Wu, Y.-T., Chang, M., Li, B., Chan, T.-W., Kong, S. C., Lin, H.-C.-K., Chu, H.-C., Jan, M., Lee, M.-H., Dong, Y., Tse, K. H., Wong, T. L., & Li, P. (Eds.). (2016). *Conference Proceedings of the 20th Global Chinese Conference on Computers in Education 2016*. Hong Kong: The Hong Kong Institute of Education.

Learning Activities in Computer-Supported Synchronous Collaboration: Quality versus Quantity

Yun-Yin HUANG*
Network Learning Institute, National Central University, Taiwan
*yyhuang@cl.ncu.edu.tw

Abstract: *Social and affective aspects in computer-supported collaborative learning are less investigated yet a crucial element for positive online learning experience. Together with cognitive and metacognitive learning activities, affective learning activities are beneficial for promoting constructive and effective negotiation. In order to facilitate effective negotiation and support social presence of computer-supported collaboration, this study implemented synchronous online chat for an EFL wiki-based collaborative writing project. This study aims to investigate the cognitive, affective, and metacognitive learning activities in such synchronous online discussion. The students' shared goal was to produce a descriptive essay with the support of synchronous online discussion. Textual data was collected from chat log and analyzed with a focus on the type of learning activities and interaction pattern through content analysis.*

Keywords: computer-supported collaborative learning (CSCL), synchronous discussion, learning activity, blended learning, instructional design

1. Introduction

Social and affective aspects in computer-supported collaborative learning are less investigated yet a crucial element for positive online learning experience. Together with cognitive and metacognitive learning activities, affective learning activities are beneficial for promoting constructive and effective negotiation. This study implemented synchronous online chat for an EFL wiki-based collaborative writing project. This study aims to investigate the cognitive, affective, and metacognitive learning activities in such synchronous online discussion, in which students brainstormed and negotiated for collective meaning in collaborative English writing. The shared goal was to produce a descriptive essay with the support of synchronous online discussion.

1.1. Social/affective aspects of online learning and types of learning activities

Social and affective factors influencing computer-supported synchronous collaboration were less investigated (Jones & Issroff, 2005); however, the success of online collaboration for learning is greatly influenced by socio-cultural factors. Studies have found that students expressed preferences for computer-supported talk when collaborating with others (Jonassen & Kwon, 2001), including more personal reflection, critical thinking and better decisions.

Cognitive, affective, and metacognitive learning activities affect learning in different ways and play significant roles in both individual and group learning (Veldhuis-Diermanse, 2003, Pifarre, 2007). In general, cognitive activities include applying external information and experiences, linking or repeating internal information, and debating ideas; metacognitive activities include planning, monitoring, and rephrasing and expanding ideas; and affective activities include asking for general feedback, chatting, and social talk. Understanding learners' learning activities in a computer-supported collaboration could be a key to effectively support and guide their learning.

1.2. Synchronous online tools for learning

Various Web 2.0 tools have been applied to facilitate computer-supported collaborative learning, and could potentially realize the collective and socio-cultural perspective of language learning. Synchronous online tools in particular, such as chat rooms, can facilitate simultaneous communication, allowing learners to receive real-time

feedback from one another, and providing an experience more similar to face-to-face interaction. Synchronous chat has been found to foster social presence and lead to a greater sense of community, which is beneficial for a comfortable and successful learning environment (McInnerney & Roberts, 2004). It has also been shown that the powerfully social nature of wikis for collaborative writing could be enhanced by the support of synchronous text applications (Oskoz & Elola, 2014).

Some studies combining multiple web tools for online collaboration found that "different discourse features which may be exploited for different pedagogical purposes," and suggested incorporation of various technological affordance of different web tools (Miyazoe, & Anderson, 2010; Sotillo, 2000). Thus, based on the aforementioned review, this study aims to facilitate EFL collaborative writing instruction with wiki (asynchronous) and chat (synchronous) in the hope that education potentials of online collaboration can be enhance given the integration of multiple modality of technology. With examination of the quality and quantity of the online learning activities in synchronous discussion, the interaction pattern and group collaboration performance are analyzed and discussed. Pedagogical implications based on the findings are provided.

2. Method

This study investigated learning activities in computer-supported synchronous collaboration in terms of the cognitive, affective, and metacognitive aspects. The synchronous online discussion was one part of the 18-week collaborative English writing projects. Students in each group produced collective textual work on wiki pages and used synchronous chat for timely communication, including exchanging ideas, negotiating, revising drafts, and editing final work. Each group had its own independent chat room and wiki page. The goal of the project was to produce a descriptive essay of a landmark on campus (realia). Each scheduled online discussion included a specific task: (1) deciding topics, (2) outlines, and (3) revision based on feedback from peers and the instructor. The three synchronous online discussions were designed to support the group collaborative writing projects, enhancing social presence by facilitating more effective and timely interaction.

2.1. Data collection

Participants were 48 college freshmen (36 males, and 12 females), enrolled in a compulsory English course. Data were collected from their three synchronous online discussions of eight participating groups of students. Each discussion lasted roughly one hour and learners were required to generate topics, outlines and revision points in each session for group writing project. Discussion log were analyzed with particular attention on the types of learning activities (cognitive, metacognitive, or affective).

2.2. Data analysis

This study applied content analysis to examine textual data from learners' communication and interaction in synchronous online chat. Systematic data analysis used established coding scheme (Veldhuis-Diermanse, 2003). Cognitive activities included applying external information and experiences, and linking or repeating internal information,; metacognitive activities included planning, monitoring, and elaborating on ideas; and affective activities included asking for general feedback, chatting, and social talk. The coding and categorization of discussion messages were conducted by the researcher and two trained teaching assistants.

3. Results and Discussion

In the collaborative writing project, participating students expressed and exchanged ideas, negotiated and compromised, and socially chatted with each other in synchronous online discussion. In order to reach the shared goal of each discussion session (deciding topics, producing outlines, and revising drafts), they exemplified various types of learning activities and strategies to reach agreement among peers.

3.1. Quantity of computer-supported synchronous collaboration: Message counts

Some groups had more affective activities than other groups, while some groups' cognitive activities outnumbered

the rest (See Table 2 for details). In terms of topic discussions, the total number of messages ranged from 75 to 200 among the eight groups of this study; yet, the proportion of each type of learning activity varied. Group 3 had 118 affective activities in their topic discussion, but only 26 metacognitive and 56 cognitive activities. Group 3, who had the most total message counts (200), seems to have a particularly large number of social interactions with little focus on the task itself.

Table 1. Message counts in topic/outline/revision discussions.

Task/Group	1	2	3	4	5	6	7	8
	Cognitive/affective/metacognitive activity							
Topic	49/56/40	51/58/25	56/118/26	35/66/24	33/36/35	78/64/28	15/38/22	48/44/26
Total	145	134	200	125	104	170	75	118
Outline	100/247/199	124/274/131	113/77/108	49/58/54	95/107/143	67/101/62	93/130/111	36/74/57
Total	546	529	298	161	345	230	334	167
Revision	52/140/121	48/81/78	52/72/94	77/55/71	38/111/85	31/28/38	14/109/118	46/79/101
Total	313	207	218	203	234	97	241	226

3.2. Quality of computer-supported synchronous collaboration: Message types

In terms of message types, it may not be appropriate to determine any pattern, since each group seemed to present a unique case of synchronous online collaboration (Figures 1). The proportions (percentages) of the three types of learning activities varied. In the *Topic* discussion, few cognitive activities referred to information found outside of the discourse, suggesting learners at this stage did not look for materials found in other sources but simply brought up ideas and contributed knowledge of their own. The lack of external references might be a result of the nature of the task, which was to decide the topic of collaborative writing, and students were making decision based on their personal preference. *Outline* discussion was more challenging than the topic discussion; not only did the total number of messages increase dramatically, but the proportions of each type of learning activity also changed. Other than affective messages, a great number of presenting ideas with or without a reason appeared in outline discussions. This type of cognitive activity includes expressing opinions, presenting ideas, and proposing solutions for a problem.

In the *Revision* discussion, students examined their first draft of writing and proposed points to be revised. They were asked to generate a list of points to be revised, including the content arrangement, sentence structure, information to be added, grammar and phrases to be corrected. More metacognitive activities appeared in the revision discussion (706 out of 1739 messages), which might be resulted from the nature of the task. Compared to the previous two discussions, in which learners had to brainstorm new ideas and propose interesting aspects to write about the topic, the revision task was more specific in which they focused on their own writing, rather than looking for more materials and external information.

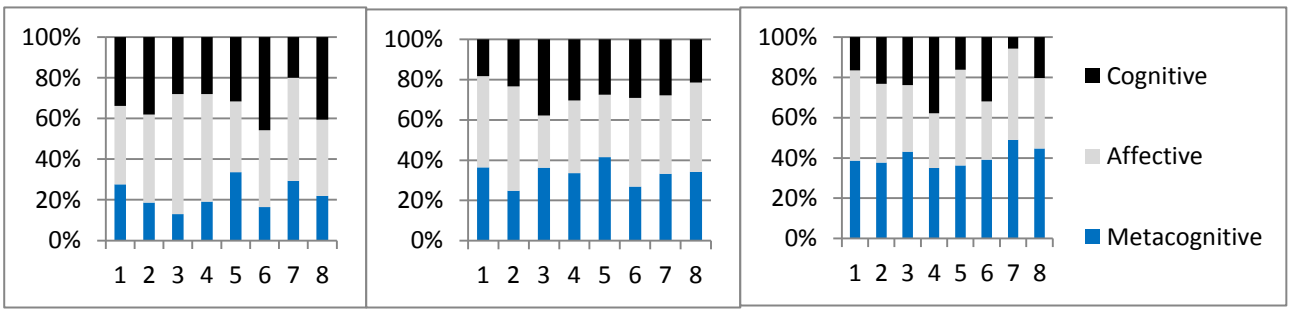

Figure 1: Proportion of learning activities of *topic/outline/revision* discussion

4. Conclusion and pedagogical implication

Taking all three online discussions together, it cannot be simply concluded which tasks would normally generate more discussion (more messages) or which group was the most productive. It is believed that both the quantity and the

quality of the discussion messages should be considered to determine the effectiveness of such collaborative instructional approach. Initially, from the textual analysis, it is found that the nature of the task would influence learning activities. For instance, the outline discussions involved more brainstorming messages (cognitive activities) and the revision discussions usually had more reflective thinking and critical judgments (metacognitive activities). Task design and teacher intervention should be considered to balance these three types of learning activities and to promote desired learning behaviors and outcomes. The findings from the content analysis indicate that synchronous chat helped to promote high group cohesion and contributed to social presence in such computer-supported collaboration; however, it also seemed to lead to "uncritical acceptance of solutions" (Mullen & Copper, 1994). Future pedagogical implications are suggested to consider both the benefit and the pitfall of using synchronous chat to facilitate online collaboration, and it is hoped that this study suggests further steps toward recognizing the role of various learning activities in successful computer-supported synchronous collaboration.

Acknowledgement

This work was supported by Ministry of Science and Technology under the grant NO. MOST-104-2511-S-008-017.

References

Jonassen, D. H., & Kwon, H. (2001). Communication patterns in computer mediated versus face-to-face group problem solving. *Educational Technology Research and development, 49*(1), 35-51.

Jones, A., & Issroff, K. (2005). Learning technologies: Affective and social issues in computer-supported collaborative learning. *Computer & Education, 44*, 395-408.

McInnerney, J. M., & Roberts, T. R. (2004). Online learning: Social interaction and the creation of a sense of community. *Educational Technology & Society, 7*(3), 73-81.

Oskoz, A., & Elola, I. (2014). Promoting FL collaborative writing through the use of Web 2.0 tools. In M. Lloret & L. Ortega (Eds.), *Technology and Tasks: Exploring Technology-mediated TBLT* (pp. 115-147). Philadelphia, PA: John Benjamins.

Pifarre, M. (2007). Scaffolding through the network: Analyzing the promotion of improved online scaffolds among university students. *Studies in Higher Education, 32*(3), 389-408.

Sotillo, S. M. (2000). Discourse functions and syntactic complexity in synchronous and asynchronous communication. *Language Learning & Technology, 4*(1), 82-119.

Veldhuis-Diermanse, A. E. (2002). *CSCLearning? Participation, learning activities and knowledge construction in computer-supported collaborative learning in higher education*. (PhD dissertation) Wageringen Univ., Veenendaal.