Taiwan Journal of TESOL
Vol. 6.2, 27-59, 2009

THE ABILITY OF COLLEGE STUDENTS TO THINK CRITICALLY AS DISPLAYED IN ONLINE DISCUSSION

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ABSTRACT

The researcher employed the framework of Garrison, Anderson, and Archer (2001) to report the ability of college students to think critically, as displayed in a blended learning strategy that combines discussion in a setting face-to-face with communication through computers, and to explore the impact of class discussion on the outcomes of perceived cognitive and social learning. Twenty-six students, with an intermediate level of English proficiency, participated in this eight-week study. Transcripts of messages among students in the discussion board were analyzed and a questionnaire was administrated at the end of the course to ask students about how they perceived the effect of online discussions on their learning and class interaction. The results show that the distribution of messages into cognitive presence categories is similar to that found previously: most messages belonged to the explorative category with a few integration messages, and few triggering events containing no solution messages. Students engaged in interaction and critical thinking, and demonstrated more profound thinking during discussion inside their class than outside. With regard to perceived learning outcomes of students resulting from blended learning, most students agreed that significant cognitive benefits can be gained from discussions via a computer. Learning outcomes of both social and cognitive nature included sharing views and understanding various perspectives. Students reported that they had more opportunities to work together in a learning community.

Key Words: critical thinking abilities, blended learning, in-class online discussion, perceived learning outcomes

INTRODUCTION

An ability to think critically is an outcome of learning highly valued in higher education. Many educators emphasize that engagement and

fostering of critical thinking skills constitutes a primary purpose of schooling (Garrison, Anderson, & Archer, 2001; Jonassen, 2000; McPeck, 1981). Especially in a world with abundant information, the challenge is to process critically the prepackaging of intellectual positions and views in modern media of communication (MacKnight, 2000). The promotion of the teaching of the skills for students to think critically is crucial for both their professional and personal lives. The talk by a teacher typically dominates a traditional classroom in Taiwan and generally yields few opportunities for students to engage in meaningful discussion that fosters critical thinking. Such teacher-centered practice tends to promote rote recall and memorization as opposed to allowing students to think in meaningful and authentic ways.

Language learning and thinking skills are closely related because foreign language learning is not only a linguistic activity but also a cognitive problem solving activity (Kabilan, 2000; Renner, 1996). Previous studies have shown that foreign language learning increases the critical thinking skills, creativity, and flexibility of learners (Gheith, 2007; Pohl, 2008). Thinking critically in language learning can only occur in learners after they have become aware of the critical elements in language learning (Thadphoothon, 2002); therefore, the teaching of strategies for language learners to be effective learners and critical thinkers should be an integral part of a second language curriculum (Liaw, 2007). Moreover, the use of communication mediated through computers (CMC), such as electronic mail and discussion boards, might afford opportunities for engagement in critical thinking because students are involved in a process of actively constructing information to become their own knowledge (Goh, Dexter, & Murphy, 2007; Murphy, 2004).

Currently, interest is increasing in CMC to enrich instructional variety and to promote collaborative learning, critical thinking, and an ability to solve problems (Curtis & Lawson, 2001; Li & Hart 1996; Lin, 2007; Meyer, 2003; Wang, 2004). A combination of face-to-face instruction and instruction mediated by computer, called blended learning (Graham, 2005), is an approach that has been increasingly adopted in higher education (An & Frick, 2006; Chen & Looi, 2007; Ng & Cheung, 2007), but questions have been raised about the effects of this approach on the quality of the interaction among students. We seek to contribute to the scant literature on the effectiveness of online discussion in assessing the critical thinking abilities of college students displayed in blended learning that incorporates online discussion in a face-to-face setting, and to explore

the impact of online discussion within a class on perceived cognitive and social learning outcomes.

LITERATUER REVIEW

Critical thinking signifies correct thinking in the pursuit of relevant and reliable knowledge about the world. Schafersman (1991) defined an ability to think critically as the ability to ask appropriate questions, to gather relevant information, to sort such information efficiently and creatively, to reason logically from this information, and to achieve reliable and trustworthy conclusions. Jonassen (2000) defined critical thinking as the "dynamic recognition of knowledge in a meaningful and usable way" (p. 7). A person with the ability to think critically is able to do the following:

1. to understand the logical connections between ideas,
2. to identify, construct and evaluate arguments,
3. to detect inconsistencies and common mistakes in reasoning,
4. to solve problems systematically, and
5. to identify the relevance and importance of ideas.

(Lipman, 1991; Schafersman, 1991)

A person with critical thinking is hence able to examine problems from varied perspectives and to seek multiple possible solutions to problems.

The ability to think critically is the most central goal of education and its most valued outcome (Garrison et al., 2001; McPeck, 1981; Norris & Ennis, 1989; Oliver, 2001). McPeck (1981) viewed critical thinking as a necessary condition for education, and Garrison et al. (2001) asserted that the creation of a critical community of inquiry is the hallmark of higher education. Oliver (2001) stressed the importance of critical thinking skills in modern society for people to make meaningful use of electronic information.

Critical thinking is a continuing process rather than a result (Brookfield, 1987; Lipman, 1991). It does not arise naturally but is a highly contrived activity for which both teachers and students need support and training (Kasper, 2000; van Gelder, 2005). In instruction based on inquiry, students are led by questions from a teacher to provide information, inferences or make a prediction about a topic. Garrison et al. (2001) emphasized that a community of inquiry is extremely valuable

because it involves reconstructing experience and knowledge through a critical analysis of subject matter by means of questioning and challenging of assumptions. A student can be trained to generate effective questions to facilitate his or her thinking ability, and each teacher has a responsibility to assess the quality of the student's ability to think critically as a learning outcome (Garrison et al., 2001).

The relation between developing an ability to think critically and learning a language is also widely recognized (Birch & Volkov, 2007; Liaw, 2007; Lin, 2004; Kabilan, 2000). Liaw (2007) indicated that the ability to think critically involves the use of information, experience and world knowledge in diverse ways so as to allow learners of a second language to seek alternatives, to make inferences, to pose questions and to solve problems. Kabilan (2000) also emphasized that the abilities used in thinking critically are necessary for language learning because learners can become proficient language users only if they display creative and critical thinking through the language. Thadphoothon's (2002) study showed that critical thinking could be enhanced in language learning through computer-mediated collaborative learning. Bean (1996) provided guidance on how to encourage inquiry, exploration and discussion in writing courses to stimulate active learning and coach writing and the ability to think critically.

Tsui (2005) examined the effect of critical thinking instruction on college students in an EFL context. 112 freshman students taking a required Freshman English course were recruited in the study. Fifty students in the experimental group received critical thinking training when learning the required English texts while the 62 students in the control group received traditional grammar and vocabulary teaching for the same texts. Results show that the experimental group outperformed the control group on both the English and the Chinese critical thinking tests after the 16-week treatment. However, in Tsai's (1997) study of the extent to which college students accepted the idea of critical thinking teaching in the English class, the results indicated that student attitude towards the critical thinking instruction was negative despite initial interest.

Many researchers indicate that various online tools can be used to foster critical thinking among students (e.g., Bullen, 1998; Burge, 1994; Lin, 2004; Murphy, 2004; Yang, Newby, & Bill, 2008). Teachers might focus on activities involving CMC to promote critical thinking for three reasons. Firstly, these activities involve students working together and

developing skills in collaboration, which gives them practice in planning and teamwork and involves them as part of a learning community in which they have a stake (Hung, 2006; MacKnight, 2000; Yu, Chen, Du, & Chan, 2003). Secondly, these activities increase the opportunities for students to engage in reflection and exploration of ideas when they are given increased responsibility for their own learning (Chen & Looi, 2007; MacKnight, 2000; Lin, Chu, Lee, & Tsai, 2003). Thirdly, students have increased opportunities for practice in discussing the subject area in these activities relative to learning activities in traditional classrooms (Chun, 1994; Kern, 1995; Yang, 2003). A student is able to articulate his or her understanding and has his or her assignments evaluated by both the teacher and his or her peers, and a student has increased opportunities to promote his or her ability to think critically during such practice.

As an extension of traditional instruction face to face and activities with communication mediated with computers, blended learning represents an attempt to amplify the strengths of each environment while concurrently minimizing their weaknesses (Bonk & Kim, 2005). For example, the lack of rich communication seems to affect the time taken to complete communications or tasks with a computer (An & Frick, 2006), but students were linguistically more creative and sophisticated during CMC (Kern, 1995). DeSanctis and Monge (1999) claimed that communication through a computer is more effective than face-to-face communication for divergent tasks such as generating ideas, whereas face-to-face communication is more effective for convergent tasks, such as making a decision, which require interdependence. Warschauer (1997) found that students (Filipino, Japanese, Chinese and Vietnamese) showed unequal participation across cultures in discussion both face-to-face and online; students from a certain country tended to dominate face-to-face discussions, but, when online discussion was provided, the difference in participation across cultures diminished.

Chen and Looi (2007) indicated that the designs of blended learning reported in the literature focus mostly on oral discussion within a class and CMC discussion outside a class, whereas little research has probed the efficacy of discussion online within a class. They argued that extending the application of online learning to a direct setting in a class would be a useful new instructional strategy. Their study (2007) showed that the integration of online discussion into the flow of the classroom provided a learner with ample time to foster habits of critical thinking, reflection and articulation of his or her viewpoints so that the subjects engaged in more

profound thinking, provided more perspectives and demonstrated a greater percentage of inference skills in messages in a class than outside. Similarly, Ng and Cheung (2007) explored the relative effectiveness of in-class online discussion and face-to-face discussion led by a tutor in the recall of concepts by two groups of pre-service teachers in different discussion modes. Results showed that there was no significant difference in the recall scores between the two groups. However, the group involved in the in-class discussions using a threaded discussion tool achieved a slightly higher mean score in the recall of multimedia design concepts. In addition, the majority of the subjects perceived that they learned more online and half of them preferred to participate in in-class online discussions.

The above literature suggests that the merits of online discussion may vary according to the contexts in which it is employed. Online discussion in class allows students greater opportunities to articulate their ideas while online discussion off class provides students with more time to make deep reflection on the issue discussed. Consequently, the comparison of online discussion used under different contexts, in class and off class, is worth exploring in order to reveal the best practice of online discussion in fostering critical thinking. Little research has been conducted to compare the critical thinking abilities displayed in online discussions inside or outside a class. The researcher sought to address the gap by assessing the ability of students to think critically as displayed in an innovative blended learning strategy that incorporates online discussion inside and outside a class and perceived cognitive and social learning outcomes through these research questions:

1. What are the similarities and differences between the critical thinking abilities displayed in online discussion inside and outside a class?
2. What are the perceived cognitive and social learning outcomes of the blended learning by the subjects?

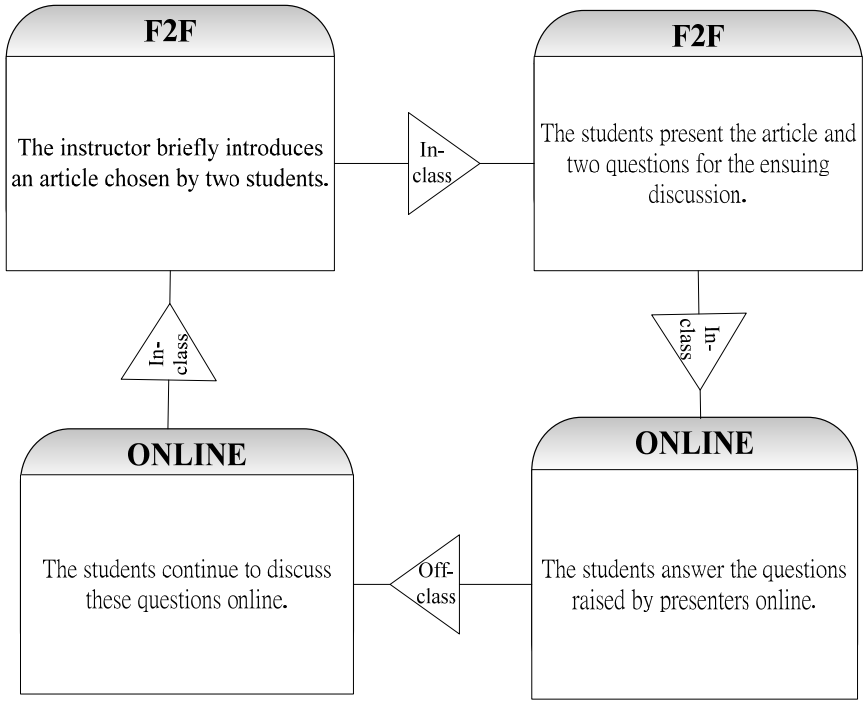
THE STUDY

Twenty-six students, with an English proficiency of intermediate level (about TOEIC 650), from the Department of Applied Foreign Languages in a national college participated in this study. All participants were sophomores and had experience of online discussion. Data was collected

during the second half of the course, a period of eight weeks. The students met for two hours each week in an English course in a computer lab. Two students formed a pair and selected one article featuring topics related to hospitality from magazines in the college library; each pair had to prepare two questions. One was for comprehension checking and the other was for further discussion. All of the 13 articles selected by the students were related to restaurants, hotels, tourism and aviation. Each student received one copy of all of the articles before the project.

Two pairs presented their articles and posed two questions in each session. All the other pairs discussed the questions face to face and then posted their answers online; every student was then encouraged to respond individually to responses of the other pairs and continued the discussion online. The purpose of the online discussions was to engage students in interactive reflection of the materials and their practical applications. In the instructional process, the instructor introduced the gist of the article and then students presented the article with software (Microsoft PowerPoint). Next, all the other students posted their answers and conducted online discussion. The instructional cycle is presented in Figure 1. During each class, the researcher allocated from 15 minutes to 30 minutes for students for discussion online. Students were encouraged to continue the discussion after classes.

Each pair began to answer questions generated by the presenters within the online discussion. The students browsed the responses of other pairs and replied to the messages that they selected, which were peer responses and not obligatory. In the final week, a survey was conducted to collect the perceived learning outcomes of students resulting from the blended learning.



Note. F2H means face-to-face.

Figure 1. The Instructional Process

Instruments

A questionnaire was employed in this project. The questionnaire (Appendix A) was designed by the researcher after considering the tips on discussion and critical thinking that were illustrated at the beginning of the course and referring to Murphy's (2004) instrument to support analyses of critical thinking in online asynchronous discussions. It asked students about how they perceived the effect of online discussions on their learning and class interaction.

Various attributes of online discussion in a class relating to the present study were grouped in the questionnaire, including eight questions with Likert-type scales, and two open-ended questions. Items 1-5 reflect cognitive issues (reflecting the construction of knowledge); Items 6-7 cognitive or social issues (reflecting the socio-constructivist approach to learning); and

Item 8 is social in nature (reflecting the development of a learning community). As for the two open-ended questions, Item 9 is related to the attitudes of the students toward online discussion in class and Item 10 is concerned with the attitudes of the students toward blended learning.

Data Collection

In this study only the responses by individual students were selected because the researcher intended to investigate the critical thinking displayed in the responses not required by the teachers (see Figure 2). All data examined were hence responses initiated by students. The detailed information about the topics and the number of posting for each topic is listed in Appendix B.

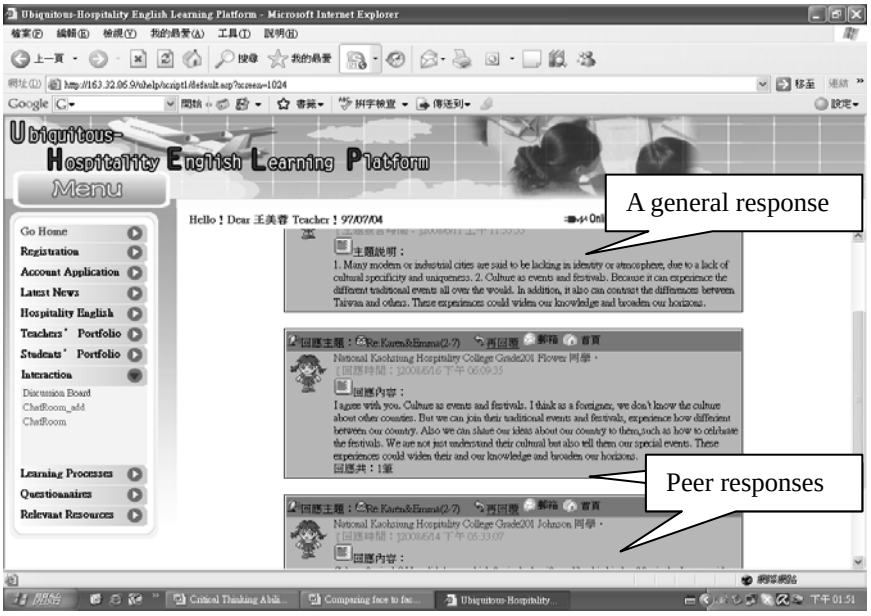


Figure 2. Samples of a General Response and Peer Responses

Thirteen topics for discussion were included and 142 English messages were posted during the research period. Among the topics, three generated more than twenty messages, five generated between ten and twenty messages, and five less than ten messages.

At the end of the study, students filled in the online questionnaire (Appendix B). The questionnaire is in English and students were required to answer it in English because the course was given in English and the instructor wanted to create a whole English learning environment.

Data Analyses

The collected data were analyzed according to two perspectives—quantitative and qualitative. The questionnaire was analyzed using SPSS 14.0. Descriptive statistics was used to present the results of the questionnaire. The reliability of the questionnaire employed in the present study was 0.91 using Cronbach's alpha coefficient of internal consistency. With regard to qualitative analyses, the primary data source was the transcripts of messages among the students on the discussion board. Content analysis was employed to analyze the transcripts of the online messages. Henri (1992) emphasized the important role that content analysis plays in an instructor's ability to guide learning when he stated that content analysis is conducted to understand the learning by the participants, and also how they treat a given topic. Content analysis is commonly used to analyze transcripts of discussion mediated with a computer in an educational setting (Chen & Looi, 2007). Borg and Gall (1989) defined this method as "a research technique for the objective, systematic and quantitative description of the manifest content of communication" (p. 357).

We adapted the framework (Table 1) of Garrison et al. (2001) to conduct the analysis of the content because of our concern with the examination of thinking at a higher level and the social aspects of asynchronous computer medicated communication. Their model treating reflection and critical thinking was most relevant to the current analysis. Their model has been extensively researched to assess skills in critical thinking in online discussions (Arnold & Ducate, 2006; McKlin, Harmon, Evans, & Jones, 2002; Meyer, 2004; Pawan et al., 2003), and its theoretical base can be helpful in grounding results in prior research findings. Several indicators and examples were established to improve the classification of student responses into four stages—triggering (posing the problem), exploration (searching for information), integration (construction of a possible solution), and solution (critical assessment of the solution). According to the authors, the participants in a community of inquiry collaborate to engage in higher-order thinking through these processes. This framework provides a concrete measure to identify the complicated

and dynamic process of the re-systemization of knowledge.

Table 1. Framework of Garrison, Anderson and Archer (2001)

Category	**Indicators**	**Sociocognitive Processes**
1. Triggering	-Recognizing the problem -Sense of puzzlement	Presenting background information that culminates in a question Asking questions Messages that take discussion in new direction
2. Exploration	-Divergence within online community -Divergence within single message -Information exchange -Suggestions for consideration -'Brainstorming' -Leaps to conclusions	Unsubstantiated contradiction of previous ideas Many ideas/themes presented in one message Personal narratives/descriptions/facts（not used as evidence） Author explicitly characterizes message as exploration－e.g., "Does that seem right?？" Adds to established points but does not defend/justify/develop systematically. Offers unsupported opinions
3. Integration	-Convergence among group members -Convergence within a single message -Creating solutions	Reference to previous message followed by substantiated agreement, e.g. "I agree because..." Building on, extending ideas of others Justified, developed, defensive, yet tentative hypotheses Integrating information from various sources：textbook, articles, personal experience Explicit characterization of message as a solution
4. Solution	-Vicarious application to real world -Testing solutions -Defending solutions	(No examples provided)

Garrison et al. (2001) used a message as a unit of analysis. They regarded a message-level unit as the most appropriate unit because a message is clearly demarcated in the transcript; multiple coders can therefore reliably identify when a coding decision is required. A complete message provides coders with sufficient information to infer underlying cognitive processes. Aligned with Garrison et al., we used a message as a unit of analysis in this project.

The researcher and her assistant (master's degree in TESOL) coded the messages. The inter-rater reliability was evaluated using Cohen's (1960) kappa (κ), which is a chance-corrected measure of inter-rater reliability. The test result showed that the inter-rater reliability between the two coders was κ=0.52. According to Altman, (1991), values between 0.41 and 0.60 may be taken to represent moderate agreement beyond chance. The value of this study can be interpreted as moderate agreement. Afterwards, discrepancies in the categorization of the items were discussed one by one by the two coders until agreement on categorization was reached.

When the raters assigned data to categories, they first read the message, identified the underlying cognitive process, and then categorized it according to the indicators and sociocognitive processes of Garrison et al. (2001) framework. In addition, Garrison et al. (2001) suggested that when there are contradictory categorization cues or evidence of multiple phases of cognitive presence, two heuristics can be utilized by coders: *code down* (i.e., to the earlier phase) and *code up* (i.e., to the later phase). Code down is used if it is not clear which phase is reflected while code up is used if there is clear evidence that multiple phases are present.

The following excerpts from the data illustrate the four-stage process. All excerpts are transcripts from the data without modification (i.e., they are from students' original writing in English). The initial phase is triggering. According to Garrison et al. (2001), an issue or problem that emerges from experience is identified or recognized in this phase. Beyond the questions prepared by the presenters, Excerpt 1 is the only instance of a triggering event.

> I agree with your answer of question 1, but I have a question. What do you think a good staff should have? And I think a good restaurant shouldn't let customer wait for long time. (Student 10, Week 1)

This message corresponds to the indicator "recognizing the problem" and was thus classified as a triggering event because the student asked a

question that turned the discussion in a new direction. This instance is the only one in the first phase and all the other messages were responses to questions prepared by the presenters.

The second phase is exploration, which occurs in a community of inquiry in iteratively moving between critical reflection and discourse (Garrison et al., 2001). This phase is divergent and characterized by brainstorming, questioning and exchanging of information. Excerpts 2 and 3 illustrate the exploratory nature of this phase.

> How about the attidutes? If the restaurant have a lot of perfect things, such as the perfect food, good locations, and the well atmposhere, but the attidute of servants are not good. Is it a good restaurant? (Student 22, Week 3)

> To make a good restaurant, good atmosphere, good staff, and good meal are all the essential factors. But how about the good service, reasonable price, and convenient location? I think they are coequal important, aren't they? (Student 2, Week 5)

These excerpts paralleled the indicator "divergence with online community", which showed evidence of the students exploring ideas amongst themselves. When discussing the quality of a good restaurant, the students held disparate opinions; some indicated the importance of the nature of the meals and some the importance of location. They therefore not only expressed their own points of view but also proposed questions.

The third phase, integration, is characterized by constructing meaning from the ideas generated in the exploratory phase and students began to assess the applicability of ideas in terms of how well they connect (Garrison et al., 2001). Take Excerpt 4 for example.

> I don't think there are many schools about tourism to be established for students learning how to serve people. In my opinion, there is a shortage of professional in tourism; however, I agree that Taiwan have the potential to develop tourism industry. (Student 13, Week 6)

The student reached the integration phase based on the exploration provided in the preceding message, which corresponded to the indicator "convergence among group members". Unlike the content of Excerpts 2 and 3 where students added further details to established points without

further developing their ideas, the students in Excerpt 4 referred to the previous message and then provided substantiated agreement and disagreement. This phase can hence involve reference to a preceding message with substantiation of agreement or disagreement, building on the ideas of others, and developing a justified but tentative hypothesis (Arnold & Ducate, 2006). Messages of this type were classified as integration.

The fourth phase is a solution of a dilemma or problem through direct or vicarious action. Progression to the fourth phase requires the students to have clear expectations and opportunities to apply newly created knowledge (Garrison et al., 2001). Excerpt 5 shows the words of a candidate which represent this final phase.

> Acorrding to your opinions about the Molecular gastronomy, you said the knowledge and skill will be a solution of our food shortage. But the Molecular gastronomy is the skill to combine two different food, and it will be spoil the oringal ingredients. So can it be a solution or not? (Student 15, Week 5)

The student in Excerpt 5 submitted her question about the applicability of the opinion but she did not "test" the proposed tentative solution. In other words, it is not clear whether the student applied newly created knowledge and then found further problems. Accordingly, "code down" was used and this example was therefore classified as being in the third phase.

Results

To answer the first research question, "What are the similarities and differences between the critical thinking abilities displayed in online discussion inside and outside a class?", the researcher examined the relationship between the cognitive skills and the critical thinking skills in this study as manifested in the postings and contexts of the postings. The frequencies of each phase of critical thinking displayed in online discussion inside and outside class are presented in Table 2. Of 142 postings, two messages in the online discussion outside class were on checking homework, which were not cognitive, and were hence discarded. The other 140 messages included 77 peer responses posted in class and 63 between classes. Regarding critical thinking displayed in online discussion in class, exploration showed the greatest frequency (50 messages) of the responses, followed by integration (26 messages).

There was only one triggering message and no solution message. As for the ability to think critically displayed in online discussion outside class, exploration again has the greatest frequency (47 messages), followed by integration (16 messages). No message was identified as triggering or solution.

Table 2. Frequencies of Critical Thinking Displayed in Online Discussion Inside and Outside a Class

Category	**No. of Messages in Class**	**No. of Messages Outside Class**
1. Trigger	1	0
2. Exploration	50	47
3. Integration	26	16
4. Solution	0	0
Total	77	63

The distribution of messages into critical thinking categories is similar to that found previously (Garrison et al., 2001; McKlin, Harmon, Evans, & Jones, 2002) in that most messages belong to the exploration category with fewer integration messages and few triggering events containing no solution messages.

A Chi-square (χ^2) test was applied to compare the phases of critical thinking between messages inside and outside class (Table 3). The result revealed that the messages posted in class have a significantly greater frequency than those posted after classes ($\chi^2 = 63$, $p < 0.01$). There was a higher percentage of exploration messages posted in online discussion outside class (75%) than in class (65%). In contrast, there was a higher percentage of integration messages posted in online discussion in class (33.5%) than outside class (25%). The results show that the ability to think critically displayed in discussion in the class differed significantly among the four categories ($\chi^2 = 46.8$, $p < 0.01$). Among these four categories of abilities, exploration has a greater percentage than integration. Similar results apply to discussion outside class ($\chi^2 = 15.25$, $p < 0.01$).

Table 3. Chi-square Test of Displays of Critical Thinking Ability

	Critical Thinking Abilities				Total	χ^2
	Triggering	**Exploration**	**Integration**	**Solution**		
In-class	1 (1.5 %)	50 (65 %)	26 (33.5 %)	0 (0%)	77 100 %	63^{**}
Off-class	0 (0 %)	47 (75 %)	16 (25 %)	0 (0 %)	63 100 %	

Note. $^{**}p < 0.01$

In the following paragraphs, we explore the perceptions by students of the activity of online discussion in class based on the results of the questionnaire. The responses for the Likert-type scales were compiled and tallied by percentages. The responses to the two open-ended questions were categorized by themes. The tabulated results appear in Table 4. For the purpose of reporting the findings, we habitually summed the responses 'strongly agreed' and 'agreed'.

As Table 4 shows, 69% of the students agreed that online discussion in class enhanced their understanding of the content of the articles. 77% of the students agreed with the statement "The in-class online discussion enhanced my understanding of hospitality culture" in response to Item 2. With regard to the enhancement of their ability to think critically, an overwhelming percentage (81%) of the students accepted that the online discussion in the class enhanced their ability to think critically. Also, 54% of the students remarked that the experience of having an online discussion in class had enhanced their English ability. Finally, 77% of the students agreed that they had a better understanding of their English ability through participating in online discussion in class.

Concerning social and cognitive outcomes, 88% of the students expressed that the online discussion in the class had enhanced their understanding of the viewpoints of others. Next, 87% of the students regarded online discussion in the class as an effective way to share views with others. Finally, regarding social learning outcomes, 81% of the students agreed that the online discussion in the class had enhanced the frequency of their interaction with one another compared with direct discussion.

Table 4. Perceptions of Cognitive and Social Outcomes

Outcomes	Item	SA	A	N	D	SD
Cognitive outcomes	1. The online discussion inside class enhanced my understanding of the content of the articles.	5 (19 %)	13 (50 %)	6 (23 %)	2 (8 %)	0 (0 %)
	2. The online discussion in class enhanced my understanding of hospitality culture.	6 (23 %)	14 (54 %)	6 (23 %)	0 (0 %)	0 (0 %)
	3. The online discussion in class enhanced my ability to think critically.	7 (31 %)	13 (50 %)	5 (19 %)	0 (0 %)	0 (0 %)
	4. The online discussion in class enhanced my English ability.	4 (15 %)	10 (39 %)	11 (42 %)	1 (4 %)	0 (0 %)
	5. The online discussion in class improved my understanding of my English ability.	6 (23 %)	14 (54 %)	6 (23 %)	0 (0 %)	0 (0 %)
Social and cognitive outcomes	6. The online discussion in class enhanced my understanding of different perspectives.	8 (31 %)	14 (57 %)	3 (11 %)	1 (4 %)	0 (0 %)
	7. The online discussion in class provided me with opportunities to share my views with others.	2 (8 %)	21 (81 %)	3 (11 %)	0 (0 %)	0 (0 %)
Social outcomes	8. The online discussion in class enhanced the frequency of the interaction among students.	4 (15 %)	17 (66 %)	4 (15 %)	1 (4 %)	0 (0 %)

Note. SA=strongly agree; A=agree; N=neutral; D=disagree; SD=strongly disagree.

To illustrate further the benefits of online discussion in general (both inside and outside class), we present some excerpts of student responses to the open-ended questions. With regard to facilitating cognitive outcomes,

the following excerpts illustrate how the students confirmed the benefits of online discussion. All the excerpts were retrieved from the original English responses by students.

> At first, I am not so sure about my understanding of the article because it is kind of hard for me. It is good that I can read others' answers and find out that we have the same understanding. Also I gained more knowledge about hospitality cultures. (Student 13)

> When discussing online, I usually think about how to make my sentences reasonable and make sense. In this way, I think I can improve my English ability and think critically. (Student 7)

Students recognized that the on-line discussion helped them to confirm their own understanding of the articles and thus improved their professional knowledge related to the hospitality industry. Moreover, by means of online discussion, they cultivated their ability to think critically by comparing their own ideas with those of others.

Online discussions yield outcomes that are both social and cognitive in nature. Positive responses of the students are sampled in the following excerpts.

> It is amazing to see that people have different opinions about the same topic. Through online discussion, I can know more about the topic and learn to think in different ways. (Student 23)

> I like to share my ideas with others. In the past, we seldom had this kind of experiences in class. I can also know what people think about my ideas from their responses. (Student 19)

These responses revealed that, when students interacted with one another, the sharing of ideas provided them with opportunities to refine and to reconstruct their thoughts. Finally, the following statements demonstrate how the students interacted with others.

> I didn't like to discuss with others in class. I felt a lot of pressure when talking to my class face to face. When discussing online, I didn't feel so stressed. (Student 11)

> In-class online discussion made the course more flexible and I have a good interaction with my classmates. Especially when we have such a tight schedule, I don't have much time to log in and discuss the questions online after classes. (Student 3)

The statements of these students showed that an online environment might liberate them from the pressure of direct communication. They considered also that the integration of online discussion into a traditional mechanism of instruction made the course flexible and interactive.

Moreover, students remarked that they learn to handle problems and compare and synthesize ideas as exemplified by the following excerpts:

> At first, we used platform to process the homework of reading articles, giving comments for classmates, and accepting criticize from classmates. From this kind of activities, I learned how to solve problems by myself and the importance of working together. On the other hand, it help me think efficiently and add my ability of handling the problems. So, I like the kind of project. (Student 16)

> I think the course helps me improve my hospitality English ability on both writing and thinking parts. I have to think in English, organize my thought, and write it smoothly and precisely. I seldom have opportunities to express my opinion in other classes, so I am not really good at expressing what I think. Practice makes perfect; by doing these discussion online, I do better and better on explain my views in English in a clean and precise way. Through the course, I learn a lot of new vocabularies related to hospitality, some special ways to speak and describe things, and several hospitality terms and customs. (Student 22)

The above excerpts to a certain extent demonstrated that students were able to assess their ability to solve problems and to think more critically. In addition, they perceived an improvement in their knowledge of English and of topics related to hospitality. However, despite all these advantages, some disadvantages were reported in the student responses.

> I need to give more opinions to our classmates but I don't have enough time in class. (Student 25)

> I think the time-controlling has to be improved. I don't have enough time to think more thoroughly about the topics. (Student 1)

Most students expressed that the time was inadequate for them to conduct online discussion in class; as a consequence, they had to learn to allocate the time for other tasks in class.

Discussions

In this study, students exhibit abilities to think critically in discussions both in and outside class. Both triggering and solutions were observed the least, a finding supported by other research (Arnold & Ducate, 2006; Garrison et al., 2001; Pawan et al., 2003). This condition might be attributed to the instructional process of this project. First, students were required to answer the questions provided by their peers in couples and then conduct individual discussions. This type of interaction is basically classified by Hare and Davis (1994) as driven by task in origin. Interaction driven by task is directed toward the completion of assigned tasks and generally takes a form of responses to discussion topics generated by an instructor and peer assessments (Cutler, 1995). Although the questions were generated by the students and it was not obligatory for students to carry out individual discussions, most students still tended to treat the discussion as an assignment and posted only independent messages without reading the further responses of other students or the responses to those responses. As a result, there were only one triggering and few solutions observed.

Second, too many questions (in total 13 for discussion) were included in this project. Students were free to participate in any discussion they liked, which resulted in too many threads for discussion and distracted students from conducting a more profound discussion. That is, for topics which received fewer messages, the students mainly focused on sharing ideas (i.e., Stage 2: Exploration), while the students demonstrated a higher level of critical thinking (i.e., Stage 3: Integration) for the topics receiving more than twenty messages. Although the relationship of the level of interaction and the level of critical thinking is not examined in this study, it could be tentatively postulated that the level of interaction might influence the development of critical thinking to some extent.

Finally, there was no teacher presence or only an implicit one during the discussions. The entire discussion was directed by the students themselves. Although Garrison et al. (2001) contended that a

well-formulated task has the potential to stimulate solutions, Arnold and Ducate (2006) argued that teacher involvement and prompting might be necessary for students to attain the solution stage with feedback and input from other students. Few students consequently reached the level of cognitive processing in solution in this project.

Although there is little difference in the quantity of critical thinking displayed in the online discussion between postings inside and outside class, the quality differs. In this project, online discussion in the class contained greater integration than outside class, conforming to the finding of Chen and Looi (2007). These authors found also that the learners were engaged in more profound thinking and provided a greater perspective in online discussion within class. Ng and Cheung (2007) similarly indicated that their subjects preferred online discussions within the class because they could concentrate and focus on the discussion topics. For our project, a similar finding arises for these two reasons. The first is that with the integration of online discussion into a traditional direct discussion, students are more engaged in class. The presence of a teacher might prompt students to engage in online discussion more extensively in the class as reported by Chen and Looi (2007); they can consequently foster a habit of critical thinking and collaborate to construct meaning. The other reason is that students expressed that they had a tight schedule so they appreciated that a defined period was allocated in class for them to discuss the topics online, as is evident in the responses by the students to the open-ended question. The 132 required credits for a college degree are compressed into three years as the students in my college have one year off campus for their internship and the subjects in this project undertook 13-15 courses (26-30 hours a week). Given that tight schedule, the chances are that students might have failed to conduct a more profound discussion even if they had joined in the discussion. The two reasons above might explain why students demonstrated a better quality of the critical thinking in online discussion with their class.

The students in this study autonomously logged onto the online discussions even though it is ungraded, in contrast with what Cross and Hitchcock (2006) reported, that Chinese students customarily follow the instruction of teachers and are unwilling to speak in a public forum because they might disturb the ‘harmony’ of sessions by challenging what is being said and so risk losing ‘face’. Moreover, the students felt more comfortable to express themselves and to present different perspectives in the online environment. This phenomenon is demonstrated in past literature

as well. For example, Millen (2008) observed her students from what Li (1999) terms Confucian Heritage Cultures (CHC)—China, Taiwan, Japan and Korea—and found that these students had difficulty functioning within the 'discourse of participation'; which is the communicative approach favored by western teachers of the English language. When the opportunity for online discussions was provided, however, the cultural influence was reduced due to the nature of the cognitively unique environment (in Arnol & Ducate's (2006) term) and the students were able to speak within it. Such learning outcomes were seldom observed in traditional classrooms face-to-face according to the researcher's teaching experience and also from the responses of students to the open-ended questions. We could tentatively conclude that engaging students in online discussion may assist them in developing higher-order thinking and allow them to learn through participation in an online community.

In brief, the online discussions in this study allowed students more opportunities to make their own discoveries and decisions about language learning. In other words, the students were empowered to ask questions in English, choose the topics in which they were interested, and then articulate their thoughts also in English. Such a practice engaged students in language use and knowledge construction. In this case, blended learning, an alternative model of instruction, has great potential to help students to become more effective learners with the ability to think critically and to regulate their own learning. Higher-order thinking can thus be facilitated by the incorporation of online discussion in a direct setting, as Chen and Looi (2007) indicated, the incorporation of online elements into learning and education has multifold benefits including an increase in student engagement, the enhancement of critical analysis and reflection, and the promotion of the social construction of knowledge.

We now turn the focus to the findings of the survey. The survey revealed that the students demonstrated positive attitudes towards the online discussion activity within the class. The incorporation of online discussion helped the students to enhance their understanding of the content of the articles and gain knowledge about hospitality culture. Furthermore, students agreed that their ability to think critically was enhanced by means of discussing the articles online. The students remarked that the online discussion in class enhanced their English ability and made them aware of the level of their English ability.

Outcomes that had both a social and cognitive nature included sharing views and understanding various perspectives. As for social learning

outcomes, students had opportunities to learn from each other through social interaction. These findings reflect the claims of social constructivism. Strongly influenced by Vygotsky (1978), social constructivism emphasizes that knowledge exists in a social context and is shared with others rather than being represented solely in the mind of an individual. Higher psychological functions originate in interaction between individuals before they are transferred within the individual (Brufee, 1986; Jacobs, Ward, & Gallo, 1997; Johnson, Johnson, & Holubec, 1993; Warschauer, 1997). When learners interact with one another, sharing ideas provides learners with opportunities to refine and to reconstruct their internal thoughts.

With regard to the attitudes of students toward aspects of blended learning in general, the results show that the students demonstrated active learning in a blended learning environment. Compared to a traditional instructional model, they took greater control of their own learning, concentrated more and learned better. In this project, students generated questions by themselves, followed by experience sharing and discussion. These students expressed that they could eliminate shyness and feel comfortable when presenting their views or opinions which were different from others in the online discussion.

The students in this project also found themselves able to identify their own strengths and weaknesses through discussions with their peers. Moore and Brooks (2000) stated that a learning community is characterized by a willingness of the members to share resources and to encourage new membership, regular communication, systematic problem solving and preparedness to share success. Students in this project learned not only by posting their own opinions in the discussion but also by reading the comments of others. The construction of knowledge by students hence began in social experience and ended with individual internalization.

CONCLUSIONS AND SUGGESTIONS

The present project integrated online discussion into a direct classroom setting and investigated the abilities of students to think critically as displayed in online discussion inside and outside class. The results show that the distribution of messages into cognitive presence categories is similar to that found previously in that most messages fell into the exploration category with fewer integration messages and only few triggering events containing no solution messages. The results

indicate that students engaged in critical thinking and demonstrated more profound thinking in online discussion inside than outside class.

With regard to the student perceptions of the learning outcomes of blended learning, most students agreed that significant cognitive benefits were acquired from online discussions. Learning outcomes that were of a both social and cognitive nature included the sharing of views and understanding of varied perspectives. Students indicated that they had greater opportunity to work together in a learning community, so that students learn simultaneously skills of both language and communication.

Of the several limitations of this project, only convenience sampling was used. This project is best described as a preliminary study as merely one class of 26 students in an English course was included in a specific context. Second, the analysis was limited to the extent that the ability of the students to think critically was manifested only in writing. As direct discussion by the students in blended learning is excluded, only a small sample (140 messages from the peer responses) was included. Third, the coding process is inevitably inductive and prone to error due to the subjective assessment of the two coders. Finally, the learning outcomes of students are measured only by student responses in the survey: no pre-test or post-test of their language learning was designed. Because of these limitations, the scope of the generalizations from the findings in this investigation is limited.

On the basis of the findings, the researcher makes some suggestions for future research. First, a learning environment that involves students in engagement, interaction, and communication is crucial for effective teaching and learning. Use of the Internet can serve to create and to support a learning environment that enhances learning, encompassing activities involving interactivity, collaboration, construction of knowledge and active learning (Jacobson & Spiro, 1995; Koschmann, Myers, Feltovich, & Barrows, 1994). Our students asked questions and conducted the ensuing discussion at their own pace. Such a process shifts the focus to education centered on the student and learning, reinforcing current pedagogical trends (MacGregor, 2002).

In the future, teachers can integrate online elements into their courses. To take advantage of online learning environments, a teacher must improve his or her understanding of the implications of varied tools so as to maximize the participation of students and to facilitate learning through thoughtful discussion. Most students in Taiwan have currently a sufficient computer literacy, which enables English teachers to focus more on

language learning when using communication mediated via computers or associated activities in their classes. Educational and professional organizations should also enhance their leadership in the effective integration of information technology as a developmental tool to confront the imperatives of an information society and economy.

Another suggestion concerns teacher presence. In a well-formulated task, such as that of the category of teaching presence of Garrison et al. (2001) includes, no overt teacher facilitation is necessary to support advanced cognitive presence, but teacher involvement and prompting might be necessary for students to attain a solution stage frequently and collaboratively with feedback and input from other students (Arnold & Decate, 2006). In this project no teacher was involved in the discussions. As expected, few solutions were achieved.

As Liaw (2007) mentioned that as the learning of higher-order thinking skills appears to be challenging for Asian learners, the teaching of higher-order thinking skills should be an integral part of a second language curriculum. Guidelines that help to facilitate profound thinking by students and to promote interaction between students in an online discussion environment should be provided in advance (Cheung & Hew, 2006). Only after careful consideration of the instructional design are promising results achievable with regard to the potential of ACMC activities to challenge students and to encourage students to work together to reach the final stage of critical thinking. The effects of teacher participation in online discussions should be investigated in future research to reveal whether teacher presence promotes solutions.

Moreover, task design is worthy of attention. In this project, too many threads of discussions were included, which resulted in students failing to attain an advanced stage of cognitive presence. Students asserted that the time was insufficient for them to conduct the online discussion within the class. In the future, the discussion topics should be appropriately chosen according to the length of the course. An alternative is to put students in a big class into groups, so that separate groups work on distinct topics. Future research might focus on the effectiveness of varied tasks in helping students to progress in their cognitive understanding of the topics.

In summary, it is possible to investigate the effects of online discussions in class in a single project given the complicated interaction of the variables contained in activities involving communication mediated via computers. Much is left unexplored about learning that results from the interaction of various kinds in blended learning. Researchers should

perhaps investigate other variables, such as group size, learner personalities, and explicit instruction in critical thinking in varied tasks to discover their effects on blended learning.

ACKNOWLEDGEMENTS

This study was supported by the National Science Council in Taiwan under Contract Number 96-2411-H-328-001. The author would like to express her gratitude to the reviewers for their valuable comments.

REFERENCES

English References

Altman, D. G. (1991). *Practical statistics for medical research.* London: Chapman and Hall.

An, Y.-J., & Frick, T. (2006). Student perceptions of asynchronous computer-mediated communication in face-to-face courses. *Journal of Computer-Mediated Communication, 11*(2), article 5. Retrieved December 10, 2007, from http://jcmc.indiana.edu/vol11/issue2/an.html

Arnold, N., & Ducate, L. (2006). Future foreign language teachers' social and cognitive collaboration in an online environment. *Language Learning & Technology*, *10*(1), 42-66.

Bean, J. (1996). *Engaging ideas: The professor's guide to integrating writing, critical thinking, and active learning in the classroom.* San Francisco: Jossey Bass.

Birch, D., & Volkov, M. (2007). Assessment of online reflections: Engaging English second language (ESL) students. *Australasian Journal of Educational Technology*, *23*, 291-306.

Bonk, C. J., & Kim, K. J. (2005). Future directions of blended learning in higher education and workplace learning settings. In C. J. Bonk & C. R. Graham (Eds.), *Handbook of blended learning: Global perspectives, local designs.* San Francisco: Pfeiffer.

Borg, W., & Gall, M. (1989). The methods and tools of observational research. In W. Borg & M. Gall (Eds.), *Educational research: An introduction* (5th ed., pp. 473-530). London: Longman.

Brookfield, S. D. (1987). *Developing critical thinkers.* San Francisco: Jossey Bass.

Brufee, K. A. (1986). Social construction, language, and the authority of knowledge: A bibliographical essay. *College English*, *48*, 773-790.

Bullen, M. (1998). Participation and critical thinking in online university education. *Journal of Distance Education, 13*(2), 1-32.

Burge, E. J. (1994). Learning in computer conference contexts: The learners' perspective. *Journal of Distance Education, 9*(1), 19-43.

Chen, W., & Looi, C.-K. (2007). Incorporating online discussion in face to face classroom learning: A new blended learning approach. *Australasian Journal of Educational Technology*, *23*, 308-327.

Cheung, W. S., & Hew, K. F. (2006). Examining students' creative and critical thinking and student to student interactions in an asynchronous online discussion environment: A Singapore case study. *Asia-Pacific Cybereducation Journal*, *2*(2). Retrieved March 12, 2007, from http://acecjournal.org/current_issue/article/2_2_examining_full.php

Chun, D. (1994). Using computer networking to facilitate the acquisition of interactive competence. *System*, *22*, 17-31.

Cohen, J. (1960). A coefficient of agreement for nominal scales. *Education and Psychological Measurement, 20*, 37-46.

Cross, J., & Hitchcock, R. (2006, July). Parallel session nine: Differences, difficulties and benefits: Chinese students' views of UK HE. In *Report on 'Responding to the needs of the Chinese learner in Higher Education: Internationalising the university at the 2nd*

Biennial International Conference. Portsmouth, Hampshire, UK: University of Portsmouth. Retrieved April 15, 2007, from http://www.lass.soton.ac.uk/education/CLearnConfRpt.doc

Curtis, D., & Lawson, M. (2001). Exploring collaborative online learning. *Journal of Asynchronous Learning Networks*, *5*(1), 21-34.

Cutler, R. H. (1995). Distributed presence and community in cyberspace. *Interpersonal Communication and Technology*, *3*(2), 12-32. Retrieved June 20, 2009, from http://www.helsinki.fi/ science/optek/1995/n2/cutler.txt

DeSanctis, G., & Monge, P. (1999). Introduction to the special issue: Communication processes for virtual organizations. *Organization Science*, *10*, 693-703.

Garrison. D. R., Anderson, T., & Archer, W. (2001). Critical thinking and computer conferencing: A model and tool to assess cognitive presence. *American Journal of Distance Education*, *15*, 7-23.

Gheith, A. G. (2007). *Developing critical thinking for children through EFL learning*. Retrieved June 20, 2009 from http://spirit-of-inquiry.concordia.ca/presentations/gheith.pdf

Goh, W., Dexter, B., & Murphy, W. (2007). *Promoting critical thinking with computer mediated communication technology*. Anaheim, CA: ACTA Press.

Graham, C. R. (2005). Blended learning systems: Definition, current trends, and future directions. In C. J. Bonk & C. R. Graham (Eds.), *Handbook of blended learning: Global perspectives, local designs* (pp. 3-21). San Francisco: Pfeiffer.

Hare, A. P., & Davies, M. F. (1994). Social interaction. In A. P. Hare, H. H. Blumberg, M. F. Davies, & M. V. Kent (Eds.), *Small group research: A handbook* (pp.169-193). Norwood, NJ: Ablex.

Henri, F. (1992). Computer conferencing and content analysis. In A. R. Kaye (Ed.), *Collaborative learning through computer conferencing: The Najaden Papers* (pp.115-136). New York: Springer.

Jacobs, G. M., Ward, C. S., & Gallo, P. B. (1997). The dynamics of digital groups: Cooperative learning in IT-based language instruction. *Teaching of English Language and Literature*, *13*(2), 5-8.

Jacobson, M. J., & Spiro, R. J. (1995). Hypertext learning environments, cognitive flexibility, and the transfer of complex knowledge: An empirical investigation. *Journal of Educational Computing Research*, *12*, 301-333.

Johnson, D. W., Johnson, R. T., & Holubec, E. J. (1993). *Circles of learning*. Edina, MI: Interaction Book Company.

Jonassen, D. H. (2000). *Computers as mindtools for schools: Engaging critical thinking*. Columbus, OH: Prentice Hall.

Kabilan, M. K. (2000). Creative and critical thinking in language classrooms. *The Internet TESL Journal*, *6*(6). Retrieved March 26, 2007 from http://iteslj.org/Techniques/Kabilan-CriticalThinking.html

Kasper, L. F. (2000). New technologies, new literacies: Focus discipline research and ESL learning communities. *Language Learning & Technology*, *4*(2), 105-128.

Kern, R. G. (1995). Restructuring classroom interaction with networked computers: Effects

on quantity and characteristics of language production. *The Modern Language Journal*, *79*, 457-476.

Koschmann, T. D., Myers, A. C., Feltovich, P. J., & Barrows, H. S. (1994). Using technology to assist in realizing effective learning and instruction: A principled approach to the use of computers in collaborative learning. *The Journal of the Learning Sciences*, *3*, 227-264.

Li, M. (1999). *Discourse and culture of learning: Communication challenges*. Retrieved March 26, 2008, from http://www.aare.edu.au/99pap/lim99015.htm

Li, R., & Hart, R. (1996). What can the Word Wide Web offer ESL teachers? *TESOL Journal*, *6*(2), 5-10.

Liaw, M. L. (2007). Content-based reading and writing for critical thinking skills in an EFL context. *English Teaching & Learning*, *31*(2), 45-87.

Lin, C. (2007). Students' perceptions of videoconferencing-assisted English learning. *English Teaching & Learning*, *31*(1), 77-116.

Lin, P. H. (2004). *A study of senior high school students' responses to the sino-American net-meeting, e-paling, and on-line forum*. Unpublished master's thesis, National Kaohsiung Normal University, Kaohsiung, Taiwan.

Lipman, M. (1991). *Thinking in education*. Cambridge, England: Cambridge University Press.

MacGregor, J. (2002). *Learning community models*. Retrieved July 8, 2003, from http://learningcommons.evergreen.edu

MacKnight, C. B. (2000). Teaching critical thinking through online discussion. *Educause Quarterly*, *4*, 38-41.

McKlin, T., Harmon, S. W., Evans, W., & Jones, M. G. (2002). *Cognitive presence in web-based learning: A content analysis of students' online discussions*. Retrieved June 20, 2008, from http://it.coe.uga.edu/itforum/paper60/paper60.htm

McPeck, J. (1981). *Critical thinking and education*. New York: St. Martin's Press.

Meyer, K. A. (2003). Face-to-face versus threaded discussions: The role of time and higher-order thinking. *Journal of Asynchronous Learning Networks*, *7*(3), 55-65.

Meyer, K. A. (2004). Evaluating online discussions: Four different frames of analysis. *Journal of Asynchronous Learning Networks*, *8*(2), 101-114. Retrieved June 17, 2004, from http://www.aln.org/publications/jaln/v8n2/pdf/v8n2_meyer.pdf

Millen, S. (2008, May). *Discourse analysis perspectives on teaching English for Hospitality*. Paper presented at the 2008 International Seminar on Applied Foreign Languages, Kaohsiung, Taiwan.

Moore, A. B., & Brooks, R. (2000). Learning communities and community development: Describing the process. *International Journal of Adult and Vocational Learning*, *1*, 1-15.

Murphy, E. (2004). An instrument to support thinking critically about critical thinking in online asynchronous discussions. *Australasian Journal of Educational Technology*, *20*, 295-315.

Ng, C. S. L., & Cheung, W. S. (2007). Comparing face to face, tutor led discussion and online discussion in the classroom. *Australasian Journal of Educational Technology*,

23, 455-469.

Norris, S., & Ennis, R. (1989). *Evaluating Critical Thinking*. Pacific Grove, CA: Midwest Publications.

Oliver, R. (2001). Exploring the development of critical thinking skills through a web-supported problem-based learning environment. In J. Stephenson (Ed.), *Teaching and learning online: Pedagogies for new technologies* (pp. 98-111). London: Kogan Page.

Pawan, F., Paulus, T. M., Yalcin, S., & Chang, C.-F. (2003). Online learning: Patterns of engagement and interaction among in-service teachers. *Language Learning & Technology*, *7*(3), 119-140.

Pohl, A. (2008). Language learning histories: An introduction to critical thinking. *EA Journal*, *24*(1), 13-23.

Renner, C. E. (1996, February-March). *Enrich learners' language production through content-based instruction.* Paper presented at a National Conference on Lingua e Nuova Didattica, Modena, Italy. (ERIC Document Reproduction Service No. ED411694)

Schafersman, S. D. (1991). *An introduction to critical thinking*. Retrieved June 12, 2008 from http://www.freeinquiry.com/critical-thinking.html

Thadphoothon, J. (2002). Enhancing critical thinking in language learning through computer-mediated collaborative learning: A preliminary investigation. *Proceedings of the International Conference on Computers in Education*. Retrieved June 20, 2009, from http://www.stc.arts.chula.ac.th/ITUA/Papers_for_ITUA_Proceedings/ Colla_for_ITU.pdf

van Gelder, T. (2005). Teaching critical thinking: Some lessons from cognitive science. *College Teaching*, *45*, 1-6.

Vygotsky, L. (1978). *Mind in society: The development of higher psychological processes.* Cambridge, MA: Harvard University Press.

Wang, M. J. (2004). A study on online peer feedback. *English Teaching & Learning*, *29*(2), 63-77.

Warschauer, M. (1997). Computer-mediated collaborative learning: Theory and practice. *The Modern Language Journal*, *81*, 470-481.

Chinese References

Lin, C., Chu, Y., Lee, C., & Tsai, H. (林建仲、朱耀明、李祈仁、蔡華齡). (2003). <培養國小學生批判思考能力之網路教學模式研究> [Developing a web-based instructional model for teaching critical thinking skills to primary school students]. 《**高雄師大學報**》[*Kaohsiung Normal University Journal*], *15*(1), 85-116.

Hung, Y-C. (洪瑀捷). (2006).《**網路輔助議題中心教學提升國中生批判思考能力之研究**》[*The study of a web-assisted issues-centered approaches to teaching in promoting the critical thinking skills of junior high school students*]. Unpublished master's thesis, National Taitung University, Taiwan.

Tsai, M. H. (蔡明秀). (1997). <在二專英語課教批判性思考技巧> [Teaching critical thinking skills in two-year-college English classes].《**大仁學報**》[*Tajen Journal*], *15*,

151-171.

Tsui, C. (崔正芳). (2005).《**大學生英語學習與批判思考能力之相關研究：問題初探**》[*The study of college students' English learning and critical thinking skills: A pioneering issue*].（行政院國家科學委員會專題研究計畫成果報告）(National Science Council Final Report, NSC93-2411-H-004-043). Taipei, Taiwan: National Chengchi University.

Yang, S. W. (楊司維). (2003).《**資訊融入以專題為基礎之教學與學習對批判思考能力與意向影響之研究—以國小六年級自然科教學為例**》[*A Study of the effect of critical thinking skills and dispositions toward critical thinking using information technology integrated project-based Instruction and learning—Taking teaching science classes to sixth-grade students as an example*]. Unpublished master's thesis, Pingtung University of Education, Taiwan.

Yang, Y. T. (楊雅婷), Newby, T., & Bill, R. (2008, March). <透過非同步線上討論區促進學習互動：提昇學生批判思考能力之實徵研究> [Facilitating interactions through structured web-based bulletin boards: A quasi-experimental study on promoting learners' critical thinking skills].《**成大研發快訊**》[*Research Express, National Cheng-Kung University*], *3*(7). Retrieved June 20, 2009, from http://research.ncku.edu.tw/re/articles/c/20080314/6.html

Yu, F., Chen, S., Du, M., & Chan, T. (于富雲、鄭守杰、杜明璋、陳德懷). (2003). <網路同儕互評與評量標準來源對批判思考能力之影響> [Effects of peer assessment and sources of assessment criteria on critical thinking within a web-based learning environment].《**南師學報**》[*Journal of National Tainan Teachers College*], *37*(2),1-21.

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APPENDIX

Appendix A. A Questionnaire on Students' Perceptions of Cognitive and Social Outcomes

Please circle the answer that best fits your opinion about statements 1-8 below and write your own opinions for 8-10 in the space provided.					
Item	**SA**	**A**	**N**	**D**	**SD**
1. The online discussion inside class enhanced my understanding of the content of the articles.	5	4	3	2	1
2. The online discussion in class enhanced my understanding of hospitality culture.	5	4	3	2	1
3. The online discussion in class enhanced my ability to think critically.	5	4	3	2	1
4. The online discussion in class enhanced my English ability.	5	4	3	2	1
5. The online discussion in class improved my understanding of my English ability.	5	4	3	2	1
6. The online discussion in class enhanced my understanding of different perspectives.	5	4	3	2	1
7. The online discussion in class provided me with opportunities to share my views with others.	5	4	3	2	1
8. The online discussion in class enhanced the frequency of the interaction among students.	5	4	3	2	1
9. Please describe how you felt about *the online discussion*:					
10. Please describe how you felt about *blended learning*:					

Note. SA=strongly agree; A=agree; N=neutral; D=disagree; SD=strongly disagree.

Appendix B. Topics for Online Discussion

Topics	Pair Reponses	Individual Responses
1. In your opinion, how to make a good restaurant?	13	22
2. In your opinion, what does Molecular gastronomy stands for and aim to?	13	16
3. What would you do to let our customers eat less in your buffet?	13	1
4. Which country do you think is good for the development of hotels? Why?	13	28
5. If you have the chance, would you like to experience extended-stay hotel?	13	13
6. In your opinion, what service should a good spa in a hotel have?	13	11
7. What are considered good service in flight?	13	2
8. If you're a passenger, which airplane do you want to take and why?	13	2
9. In your opinion, what kind of food is appropriate in flight? Use the fresh food and the fruit in season.	13	11
10. Are you looking forward to the World Games 2009 Kaohsiung? What's your opinion?	13	11
11. Which of the typical activity in cultural tourism that you prefer to go? Why?	13	21
12. Do you think that medical tourism will be popular in Taiwan?	13	1
13. If you have enough money to go outerspace, will you go? Why or why not?	13	3
Totals	169	142

Note. The questions are from students' original writing in English.