helps instructors to consider the following questions: What subjects should be taught? Do e-learning instructors understand adult learners? Also, how do e-learning instructors promote interaction?

This paper discusses instructor-content interaction, learner-content interaction, learner-instructor interaction, learner-learner interaction, implications for e-learning practice, and recommendation for the further application of e-learning.

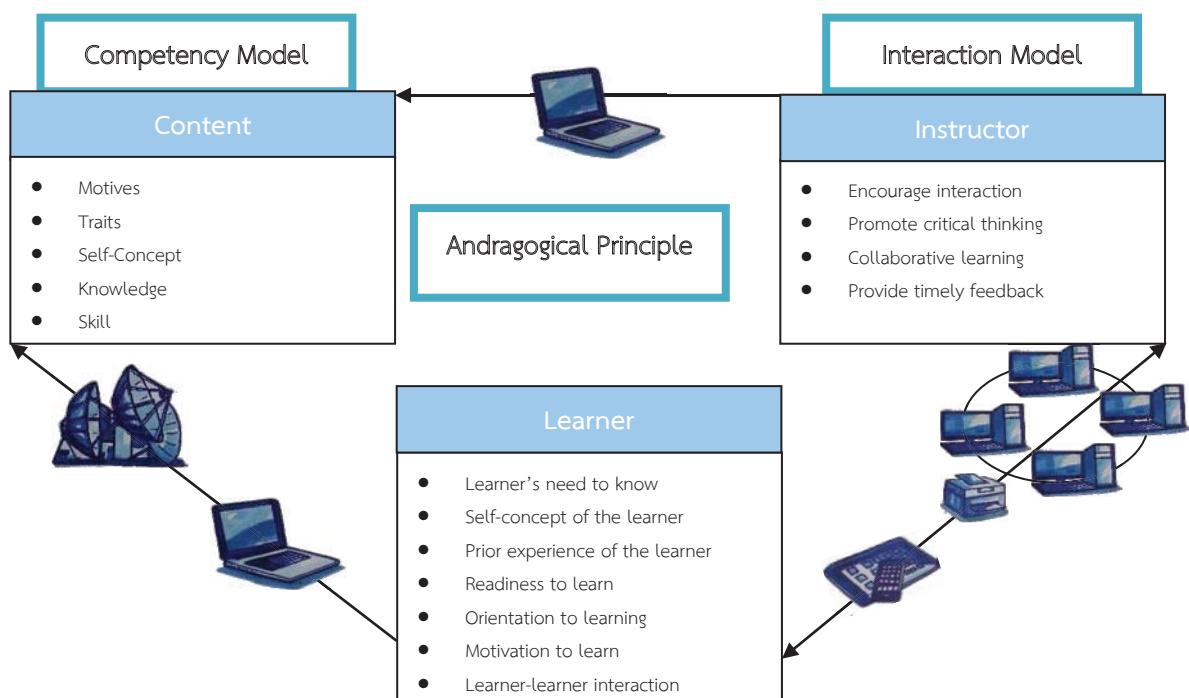


Figure 1. Interaction model for e-learning Environment (Knowles Holton, & Swanson, 2005; Moore, 1989; Prammanee, 2005; Spencer & Spencer, 1993)



Instructor-Content Interaction

The instructor-content interaction refers to the e-learning instructor's creation of e-learning content based on the course syllabus and the delivery of the content to learners. An e-learning instructor has to make sure that the course content is applicable to learners' real life experiences (Frymier & Shulman, 1995). The concept of motivating learners to pay close attention to the course, personal goals, and/or real-world situations should be included in the course content (Keller, 1987). With the present advanced state of Information Communication Technology (ICT), an instructor can change course content via the Web before and during a course using applications (McNaught, Whithear, Browning, Hart & Prescott, 1998) such as WebCT, Blackboard, and Moodle. Designing e-learning content, considering what learners need to learn does not mean designing whatever matches with what learners want to learn, but designing the course based on the course syllabus for a particular program. Meishar-Tal, Kurtz & Pieterse (2012) found that Facebook can be used for delivering course content and boosting learner-learner and learner-instructor interactions as learners seem satisfied using Facebook. For the content in the digital age, learners are satisfied with the use of e-books because they are user-friendly, accessible, easily transportable, and relatively low cost. Additionally, they are searchable and can link to other resources (Baek & Monaghan, 2013; Feldstein, et al., 2012).

Adult learners usually select an instructional program related to their personal needs or goals (Means, Jonassen & Dwyer, 1997). Therefore, an e-learning instructor can best increase learner motivation and create relevant content based on the course syllabus using individual or group assignments and real-world/job examples. For instance, the author teaches the graduate course: Instructional Systems Design and Development (ISDD) at the Department of

Educational Technology and Communications (ETC) at Rajamangala University of Technology Thanyaburi, Thailand. In this ISDD course, the author requires learners to write a five phases of ID training manual. The author has observed that most learners used their experiences in writing an ID manual and incorporated ideas similar to those of the following studies, Driscoll (1993); Keller (1987); & Keller & Suzuki (2004). When learning about subjects relevant to their jobs, they seem to pay more attention. If course content is not applicable to the learners' interests, an online instructor can easily adapt the courses' learning activities to the learners' needs, goals, and experiences.

Learner-Content Interaction

Learner-content interaction is described both in terms of e-learning content and how learners participate in an e-learning environment. Moore (1989) pointed out that learner-content interaction deals with learners interacting with the "content or subject of the study" for learning. To take advantage of information technology, an instructor should consider using e-books in an e-learning environment. Feldstein, et al., (2012) found that digital textbooks or e-books allow learners to access unlimited amounts of information, are flexible, link to other resources, and represent lower-cost for learners and instructors when compared to traditional textbooks. Furthermore, more learners accessed digital open textbooks than traditional textbooks and they often attained higher grades. Li, Chen, Fan & Huang (2014) found that using annotation maps assisted readers to better review e-book content. Five significant aspects make up the e-learning content that develops learners' competency. They are: motives, traits, self-concept, knowledge, and skill (Spencer & Spencer, 1993).



Motives

Motives are “The things a person consistently thinks about or wants” (Spencer & Spencer, 1993) so motives are a significant aspect in driving people toward behaviors appropriate in achieving a desired goal. Each person has individual motives, thoughts and wants for their individual objectives. Motives can be very personal and short term, but if they are consciously created, focused, and reinforced they may be very long term.

One job of the e-learning instructor is to take responsibility in asking learners to set both short term and long term learning goals. A goal is what a person is consciously trying to achieve. Goals can be listed and modified as necessary. Perceived self-efficacy is believing that you have the ability to achieve a particular performance, the feeling that you can do what you set your mind (Bandura, 1988). Self-efficacy and goal setting are affected by self-observation, self-judgment, and self-reaction (Schunk, 1990). When learners perceive agreeable goal development, they feel capable of improving their skills. Goal attainment, coupled with self-efficacy can lead learners to develop and state challenging goals for themselves.

One of the reasons for trying to encourage learners to create motives or goals is to answer the common question of learners’ “Why do we have to learn this subject?” To answer this question the designer or instructor has to design a course content that has relevance to the current and future career opportunities of learners (Keller, 1987; Keller & Suzuki, 2004). “Relevance can come from the way something is taught; it does not have to come from the content itself” (Keller, 1987) That is, people who have high expectations or a “high need for achievement” always set challenging goals and try to achieve them. Therefore, when designing an e-learning course, the designer or instructor should focus on what learners want to learn so that they can see how

the course helps them meet their individual achievement goals. Self-assessment measurement is particularly useful for identifying learners’ motives. The instructor may wish to administer competency questionnaires or require a demonstration of ICT competency, or give a non-graded assignment one month before class begins or request a reflective report from the students on their own assessment of their ICT skills and their readiness for an online course.

2. Traits

Spencer & Spencer (1993) stated that traits are “Physical characteristics and consistent responses to situations or information...Emotional or self-control and initiative are more complex consistent response to situations” (p. 10).

When facing problems or stress, good counseling, coordination, human relations, strategic planning, and emotional control are core trait competencies of a Human Resource (HR) manager. Spencer and Spencer (1993) stated that “Motives and competencies are intrinsic *operant* or *self-starting* ‘master traits’ that predict what people will do on their jobs long term, without close supervision”. Lifelong learning and independent learning are especially encouraged in adult learners because they have the self-discipline, flexibility, and motivation to continue learning at varied times and places. McClellan (1973) commented that traits are characteristics of each person which can represent if he or she looks credible for being a leader.

3. Self-Concept.

Spencer & Spencer (1993) defined self-concept as “A person’s attitudes, values, or self-image...self-confidence, a person’s belief that he or she can be effective in almost any situation is part of that person’s concept of self”. For example, an HR manager is more likely to show skills and competencies of an HR manager. Awareness of the self-image can help teachers predict how someone will behave; for example, when someone thinks they are not smart, he or she will



lack confidence and look down on him/herself. However, even though a person's self-concept has existed for a long time, this self-concept can be changed. For instance, some people have some bad attitudes towards their parents' behaviors; they may change their attitudes when they have their own children and see life differently. For those who have a bad attitude about education they may change their attitude when they have success in a particular topic or subject. Therefore, when designing an e-learning course, an instructor should focus on course activities that allow for individual learners to show their attitudes, values, or self-image so that they can find their strengths and skills, and so their classmates can also learn from them. Moreover, an e-learning course should begin with simple problems and gradually move to more difficult topics so that the learners will have developed a good attitude in learning, building on their success with simpler content and thereby motivating them to learn.

4. Knowledge.

Spencer & Spencer (2003) defined knowledge as "Information a person has in specific content areas, knowledge is a complex competency. Scores on knowledge tests often fail to predict work performance because they fail to measure knowledge and skills in the ways that are actually used on the job".

McClellan (1973) indicated that knowledge deals with a specific background knowledge of each person such as computer programming, communicative English language, or Thai language. Examples of on the job knowledge include: a nurse's knowledge of injection areas in the human body, or a seller's knowledge of product specifications, prices and which product best fits a customer's needs.

There are three problems with knowledge tests. First, many of knowledge tests focus on learners' ability to memorize facts or formulas. Second, many of knowledge tests focus on measuring someone's capability to select his or

her choices but do not measure whether someone can perform on the basis of that knowledge. Finally, knowledge tests frequently just predict what "someone can do, not what he or she will do" (Spencer & Spencer, 1993).

Schank & Abelson (2014) pointed out that knowledge is "what people know, attempt, to formalize what they know, make rules about what can follow from what they know...". Schank & Abelson (2014) also expressed how people apply knowledge by understanding the communication, answering questions, and giving some advice to other people.

In an e-learning environment, knowledge construction can occur by adding some web links to a LMS, sharing information, posting course content and providing examples, reflection or feedback exercises, searching for information, and discussing their interpretations of what they are learning.

When designing an e-learning course, the designer needs to consider what "knowledge" the learners want or need. In addition, to the paper-pencil tests, it is necessary to use performance tests and oral tests for measuring knowledge and skills.

5. Skill.

Skill is defined as "The ability to perform a certain physical or mental task" (Spencer & Spencer, 1993). While McClellan (1973) stated that skill is the knowledge that has been practiced very often until one becomes expert in a particular area. For example, a seller can calculate the price or cost of goods without using a calculator. When designing e-learning courses, the designer or instructor needs to allow learners to apply both their physical and mental skills and abilities and allow them to practice the skills until they are proficient, so that they can apply what they have learned into their jobs efficiently and effectively. For example, Prammanee (2005) found that applying both cognitive and metacognitive approaches in course activities could help learners



to think more critically and gain more knowledge and skills.

Thus, when design e-learning content, the designer should allow learners to practice a particular skill until they become experts. e-learning instruction can answer this issue because it promotes learners to learn anytime and anywhere they want. Moreover, e-learning instruction allows learners to experiment computer-assisted instruction, computer-based training, and web-based training several times until they understand the lesson clearly.

Learner-Instructor Interaction

Learner-instructor interaction happens when the instructor provides motivation, feedback, and engages the learners with learning (Moore, 1989). Dzakiria (2012) stated that learner-instructor interaction help learners understand course material, course content, and to clarify any doubts using electronic forms like synchronous (real-time chat) and asynchronous (webboard, e-mail, mailing list) communication. Balaji and Chakrabarti (2010) found that the more learners perceive interaction, the more they participate in learning. Angelaki & Mavroidis (2013) found that over 94 percent of the learners need to communicate with their instructor and classmates, but little has been done to mitigate the problem. This model discusses learner-instructor interaction based on the original interaction model of Moore (1989) and the findings of Prammanee (2005), which include and encourage interaction, promote critical thinking, collaborative learning, and providing timely feedback.

1. Encourage interaction.

When teaching an e-learning course, the instructor is not only required to be an expert in content and teaching, but to encourage interaction to facilitate the students learning during the e-learning course. Online interaction is one of the most important issues to motivate learners to enroll or not to enroll in an e-learning program.

This is because learners are often reluctant to enroll and easily drop out of an e-learning course because they are dissatisfied with a lack of or poor interaction, and timely feedback from their instructor and classmates (Acker & McCain, 1993; Kearsley, 1995; Hara & Kling, 1999; Muirhead, 1999). An e-learning instructor should "facilitate, but not lead" the discussion (DeLoach & Greenlaw, 2007). Fisher (2003) recommended that an e-learning instructor facilitate but not overly control or direct learning. This of course may require a change in mindset among the learners, some of who may be used to passively listening to lectures and are reluctant to actively participate and help construct a learning environment. E-learning instructors, after delivering the lectures, need to make sure that they provide contact information for learners to ask questions about the course-related activities, and offer help with course activities, because instructors and learners may not see one another for the whole semester.

Social cues or emoticons and familiarity with fellow learners are other related issues of Henri (1992) model that influences online course interactions. Before learners get comfortable enough to exchange ideas and information online, it is important to allow them to get to know one another, as they may not be able to interact face to face or socialize after class as in the traditional classroom setting. In e-learning environments, social cues help learners to introduce themselves to the rest of the class. Prammanee (2005) found that learners used more social cues in the early weeks of class than the later weeks because they need to know their fellow learners before they feel comfortable to exchange some ideas and information related to the course objectives. Hara, Bonk & Angeli (2000) in a similar study, noted the number of social cues decreased as the semester progressed. These findings could benefit instructors who plan to teach e-learning environment because it would encourage them to allow their learners to get to know each other better, thus



possibly making learners engagement and interaction more useful.

2. Promote Critical Thinking.

An e-learning instructor needs to promote critical thinking. Critical thinking, which includes cognitive and metacognitive skills, is defined as “the mental process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and evaluating information to reach an answer or conclusion” (Dictionary.com, 2013). Prammanee (2005) found that cognitive skill “the assignments not only ask students to answer yes/no question but also ask students to answer, “Why is this correct or incorrect?”

When designing e-learning courses, the designer should use course activities that require learners to apply their cognitive and metacognitive skills such as using multiple choice examination questions, short answers, essays, and course projects. Using only multiple-choice exams, have the shortcoming that learners might have memorized the course content and just recall information from the readings in order to complete the exams, but lack the ability to reason why a given answer is correct or incorrect (Prammanee, 2005). For this reason it is important to incorporate several kinds of course activities for learners to apply a variety of skills for learning activities so that they can apply them in current and future real life situations.

3. Collaborative Learning

Moore (1989) pointed out that learner-learner interaction is for resource sharing. This idea is similar to Salmon's (2000; 2002) online learning model which sees knowledge sharing as a part of the model's information exchange. Facebook can help an instructor to promote collaborative and active learning (Wang, Woo, Quek, Yang & Liu, 2011). Sometimes encouraging learners to participate in e-learning activities may not be enough so in some cases it is necessary to require them to participate as part of their course grade (Dzakiria, 2012).

Other researchers (Cavalier & Klein, 1998; Hathorn & Ingram, 2002; Jonassen, 2003; Lamb, 2003; Weller, 2002) agree that collaboration is very important to help learners produce a higher-level quality of work outcomes. Prammanee (2005) found similarly, that collaboration can assist learners in their brainstorming and decision making as they work on group projects as well as by discussing topics, content, and resources for their projects. In addition, collaboration can benefit learners when they need to gather information from various sources. For example, one or more members in the group could help the team locate the information either from libraries or online while other members perform other tasks. Subsequently they can work together to read, summarize, prepare, and present the project. Group work produced a higher level of quality in the completed work than when students worked alone. DeWitt, Siraj & Alias (2014) and Palloff & Pratt (1999) have added that group work and collaboration enhance teaching and learning as learners can construct knowledge. Thus, designing e-learning courses the designers or instructors need to incorporate collaborative learning strategies because learners can work together online and produce high quality of work outcomes.

4. Provide Timely Feedback.

Moore's (1989) original model learner-instructor interaction deals with the instructor providing motivation, feedback, and encouraging dialogue between the instructors and the learners. Another issue that appeared to influence interaction in e-learning courses is the provision of timely feedback. Feedback can help learners to know whether they are making progress or not (Acker & McCain, 1993; Dzakiria, 2012; Muirhead, 1999; Shute, 2008; Taşçı, Parlak, Kibar, Taşbaşı & Cebeci, 2014; Wagner, 1994). Karal, Kokoç, Çolak & Yalçın (2013) found that immediate feedback among learners can increase the level of interaction because formative feedback can



modify, improve learning, and allow learners to ask different kinds of questions (Kuo, Walker, Beland & Schroder, 2013; Shute, 2008). Timely feedback promotes learner-instructor interaction because learners feel they are receiving adequate support and attention from their instructors.

Learner-Learner Interaction

Moore (1989) stated that learner-learner interaction is the interaction between “one learner and other learners, alone or in groups...sometimes an extremely valuable resource for learning, and is sometimes even essential”. The goal of learner-learner interaction is to exchange and share some ideas and information from one another about course related activities. Moore & Kearsley (1996) indicated that learners seemed to interact more when they interact with classmates who are close in ages. Likewise, adults tended to interact more if they share similar experiences and backgrounds, as seen by Dzakiria (2012), who found that participation, response, and feedback behavior are necessary to increase effective learning in distance as well as learner-learner interaction and also assist learners to understand course content and promote critical thinking. Moreover, group work and discussion help learners to reduce feelings of loneliness and boredom.

E-learning courses draw on the ability of adults to be self-directed. Employing adult learning principles (Andragogy) into the design and delivery of e-learning courses will improve learning effectiveness. This e-learning model uses the principles of Knowles, Holton & Swanson's (2005) to design e-learning courses for learner-learner interaction. The model is based on the following six assumptions:

1. Learner's Need to Know

Knowles, et al., (2005) stated that “Adults need to know why they need to learn something before undertaking to learn it.” E-learning is a growing phenomenon and most of the learners are adults. Thus, designers have to design based on

the needs of adult learners (Cercone, 2008; Moore & Kearsley, 1996). As an e-learning instructor it is necessary to assist learners to identify the gap between what they already know and what they need to know. Needs analysis is one of the useful tools, which should be done prior to beginning online instruction to identify/assess the gap in their knowledge, motives, traits, self-concepts, and skills.

2. Self-Concept of the Learner

Knowles, et al., (2005) pointed out that “Adults have a self-concept of being responsible for their own decisions, for their own lives.” Adult learners want to control their own lives and they may want to be independent in learning; if they are Self-Directed Learners (SDL), they have already developed the characteristics to allow them to learn independently (Knowles, et al., 2005). Knowles (1975) defined self-directed learning as a process in which “Individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies and evaluating learning outcomes”.

Skiff (2009) has applied Knowles's SDL concept in the way that learners can take the “initiative to pursue a learning experience” (What is Self-Directed Learning?) and be responsible for their learning outcomes. Once learners have taken the initiative, they have to take responsibility for their own learning experiences and outcomes. SDL does not mean learners learn alone, but it allows them to identify their own learning needs and how they want to meet those needs. According to Long's (2010), SDL consists of certain information literacy skills required to search for and use information resources.

3. Prior Experience of the Learner



Adult learners come to learn with many different life experiences and resources. They can use their experiences and resources to facilitate their own and their classmates learning. Moore's (1989) original model of learner-learner interaction is helpful in terms of resource sharing. Prammanee's (2005) study confirmed Moore's original model in that learners build their knowledge through the clarification of course activities, the exchange of information, provision of assistance to classmates, and the active engaged participation in online activities. For example, group members could help each other to locate the information either from libraries or online sources. Depending on the autonomy of learners, the e-learning instructor may have to encourage or require participation, as voluntary participation may not be sufficient motivation to fully engage in the learning process. The instructor should stress that collaborative learning can lead to better learning outcomes. Unfortunately many learners rely too heavily on the instructor and do not realize that they themselves can be active in constructing and sharing knowledge.

Readiness to Learn

Adult learners learn best when "they need to know and be able to do (something) in order to cope effectively with their real-life situations...the developmental tasks associated with moving from one developmental stage to the next" (Knowles, et al., 2005). When creating an e-learning course, an instructor should focus on information or knowledge that can be directly applied to learners' real lives or jobs. The e-learning instructors should, prior to beginning an e-course, conduct an online survey to investigate what subject learners really want to learn in a particular course.

4. Orientation to Learning

One reason adult learners are motivated to learn is because learning will assist them to "perform tasks or deal with problems that they

confront in their life situation" (Knowles, et al., 2005). Moreover, adult learners learn better when instruction occurs in the context of real-life situations because they want to use new knowledge to solve real problems. When creating an e-learning course, an instructor should require and design into the course principles and activities that are learner-centered, require problem solving, or include problem-based learning principles.

5. Motivation to Learn.

Adult learners may be motivated by "...the desire for increased job satisfaction, self-esteem, quality of life..." (Knowles, et al., 2005). They may, also be motivated by external goals such as "a better job, promotions, and high salaries". Adult learners may come to school because they may want to improve their knowledge and skills to perform their jobs. When creating an e-learning course, an instructor should consider direct questions as follows:

- How to increase job satisfaction for the adult learners?
- How to promote learners self-esteem?
- How to improve the quality of life of the learners?
- How can the learners better perform in their job?
- How can the learners be promoted?
- How can the learners get a raise(or rise)?

Implications for e-learning practice

The author introduced an interaction model for e-learning environment, which is constructed from the five types of competency model, the four types of learning interactions, and the andragogical principle. The author used four types of interactions as a guideline to the discussions in this section.

Instructor-content interaction allows an instructor to take responsibility for creating and delivering course content based on the learners' desire, but the content has to match with the



objectives of the course for the adult learners. Furthermore, providing up-to-date and all time accessible course content will be one of the most important strategies to motivate adult learners in the 21st century. The information age tends to make people feel impatient for learning, so the instructors need to incorporate up-to-date information for learners (Baekan & Monaghan, 2013; Feldstein, et al., 2012). Moreover, teaching and learning activities need to allow learners an opportunity for practicing things related to their life experiences. Thus, an e-learning instructor needs to consider carefully about adjusting course contents, how to deliver the course content, and customizing teaching and learning activities.

Learner-content interaction deals with how learners gain benefits when interacting with the course content. In order to have competency the author recommends incorporating five aspects of Spencer & Spencer (1993): motives, traits, self-concept, knowledge, and skill. Motives for e-learning content involve providing the course content that relates to their profession so that it makes them really wanting to learn. Traits deal with the characteristics of each person, such as leadership or trustworthiness. Self-concept is how the person reviews him/herself, such as for people who have high experiences or who set high standards for themselves to achieve. Thus, for learners' benefits an e-learning instructor may need to analyze the learners' needs prior to creating and delivering course contents. A priori knowledge is also one of the most important issues for e-learning, so an instructor has to review carefully whether the learners have been exposed to a particular subject before and review how much they know. After that the instructor has to make sure that they have practice until they are skillful in a particular task.

For the learner-instructor interaction in e-learning environment, the e-learning instructor has to make sure to encourage interaction because without interaction the effective learning may not

occur. Sometimes instructors may need to lead interaction by asking learners to provide background information, search for additional information, and require learners to participate to get a grade in the course. To promote critical thinking in e-learning environments it is necessary that an e-learning course apply several kinds of exams such as multiple-choice exams, short answers, and essays. Moreover, e-learning instructor has to provide collaborative learning by assigning learners to share some resources, opinions, and ideas online related to the course content. Providing timely feedback is another issue that an e-learning instructor may need to take into account because instructors and learners do not meet one another, so some learners may need trustworthy feedback in order to solve problems related to the course content.

Learner-learner interaction is based on six assumptions of Knowles, et al., (2005): learner's need to know, self-concept of the learner, prior experience of the learner, readiness to learn, orientation to learning, and motivation to learn. To fulfill these six steps, an e-learning instructor needs to conduct needs assessment for researching what learners really need to learn. Next, the e-learning instructor needs to allow adult learners to take responsibility to choose or manage their own learning activities. Another important issue is to know prior experiences of the learners because e-learning content should be created and delivered based on the learner prior experiences. In addition it will save times and budgets if the course provides for learning only the necessary skills. Adult learners learn readily when they can apply their new knowledge to their profession, and it may benefit them to get promotion on their jobs. In this case it will motivate them to learn better than using teacher-centered instructional techniques.

Recommendation for the Further Application of e-learning



1. E-learning instructors should understand the nature of e-learning content by conducting an assessment of content, learners, and media prior to creating and delivering the e-learning content.

2. E-learning instructors should understand, create, and deliver course content that benefits adult learners.

3. E-learning instructors should understand the nature of adult learners, such as what topics they need to learn and why and how can they manage their own learning.

4. E-learning instructors should encourage interaction, promote critical thinking and collaborative learning, and provide timely feedback.

5. E-learning instructors should create e-learning content that motivate adult learners to build competency related to the course content.

Conclusion

Design e-learning course based on competency model, interaction model, and andragogical principle can motivate adult learners to learn and develop their competency.

The competency used in this model includes motives, traits, self-concept, knowledge, and skills. Therefore, designing effective and proper e-learning instruction for adult learners, the designer has to incorporate the following terms such as preference topics, problem-solving, critical thinking, collaborative learning, and self-image making techniques.

Interaction model for e-learning instruction includes encouraging interaction, promoting critical thinking, collaborative learning, and providing timely feedback. Promoting e-learning interaction instructor has to provide contact information, offer help with course activities, incorporate several course activities, share resources, and provide timely feedback.

The andragogical principle includes learner's need to know, self-concept of the learner, prior experience of the learner, readiness

to learn, orientation to learning, and motivation to learn. Designing e-learning instruction for adult learners, the designer has to consider the essential subjects. There are as follows: allowing independently learning, sharing experiences and resources, considering what they can perform after learning, performing tasks or deal with problems in their life, increasing job satisfaction, considering self-esteem, and allowing quality of life.

The four types of interactions discussed above are important for the designers and learners in e-learning environments. An e-learning instructor should create content that motivate learners to learn based on the course description of a program. When a learner interacts with the course content, learning should occur without any difficulty. By definition, technology is required in an e-learning course, as well as the ability to competently use it so that, learners can interact with their instructor, classmates, and the course content. Without an instructor or tutor, the learner has no support for learning in ideal situation.

The combination of competency model, interaction model, and adult education theory from the previous model and recent research findings can be useful for e-learning instructors and learners. The instructor must find a way for learners to assess themselves, discover what they really want to learn and verify what knowledge and skills that they already have as well as those they would like to develop. Finally, e-learning content should motivate adult learners to build competency related to the course content so that they can perform their jobs better.

References

Acker, S. R., & McCain, T. A. (1993). *The Contribution of Interactivity and two-Way Video to Successful Distance Learning Applications: A Literature Review and Strategies Positioning*. The Center for Advanced Study in Telecommunications. The Ohio State University, Columbus, OH.



Allen, I. E., & Seaman, J. (2007). *Online Nation: Five Years of Growth in Online Learning*. Needham, MA: Sloan Consortium.

Angelaki, C., & Mavroidis, I. (2013). Communication and social presence: the impact on adult learners' emotions in distance learning. *European Journal of Open, Distance and e-Learning*, 16 (1). Retrieved January 12, 2014, from <http://www.eurodl.org/index.php?p=archives&year=2013&halfyear=1&article=575>

Baek, E., & Monaghan, J. (2013). Journey to textbook affordability: An investigation of students' use of e-Textbooks at multiple campuses. *The International Review of Research in Open and Distance Learning*, 14(3), 1-26. Retrieved February 3, 2014, from <http://www.irrodl.org/index.php/irrodl/article/view/1237/2478>

Balaji, M. S., & Chakrabarti, D. (2010). Student interactions in online discussion forum: Empirical research from 'Media Richness Theory' perspective. *Journal of Interactive Online Learning*, 9(1), Retrieved July 5, 2014, from <http://www.ncolr.org/jiol>.

Bandura, A. (1988). Self-regulation of motivation and action through goal systems. In V. Hamilton, G. H., Bower & N. H. Frijda (Eds.), *Cognitive perspectives on emotion and motivation* (pp. 37-61). Dordrecht, the Netherlands, Kluwer Academic Publishers.

Bishop, J. S., & Spake, D. F. (2003). Distance education: A bibliographic review for educational planners and policymakers 1992-2002. *Journal of Planning Literature*, 17, 372-391.

Clark, R. C., & Mayer, R. E. (2011). *E-learning and the Science of Instruction: Proven Guidelines for Consumers and Design for Multimedia Learning*. San Francisco, CA: John Wiley & Sons.

Cavalier, J. C., & Klein, J. D. (1998). Effects of cooperative versus individual learning and orienting activities during computer-based instruction. *Educational Technology Research and Development*, 46(1), 5-17.

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

DeLoach, S. B., & Greenlaw, S. A. (2007). Effectively moderating electronic discussions. *Journal of Economic Education*, 38(4), 419-434.

Delors, J., Mufti, I. A., Amagi, I., Carneiro, R., Chung., Geremek, B., Nanzhao, Z. (1996). Learning: *The Treasure within, Report to UNESCO of the International Commission on Education for the Twenty-first Century*. France: UNESCO Publishing.

DeWitt, D., Siraj, S., & Alias, N. (2014). Collaborative mLearning: A module for learning secondary school science. *Educational Technology & Society*, 17(1), 89-101.

Dictionary.com. (2013). Critical Thinking, in Dictionary. com's 21st Century Lexicon, Retrieved December 15, 2013, from <http://dictionary.reference.com/browse/critical>.

Driscoll, M. (1993). *Psychology of Learning for Instruction*. Needham Heights, MA: Allyn & Bacon.

Dzakiria, H. (2012). Illuminating the importance of learning interaction to open distance learning (ODL) success: a qualitative perspectives of adult learners in Perlis, Malaysia. *European Journal of open, Distance and e-Learning*. Retrieved March 3, 2014, from <http://www.eurodl.org/index.php?p=archives&year=2012&halfyear=2&article=531>

Feldstein, A., Martin, M., Hudson, V., Warren, K., Hilton III., & Wiley, D. (2012). Open textbooks and increased student access and outcomes. *European Journal of Open, Distance and e-Learning*. Retrieved February



13, 2014, from <http://www.eurodl.org/index.php?p=archives&year=2012&halfyear=2&article=533>

Fisher, M. D. (2003). *Designing Courses and Teaching on the Web: A 'how-to' guide to Proven, Innovative Strategies*. Lanham, MD: Scarecrow Education.

Frymier, A. B., & Shulman, G. M. (1995). What's in it for me?: Increasing content relevance to enhance students' motivation. *Communication Education*, 44(1), 40–50.

Griffin, P., & Robertson, P. (2014). Professional Learning Teams and Decision-Making. In P. Griffin, (Ed.). *Assessment for Teaching* (pp. 13–23). New York: Cambridge University Press.

Hara, N., Bonk, C. J., & Angeli, C. (2000). *Content Analysis of Online Discussion in an Applied Educational Psychology*. Bloomington, IN: Center for Research on Learning and Technology Report No. 2–98.

Hara, N., & Kling, R. (1999). Students' frustrations with a Web-based distance education course. *First Monday*, 4(12). Retrieved January 17, 2014, from http://firstmonday.org/issues/issue4_12/hara/index.html.

Hathorn, L. G., & Ingram, A. L. (2002). Online collaboration: making it work. *Educational Technology*, 42(1), 33–40.

Henri, F. (1992). Computer Conferencing and Content Analysis. In A. R. Kaye (Ed.), *Collaborative Learning through Computer Conferencing: The Najaden Paper* (pp. 117–136). Berlin, New York: Springer-Verlag.

Jonassen, D. H. (2003). The vain quest for a unified theory of learning. *Educational Technology*, 43(4), 5–3.

Karal, H., Kokoç, M., Çolak, C., & Yalçın, Y. (2013). Using Pen-Based Technology in online mathematics course: an evaluation study. *European Journal of Open, Distance and e-Learning*, 16(2). Retrieved March 3, 2014, from <http://www.eurodl.org/index.php?p=archives&year=2012&halfyear=2&article=599>

Kariya, S. (2003). Online education expands and evolves. *IEEE Spectrum*, 40(5), 49–54.

Kearsley, G. (1995). The Nature and Value of Interaction in Distance Learning. In M. Koble (Ed.). *The American Center for the Study of Distance Education Invitational Research Conference in Distance Education: Towards Excellence in Distance Education: A research agenda*, Discussion Papers, (pp. 366-374). University Park, PA: Penn State.

Keller, J. M. (1987). Development and use of the ARCS model of instructional design. *Journal of Instructional Development*, 10(3), 2–10.

Keller, J. M., & Suzuki, K. (2004). Learner motivation and E-learning design: a multinational ally validated process. *Journal of Educational Media*, 29(3), 229–239.

Knowles, M. S. (1975). *Self-Directed Learning: A Guide for Learners and Teachers*. New York, NY: Association Press.

Knowles, M. S. (1980). *The Modern Practice of Adult Education: From Pedagogy to Andragogy*. Chicago: Follett.

Knowles, M. S. (1984). *Andragogy in Action*. San Francisco: Jossey-Bass.

Knowles, M. S., Holton, E. F., & Swanson, R. A. (2005). *The adult learner* (6th ed.). Burlington, MA: Elsevier Butterworth-Heinemann.

Kuenzi, J. F. (2005). The Postsecondary Education Student Population: CRS Report for Congress (2005). Retrieved March 3, 2014, from <http://congressionalresearch.com/RL31441/document.php?study=The+Postsecondary+Education+Student+Population>.

Kuo, Y., Walker, A. E., Beland, B. R., & Schroder, K. E. (2013). A predictive study of student satisfaction in online education programs. *The International Review of Research in Open and Distance Learning*, 14(1), 16-39. Retrieved December 5, 2013, from



http://www.irrodl.org/index.php/irrodl/article/view/1338/2416.

Lamb, A. (2003 (July-August). Extreme thinking transforming traditional student projects into effective learning environments. *Educational Technology*, 43(4), 31–40.

Li, L. Y., Chen, G. D., Fan, C. Y., & Huang, D. W. (2014). The effects of the E-Book system with the reading guidance and the annotation map on the reading performance of college students. *Educational Technology & Society*, 17(1), 320–331.

Long, H. B. (2010). Trends in Self-Directed Learning Research Paradigms. In M. G. Derrick & M. K. Ponton (Eds.), *Emerging Directions in Self-Directed Learning* (pp. 19–36). Chicago, IL: Discovery Association Publishing House.

McClelland, D. C. (1973). Testing for competence rather than intelligence. *American Psychologist*, 28(1), 1-14.

Means, T., Jonassen, D., & Dwyer, F. (1997). Enhancing relevance: Embedded ARCS strategies vs. purpose. *Educational Technology Research and Development*, 45, 5–17.

McNaught, C., Whithear, K., Browning, G., Hart, G., & Prescott, J. (1998). *The best of Both Worlds: Redeveloping a Multimedia Project for the Web*, Paper Presented at the EDMEDIA & ED-TELECOM 98, Freiburg, Germany.

Meishar-Tal, H., Kurtz, G., & Pieterse, E. (2012). Facebook group as LMS: A case study. *The International Review of Research in Open and Distance Learning*, 13(4), 33–48. Retrieved January 12, 2014, from http://www.irrodl.org/index.php/irrodl/article/view/1294/2295

Moore, M. G. (1989). Three types of interaction. *The American Journal of Distance Education*, 3(2), 1–6.

Moore, M. G., & Kearsley, G. (1996). *Distance Education: A systems view*. Belmont, CA: Wadsworth.

Muirhead, B. (1999). *Attitude toward interactivity in a graduate distance education program: A qualitative analysis*. Published by Dissertation.com. Retrieved September 9, 2001, from http://www.dissertation.com/library/1120710a.htm

Nilsook, P. (2011). *Information Technology in Education*. Bangkok: King Mongkut's University of Technology North Bangkok Textbook Publishing Center.

Palloff, R. M., & Pratt, K. (1999). *Building Learning Communities in Cyberspace: Effective Strategies for the Online Classroom*. San Francisco, CA: Jossey-Bass.

Prammanee, N. (2005). *Understanding Participation in Online Courses: A Case Study of Online Interaction*. Doctoral dissertation, College of Education, Department of Educational Technology, Research & Assessment, Northern Illinois University.

Salmon, G. (2000). *E-Moderating: The key to Teaching and Learning Online*. London: Kogan Page.

Salmon, G. (2002). *E-tivities: The key to Active Online Learning*. London: Kogan Page.

Schank, R. C., & Abelson, R. P. (2014). *Knowledge and memory: The real story*. In R. S. Wyer, JR (Ed.), *Knowledge and memory: The real story: Advances in social cognition Volume VIII* (pp. 1–86). New York: Psychology Press.

Schunk, D. H. (1990). Goal setting and self-efficacy during self-regulated learning. *Educational Psychologist*, 25(1), 71–86.

Shute, V. J. (2008). Focus on formative feedback. *Review of Educational Research*, 78, 153–190.

Skiff, D. (2009). What is self-directed learning? Retrieved May 23, 2013, from http://www.selfdirectedlearning.org/what-is-self-directed-learning



Spencer, L. M. Jr., & Spencer, S. M. (1993). *Competence at Work: Models for Superior Performance*. New York: John Wiley & Sons.

Taşçı, T., Parlak, Z., Kibar, A., Taşbaşı, N., & Cebeci, H. İ. (2014). A novel agent-supported academic online examination system. *Educational Technology & Society*, 17(1), 154–168.

Tweedell, C. B. (2000, October). *A Theory of Adult Learning and Implications for Practice*. Paper Presented at the Meeting of the Midwest Educational Research Association Annual Meeting. Chicago, IL.

Wang, Q., Woo, H. L., Quek, C. L., Yang, Y., & Liu, M. (2011). Using the Facebook group as learning management system: An exploratory study. *British Journal of Education Technology*, 43(3), 428–438.

Wagner, E. D. (1994). In support of a functional definition of interaction. *The American Journal of Distance Education*, 8(2), 6–26.

Weller, M. (2002). *Delivering Learning on the Net: The Why, What & How of Online Education*. London UK: Kogan Page.