

Running Head: CTSs

IMPROVING CRITICAL THINK SKILLS THROUGH ONLINE SYNCHRONOUS
COMMUNICATIONS: A STUDY OF LEARNERS' ATTITUDES TOWARD
BUILDING KNOWLEDGE NETWORKS

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Abstract

The main purpose of this study is to investigate the College learners' attitudes toward Online Synchronous Communications (OSCs) to build knowledge networks. Also, this study focuses on how to improve these learners' critical thinking skills via synchronous communicational activities. Based on the main purpose of this study and the concerns, the key research inquiries are: 1) To what extent do online learner abilities continue to develop their critical thinking skills to become deeply engaged in OSCs?, 2) What kinds of OSCs-based experiences are associated with their critical thinking developments to build knowledge networks?, 3) What are online learner patterns in critical thinking developments to address complex problem solving activities in democratic and multicultural contexts in OSCs? and 4) What are the impacts of these learners' critical thinking developments on their learning outcomes to appreciate OSCs? This is a qualitative case study that utilizes both qualitative and quantitative data to provide detailed information to the researcher for the data collection. The research site was the *Designing Online Learning Environments* course at the Department of Distance Education of Social Sciences Institute in the large urban and government-based University in the Spring Semester 2004. There were totally eleven learners (three of them were men and the rest of them were women) in this course. The author hoped that learners' attitudes toward synchronous online activities were more clearly defined, and examined as well as analyzed to integrate and implement new communication technologies into the curriculum efficiently.

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1. INTRODUCTION

WebCT is a supplement medium to on-campus face-to-face classes and online courses in the College. As noted by Abbey (2000), Bowers (2000), Lessing (2001), and Lessing (2000), many professors are now offering various types of WebCT-based courses, ranging from the simple to the complex, to their learners. Integrating a variety of teaching and learning styles, WebCT brings new ways for the faculty and learners to share global knowledge easily, and deliver educational information electronically. There is no doubt that the classrooms are no longer bound by time and space in the College. Although WebCT supports both online synchronous and asynchronous educational activities, there are very few professors who regularly schedule WebCT chat rooms with their learners in the College. Online synchronous activities, however, can provide the faculty and learners with democratic and multicultural communication milieus where they can negotiate shared meanings to build a global online society by realizing cultural diversity and understanding ethical values from different perspectives (Bonk and Cunningham, 1998; Jonassen, 2000; Jonassen, Peck, Wilson, B., 1999). Therefore, learners' attitudes toward synchronous WebCT-based communications need to be more clearly defined, examined and/or analyzed to integrate and implement this technology into the curriculum efficiently. The main purpose of this study is to investigate the College learners' attitudes toward synchronous online collaborations to build knowledge networks. Also, this study focuses on how to improve these learners' critical thinking skills via synchronous communicational activities.

2. PURPOSE

Online Synchronous Communications (OSCs) have potentials to improve learners' critical thinking skills (Bastiaens and Martens, 2000; Jonassen, 2000; Scardamalia, 2003; Wiburg and Butler, 2002), and also reduce the limitations of time and space in learning. Online synchronous communications helps learners be engaged citizens, informed individuals and dynamic members of their society. Also, having different communication styles and strategies, learners need various opportunities to improve their critical thinking skills during communication processes. Also, this paper deals with the pragmatic suggestions of communicational problems and pitfalls, and also the pedagogical foundations of educational activities for (OSCs) in distance education. Therefore, this study addresses key questions about developing learners' critical thinking skills toward constructing knowledge networks. Based on the main purpose of this research, the key research inquiries are:

1. To what extent do online learner abilities continue to develop their critical thinking skills to become deeply engaged in OSCs?
2. What kinds of OSCs-based experiences are associated with their critical thinking developments to build knowledge networks?
3. What are online learner patterns in critical thinking developments to address complex problem solving activities in democratic and multicultural contexts in OSCs? and
4. What are the impacts of these learners' critical thinking developments on their learning outcomes to appreciate OSCs?

3. THEORETICAL FRAMEWORK

This enhanced WebCT-based graduate course in the College allowed the faculty and learners to build an online knowledge network synchronously based on the constructivist theoretical framework. Besides, this course helped the learners understand problems from diverse real-life experiences. Therefore, the course owner and learners engaged open-ending meanings that there were no prescribed approaches or solutions. In this case, in this course, obtaining, evaluating and producing educational knowledge via online synchronous communications were dynamic and social activities (Kyrish, 2004). Besides, the critical thinking skill improvements were very important to help online learners better read, listen, understand, and remember educational knowledge. Therefore, these learners became active participants in the construction of knowledge, rather than passive receptacles for information (Jonassen, 2000; Neo, 2005; Mantyla, 1999). To develop their critical thinking skills with OSCs in this course, they were easily incorporated into a constructivist classroom to produce their own knowledge. In this constructivist milieu, the learners worked on the complex projects, synthesized knowledge to build their own understandings, learnt the essential skills and concepts of online knowledge networks, and used their critical thinking skills to solve real-life problems (Bonk and Cunningham, 1998; Cecez-Kecmanovic and Webb, 2000; Huerta, Ryan, and Igbaria, 2003; Schrum and Benson, 2002). To become meaningful and understandable, these projects were often done in groups. Moreover, engaging these learners in critical thinking skill activities about how to communicate synchronously online helped them to be active members in their community. Also, being critical thinkers in this graduate course helped them produce their own knowledge about the political, cultural, ethical, educational and social problems of their online knowledge society. In short, the author utilized *Constructivist Learning Theory* to improve the learners' critical thinking skills to build synchronous knowledge networks online in this course.

This constructivist learning milieu combined with the principles and strategies of the *Media Richness Theory* (Daft and Lengel, 1986; Daft, Lengel and Trevino, 1987), which helped the course owner concentrate on significantly decreasing the boundaries of time and space. The media richness of a channel was concerned about examining the four main aspects of online synchronous communications: 1) the capacity for immediate feedback determined by the amount and the promptness of the feedback the receiver could give to the sender; 2) the ability to support natural language regarded to have the ability to support natural language if the sender could structure and send the message in the most intuitive manner or as if it were in a conversation; 3) the number of cues was provided by the channel included both verbal and non-verbal cues such as tone of voice, hesitation, facial expressions, vocal cues, dress and posture. As underlined by McChesney (1999), these issues helped the learners to interact more effectively and the extent to which the channel generated social presence for the receiver provided by a channel influences individuals' motivation to engage in interpersonal communication. Furthermore, online learners could appraise the quality of OSCs whereas they decreased ambiguity about authentic practices. In this context, Table 1 shows that empowering these communications through the proper selections of communication media for improving critical thinking skills based on the core of constructivist learning process that this interactive milieu would help learners develop more positive attitudes toward OSCs.

		MEDIA RICHNESS THEORY						
Communication Learning	Foundations	Clarity	Completeness	Contextually	Truthfulness	Diversity	Flexibility	Accountability
		Critical Thinking Skills Improvements	engaging learners in projects designed to be realistic, intriguing and relevant to real-life experiences	modeling how theory can be transferred into practice in OSCs	improving learners' independent learning strategies by utilizing OSCs	encouraging learners to take ownership and responsibility for their learning and communication processes	taking a variety of perspectives and a global view of knowledge sharing	integrating authentic contexts by clearly stating the pedagogical guidelines to OSCs
	Critical Thinking Patterns	focusing on questions; identifying questions; formulating criteria for s	arguing several options before making critical decisions	utilizing for much of the communicative efforts	realizing their strengths and weaknesses	Exploring various opportunities to learn concepts, apply information, and represent their knowledge in a variety of ways	analyzing arguments; communicate with others judging possible answers; keeping the situations in their mind	establishing their roles and responsibilities for OSCs
	Learning Impacts and Communicational Outcomes	promoting interactive communicational activities among learners	valuing of individual differences to build a democratic and multicultural society via OSCs	providing with various equal access opportunities via the OSCs to share power and culture democratically	appreciating the needs and expectations of each other when communication synchronously	confronting the conflicts positively by understanding others' perspectives via OSCs	making inclusive decisions according to the current needs and expectations of their community	coping with the difficulties and barriers of how to build and learn via OSCs

CONSTRUCTIVIST LEARNING THEORY
Table 1. The Framework for Improving Critical Thinking Skills through Online Synchronous Communications

4. METHODOLOGY

This study has taken a grounded theory approach to allow the researchers to explore and discover these learners' attitudes toward OSCs for two reasons: First, the learners must have a clear understanding of the strategies and principles of OSCs to work more effectively in distance education with diverse populations. Second, these activities can help them expose to different cultures and ways of thinking to build democratic and authentic experiences. Therefore, the researcher tends to analyze the research data inductively rather than to prove or disprove a hypothesis. The main focus in this study is to investigate and understand the insider's views toward communicating synchronously online to build knowledge networks; and to expound on the participants' perspectives and interpretations rather than the researcher imposed categories in this study.

4.1. Research Design

This is a qualitative case study, which aims to investigate and argue the experiences on OSCs to improve the learners' critical thinking skills to build a democratic and multicultural knowledge networks. This study, therefore, utilized both qualitative and quantitative data, which were collected from different sources. This helped the author generate new perspectives and stimulate new directions in the data analysis. Besides, the combinations of the data collection provided the researcher with data triangulation to overcome the natural prejudices, which derived from a single data sources. This research presents a structured way for those involved in Constructivist Learning Theory and Media Richness Theory-based approaches to improve learners' critical thinking skills to look at practices and experiences from the real-life situations. Besides, this article addresses the achievement challenges and assessment concerns of OSCs.

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4.2. Participants

The research data were collected from the *Designing Online Learning Environments* course of the Distance Education Graduate Program of the College during the fourteen weeks in the Spring Semester of the 2003-2004 school year. There were totally eleven learners (n=11) in the course. Three of these participants were men whereas the rest of them were women. When the study started, these learners were between 21-37 years old, and had different educational backgrounds. These learners were chosen for three major reasons: First of all, all of these learners were strongly interested in communicating synchronously online and designing these kinds of activities to build a

knowledge networks in their own workplaces. Secondly, they were considering the idea of being a part of any educational design teams to deliver online synchronous communications after graduating the program. Finally, the researcher of this paper taught this course, and designed the on-campus face-to-face class and WebCT-based online milieu of the course.

4.3. Background of the Class

The *Designing Online Learning Environments* course of the Distance Education Graduate Program of the College covered many different design strategies and principles of how online synchronous communications could promote democracy and equity for all learners, build capacity to overcome racism and other forms of bias, identify approaches to online synchronous activities in the global context, and advocate for social change in higher education settings. The learners in this graduate course attended a three-hour session of the regular face-to-face classes each week during the fourteen weeks in the Spring Semester, and also they collaborated with each other synchronously and asynchronously via the course WebCT site and posted all their works and papers online before and/or after the regular class meetings. In the regular class meetings, the learners achieved their own learning goals based on the philosophical approach of the course, discussed the current social and political pressures on online synchronous communications, and discovered the aims of their e-learning projects. To explore the dynamic relationships between changes in technology, society, and education and their influence on human interactions, these learners collected information from a variety of perspectives to build their own knowledge networks. They found the answers to develop the policy and strategic planning to achieve educational equity across online groups by reading widely in books outside of education and interacting with other learners, professors and experts.

The online class was designed to help these learners discover the pedagogical strategies and principles of online synchronous communications to advance democracy and equity in higher education milieus. Therefore, they understand how to build online knowledge networks to enhance their higher-level thinking skills. The WebCT site had eight stages to construct a democratic and multicultural knowledge networks:

1. Syllabus (the course goals and objectives, the course agreement),
2. Bookmarks (Weekly course contents and activities),
3. Self-Packages (Introduction, readings and links, discussion questions, and self-test),
4. Communication Tools (Email to communicate with the educator and/or other learners privately, five chat rooms for the semi-structured structured synchronous communications and group works, and a bulletin board for the structured e-activities),
5. Announcements (The timeline for learners' projects),
6. Learner Logs (Weekly experiences toward online synchronous communications),
7. Glossary (Construed with the learners related to the course content),
8. Learner Homepages (The learner free-speech pages),

In the WebCT course site, the learners were engaged in *Anchored Education*. Norton and Wiburg (2002) point out that *Anchored Education* “creates environments that permit sustained exploration by students and teachers and enables them to understand the kinds of problems and opportunities that experts in various areas encounter and the knowledge that these experts use as tools.” (p.103). All communicational activities in this online class were designed based on the model of a constructivist design based the principles of the Media Richness Theory.

4.4. Research Setting

Although the research data were collected from both the face-to-face and online classes, the main research site was the five chat rooms of the WebCT site. These chat rooms encouraged the learners to effectively transfer their knowledge to the new contexts of OSCs. Besides, they involved in improving their complex critical thinking skills to produce and demonstrate their knowledge, which provided the rubrics for assessment criteria to promote online synchronous collaborations among professionals, learners and community. Besides, these learners clearly understood their changing needs and learning styles, realized new opportunities to share knowledge, and found powerful solutions for the complex problems of their real-life experiences in these chat rooms. In the chat rooms, the learners in this study could face with the cultural, ethnical, and racial mixed heritage issue of online knowledge networks. Besides, they learnt their perceptions were based on any stereotypes and misconceptions on diversity. Therefore, they experienced some challenges listed by follows:

1. the quality and quantitative of collaborations,
2. the amount of communicational difficulties and barriers,
3. the opportunities of equal access to share power and culture,
4. the current and future needs of the participants,
5. the philosophical foundations of a democratic and multicultural society.

OSCs helped the learners construct their individualistic learning types. Therefore, diversity, cultural sensitivity and flexibility were three vital issues to successfully build knowledge networks in this research site. The learners developed in-depth understandings to respect and accepted the different perspectives of their diverse classmates. Not only did the course owner employ multiple approaches and strategies in designing, developing, implementing and evaluating OSCs, but also promoted democracy and equity issues across the learners to improve their critical thinking skills. The participants in this course worked together on their projects and communicated with each other synchronously in chat rooms to solve complex problems about building knowledge networks. Besides, they shared and exchanged their ideas by posting their assignments and works synchronously. These kinds of socio-cultural activities provided more insightful information and a friendly environment to the learners. The researcher performed as an online educator and a cognitive coach when the learners needed to encourage their independence thinking activities. The course delivery required active collaborations and interactions between the educator and graduate learners to complete course requirements. Therefore, the chat room communications were designed based on *Anchored Education* to help the participants make right decisions toward constructing online knowledge networks in the course.

To design, implement and evaluate any interactive OSCs-based contents in this course, as mentioned by Anderson and Garrison (1998), Picciano, (2001), Resta, (2002) and Tait and Mills (1999) therefore, the course owners and learners defined and analyzed the essential foundations of their online activities that helped them their synchronous collaborations. Furthermore, these important basics helped these learners understand undoubtedly the *open, flexible, and distributed* nature of the contents of OSCs: 1) developing the strategic technology plan for OSCs; 2) implementing the program development process (Type, Purpose, Strategies, Components) for online interactions, and 3) evaluating the online implementation process powerfully.

4.5. Data Sources

Data in this research were collected from the *traditional* and *online classes*.

1. The data from the traditional class sessions came from seven different sources:
 - a. pre-survey and post-test (the philosophy of online knowledge networks, a Likert type twenty items and two open-ended questions),
 - b. classroom observations (the face-to-face class about online communications),
 - c. interviews (three 30 minutes individual interviews and two focus group interviews),
 - d. two mid-term projects (about designing online synchronous communications)
 - e. final exam (reporting and presenting their course projects),
 - f. publishing (sending their course projects to the educational journals),
 - g. conference (attending any educational conferences to present their projects)
2. Online data sources are be listed by follows:
 - a. pre-survey and post-survey (about online synchronous communications, a Likert type twenty items and two open-ended questions about the course),
 - b. online chats (semi- structured, once a week),
 - c. bulletin board (posted assignments and projects),
 - d. learner weekly logs (experiences from their synchronous communications),
 - e. observations (from the five chat rooms), and
 - f. attitude survey (an open-ended nine questions).

Also, the researcher kept journals regularly to understand the learners' attitudes toward online synchronous communications to find out achievement challenges about the discourse and the investment in building democratic and multicultural knowledge networks.

4.6. Data Collection

This is a qualitative case study that the qualitative and quantitative data were collected from the different sources. Therefore, utilizing the mixed data provided a more complementary and diverse aspects of the complex phenomenon. Besides, the researcher regularly recorded and systematically stored the qualitative and quantitative data, and also indexed all data carefully. In this study, the researcher used *interactive* methods to collect the qualitative data (Patton, 1990). The interview protocols were one of the main instruments of data collections. The researcher interviewed all participants individually at the second week, the eight week and the thirteenth-week of the Spring Semester of the 2003-2004 school years. The two focus group interviews were held at the first and last weeks of the Semester. The interviewers set the dates and locations for the all interviews. Each individual and focus group interview lasted approximately 30 minutes in length, was tape-recorded. Also, the researcher took the paper-pencil notes of each interview session. The researcher obtained detailed information on the learners' attitudes toward online synchronous communications from the observations, which were *onlooker* and *overt observations*. Therefore, the researcher attended the regular and online class sessions to make direct observations of the learners' attitudes towards online synchronous communications. The learners knew that they were observed by the course owner in this course.

To investigate the learners' attitudes toward OSCs by improving their critical thinking skills to build knowledge networks, the researcher modified three different surveys: The first one was a paper-pencil whereas the second survey was totally online. The paper-pencil survey was about the philosophy of online knowledge networks. This survey was used for as a pre-survey and as a post-survey, and handed out the learners at the second and thirteenth weeks of the Spring Semester. The second survey was about online synchronous communications, and delivered online at the first and last week of the Semester as a pre-survey and post-survey. The third survey was a nine-question attitude survey to find out the learners' attitudes toward online synchronous communications to construct knowledge networks. This qualitative survey was posted on the WebCT bulletin board at the last week of the class, and asked the learners to freely express their attitudes toward online synchronous communications, knowledge networks and critical thinking skills. After reading all responses, these learners met one of the chat rooms to exchange and share their ideas about their answers.

Finally, the researcher regularly kept and stored the logs from a thirty-minute class chats each week, and randomly picked the sixteen logs from the four different chat rooms, where the learners worked in groups to completed their group projects. Because of the course recess area, the logs of the fifth chat room were neither observed nor transcribed.

4.7. Data Analysis

It took nearly one year to complete the data analysis and triangulation perfectly; because the collected data from the different sources were very rich and dense. The researcher analyzed and defined the collaborations, interactions and activities through the data and outcomes from the learners to build democratic and multicultural networks. Also, the researcher demystified the design strategies and principles of online synchronous communications to clearly define the existing philosophical and pedagogical arrangements of this online society. During the data analysis procedure, the researcher briefly followed these steps given in a logical order:

1. negotiated with two other people to analyze the qualitative and quantitative research data that prompted the research credibility and transferability,
2. transcribed each tape cassettes,
3. transcribed the chat room logs,
4. wrote the field notes from the class and all online activities,
5. identified patterns,
6. analyzed the content of each interview, class observation, and chat log,
7. analyzed the two surveys, and
8. triangulated all quantitative and qualitative data, and
9. reported results in descriptive and narrative form.

The process of the data analysis in this study was to systematically search and arrange the interview transcripts, field notes, chat logs and surveys. Besides, the researcher conducted the content analysis to identify code and categorize the primary patterns and themes in the data collected from the different sources. Furthermore, to provide the credibility in this qualitative study, the researcher adopted a stance of neutrality with regard to the research phenomenon under study (Patton, 1990). In other words, she did not try to prove a specific perspective and manipulate the data from the different sources. Utilizing both qualitative and quantitative methods in this

study was to examine more complementary and different aspects of the complex phenomenon. The combination of this method helped the researcher to generate new perspectives and stimulate new directions in data analysis. A combination of the qualitative and quantitative methodologies provided *data triangulation* from a variety of data sources, the *theory triangulation* from the different disciplines and *method triangulation* from the consistency of different data sources (Patton, 1990). Therefore, the researcher overcame the intrinsic bias that could come from single methods. Finally, the researcher was a center of the analytic process and had a very crucial role on the credibility issues of this study. Also, she closely followed the design and methods of qualitative research by collaborating with her peers and colleagues, and also the experts from the related fields, educational technology and research methodology.

5. FINDINGS

According to the collected qualitative and quantities data, the learners in this course could ask dynamic questions to each other under diverse considerations that these learners were engaged real-world problems to utilize OSCs. Furthermore, they could focus on questions; identify questions; formulate criteria for judging possible answers; and keep the situations in their minds. On the other hand, they had some difficulties to explore various opportunities to learn concepts, apply information, and represent their knowledge in a variety of ways. Therefore, they could not analyze arguments to empower their cognitive tools in communication milieus. Although OSCs supported them in the representation of their ideas, belief, opinions, attitudes and intentions, these learners could not locate diverse knowledge to answer questions without biases and stereotypes; and map their ideas and concerns to explain and share knowledge as well as look for alternatives on their own artifact knowledge constructions to represent what they learned. They synchronously communicated with other learners, professors and the course owner to build an online knowledge networks by organizing arguments, reconstructing solutions; formulating alternative models; building credible and transferable resources; and withholding the unique and critical concerns.

Like the majority of the participants (72.7%), Rose Mary pointed out that "... I am used to involving in traditional learning methods, and memorize everything...after the finals, just let yourself forget everything before you suck up ...". Therefore, in this course, developing the learners' critical thinking skills was placed at the center of communicational concentration. Also, their higher-order thinking processes that transferring from one situation to another had become one of the very important fundamentals of how to collaborate via OSCs powerfully in this class. To sum up, in this study, the majority (81.8%) of the participants tried to improve their critical thinking skills that they tended to explore diverse points of views; learn from their mistakes; become flexible; seek and provide reasons for what they are doing; remain relevant to the main point of a discussion; consider the new ideas and opposite information and knowledge; follow their own thinking; be sensitive to others' ideas and knowledge; seek appropriate solutions; and distinguish between concrete objects and abstract constructs. However, in this study, the majority of the learners (90.9) had difficulty in developing more positive intentions of their critical thinking developments. The 72.7 % of this 11 learners did not recognize when they were acting impulsively, thinking rigidly and planning the OSCs-based steps. Moreover, the majority (81.8%) indicated that they did not need high-level communication skills in their group works. In this framework, the researcher disputed the dynamic critical thinking patterns of the learners as the following:

Of eleven learners in this study,

1. all of them could think descriptively rather than normatively with respect to approach of thinking,
2. the six learners (54,5%) realized intradisciplinary thinking, the two (18.2%) focused on reflective thinking with respect to modes of thinking involved,
3. all learners would like to make the authority of the expert central, such as the course owner, and none of them did not realize their expertise areas nor take responsibility of their communication process,
4. all learners had very limited language skills; but they realized that improving their language skills was the most important issue for them to become critical thinkers.
5. the four of them (36,4%) realized the importance of the view of other learners, when discussing their basic mental skills and processes whereas the rest of them (63.6%) had no ideas about the role of values of thinking in this process,
6. none of them viewed debates and argumentations as central to rational thinking, and also no body did not play down the significance of dialectic thinking,
7. the two of them (18.2%) underemphasized the affective obstacles to rational thinking, prejudice, bias and self-deception, but the rest of them (81.8%) did not show any interests toward the view of affect,
8. all learners made central role of the course owner as autonomous critical thinker, and also they would like to accept her own biases, prejudices and point of views rather,
9. the majority of them (90.9%) needed to developed the face-to-face group communications wherein dialogical exchange was the matter of their RLO-based productions, and also none of them indicated the arts of advocating, restructuring and challenging each other's ideas,
10. none of them did not enjoy to become Socratic questioners as intelligent skeptics,
11. all of them highlighted teaching for critical thinking as an intellectual art,
12. all of them paid attention to the significance of teachers developing a philosophy of education into which autonomy and self-criticism became central values,
13. the five of them (45.5%) appreciated the significance of rational passions and universal intellectual virtues and ethics whereas the rest of them (54.5%) were cautious about national intellectual virtues and ethics,
14. the three learners (27.3%) could orient themselves toward domain-specific thinking with a specialist learning and working within a discipline, and the seven of them (63.6%) emphasized the link between teaching for critical thinking and developing moral insight with the rights of the course owners,

In this study, language was the essential medium of the learner critical thinking improvements within which their thoughts took form and gained expressions. All learners realized that they had to paid close attention to their language to express what and how they thought. Moreover, the majority of these learners (90.9%) pointed out that they had very limited word treasures, so that their communications did not guide their interpretations of others words nor generated meaningful dialogs among them. Finally, the quantitative data obtained from both the online pre-survey and the post-survey, and the traditional class pre-survey and the post-survey indicated that there was no significant difference between the learners' critical thinking skills improvements and their attitudes toward building knowledge networks.

5.1. The Overall Results

According to the data analysis, the findings of this study related to the learners' attitudes toward OSCs to build a democratic and multicultural knowledge networks are summarized the below: The learners connected their knowledge and had more in depth reflections to construct online knowledge networks via synchronous communications. Although these learners had different learning styles, they liked to collaborate with each other online. Besides, they used learner-centered and reflective-knowledge constructions. All of them pointed out that online synchronous communications could build interactive contexts for educational communications.

As highlighted by Jonassen (1999), these learners explored their own interests and needs, and became active participants, who develop their own ideas before entering the discussions. Although the majority of them believed that OSCs were a superior way to interact with each other, there were only three learners, who regularly scheduled WebCT chat rooms, in the class. The six of these eleven learners indicated that the younger learners were self-directed and enthusiastic to take responsibility for their learning. On the other hand, the two important cognitive challenges for all learners to support their knowledge constructions were identifying their own social presences and authentic communication tasks. All learners mentioned that social context and nonverbal cues associated with face-to-face conversations were missing in OSCs whereas the eight of them pointed out that "*...it was not a big deal...*". However, all of these learners realized that OSCs were relatively more epigrammatic, so that their online postings became thoughtful and creative dialogues. As noted by Burniske and Monke (2001), and Porte (2004), to take advantage of the benefits of these online collaborations, these learners improved their ability to write and read online.

Although these learners understood that their roles in these kinds of communications changed radically and dramatically, the majority of them did not like the professor's new roles as a facilitator and mentor. In contrast, all of them indicated that OSCs with more capable peers helped them intellectually growth. Also, the nine of these learners in this research mentioned that OSCs provided them with flexible learning environments, which extended educational opportunities beyond their face-to-face class meetings. However, all of these learners strongly brought up that having different Internet connections to access the WebCT site was the main problem of their online communications. Therefore, the majority of them preferred to focus on a linear and single discussion topic. Also, the four of these learners indicated that they were distracted with receiving many postings from other learners that were off the subject. They also strongly highlighted that becoming overload from the online communications was the real problem for them. Finally, the majority of these learners realized that their previous experiences and knowledge about new technologies affect their enthusiasm to communicate online synchronously. Therefore, the three of them indicated that they felt unpleasant and anxious experiences about online collaborations.

Improving learners' critical thinking was the most important educational goals in this course. However, involving these learners to become critical thinkers was often difficult. These learners made extra efforts to integrate the problem solving and decision making skills into their daily routines. On the other hand, this research provided these learners a structured way for those involved in a constructivist-based approach to look at authentic practices and learn from diverse evidence with reducing reliance on trial and error. This milieu presented one such possibility for helping them to realize the power of OSCs and the strengths and limitations of these interactions.

6. CONCLUSIONS

The main purpose of this paper is to discuss learners' attitudes toward building knowledge networks, and also improving their critical think skills through Online Synchronous Communications (OSCs). Like the use of any other communicational media, these synchronous communications as interactive collaborative activities were strongly related to the design models and strategies of constructivism (Jonassen, 1994) and media richness. Therefore, the professor and learners carefully redesigned and revolutionized their new roles in these synchronous milieus together to build online knowledge networks. All learners in this course had positive attitudes toward communicating online synchronously; because they brought different levels of thinking skills to online collaborations, which fostered more their controls and self-directed learning settings. Besides, the learners in this study learnt how to

- discover new communication technologies and their relationships to conduct synchronous online communications to societal and educational change,
- focus on working collaboratively with each other regularly to promote excellence through continuous process improvement and the creative pursuit of new ideas and systems in OSCs,
- plan, manage and lead effectively in professional development and life-long learning endeavors to construct knowledge networks, and
- work in a multicultural team to investigate the relationship between OSCs and critical thinking developments to build democratic and multicultural knowledge networks.

In short, the learners took account of OSCs, and altered their roles and learning strategies dramatically. The faculty and learners clearly determined the pace and place for not only their learning activities (Berge, 2000; Marquardt and Kearsley, 1999; Moore and Kearsley 2005; Palloff and Pratt, 1999), but also their online communications. Also, their attitudes toward building online knowledge networks synchronously were becoming important issues to improve their critical thinking skills by addressing real-life problems and experiences.

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