

CHINESE EFL TEACHERS' SOCIAL INTERACTION AND SOCIO-COGNITIVE PRESENCE IN SYNCHRONOUS COMPUTER-MEDIATED COMMUNICATION

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The present study examines the professional growth of three Chinese English teachers by analyzing their interactional patterns and their social and cognitive presence in an online community. The data from social network analysis (SNA) and content analysis revealed that computer-mediated communication (CMC) created new opportunities for teachers to interact personally, socially and professionally with other fellow teachers with whom they would otherwise not have contact in their working milieu. At the initial stage of their online communication, newcomers to the forum were more likely to rely on vertical relationships, preferring to communicate with people with more expertise or power in the community. New horizontal, peer-to-peer relationships emerged with their increasing involvement in online discussion. Moreover, codes of social presence were frequently used by the participants, especially by the peripheral members in the community. “Elucidating” was the most frequent category of cognitive presence codes used by all the participants while the codes of the other three phases varied with individual teachers. No significant change was observed in the development of cognitive presence likely due to the effect of the time variable. The study has some practical implications for the professional development of language teachers in an online community.

Key Words: Computer-Mediated Communication, Discourse Analysis, Teacher Education, Social Presence, Cognitive Presence, Community of Inquiry

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With the advance of emerging information and communication technology (ICT) and the growing interest in the use of the internet for education, computer-mediated communication (CMC) presents EFL teachers with a broad range of new opportunities for professional development. On the one hand, CMC facilitates both person-to-person and person-to-group communication by means of computer networks, such as e-mail, threaded forums, electronic bulletin boards, network videoconferencing, and more recently since mid-2000s, web 2.0 social media services like weblogs, microblogs, wikis, podcasts, and so on (Alexander, 2006). On the other hand, CMC makes professional development available to educators any time, any place, by using a range of digital resources to enhance the pedagogy of teaching and bringing together diverse voices from teachers with whom they would otherwise not have contact in their local working milieu (Dede, Ketelhut, Whitehouse, Breit, & McCloskey, 2009).

Given the geographical vastness of China and the severe shortage of competent teacher educators therein, CMC-based teacher development initiatives have gained growing prominence in China in recent years, at both national and local levels. For instance, in 2010, about 1,029,000 teachers participated in technologically supported “Distance Teacher Training Programs”, an integral component of the country's

National Teacher Training Project which has been financially supported by the state since 2010.¹ A broad range of objectives for teacher development underlie these CMC-based professional development programs in China. These include introducing the New National Curricula, building teachers' pedagogical knowledge base, altering teachers' beliefs and instructional practices, sharing experiences and resources and creating communities of teacher development, among many others. Compared with face-to-face teacher training programs, these online teacher development initiatives can create an evolutionary path towards providing real-time, ongoing, work-embedded support for teachers with busy schedules and diversified demands.

The present study aims to examine some Chinese EFL teachers' professional development in a CMC-based community by analyzing their interaction patterns and their online discourse in a regular CMC-based forum.

BACKGROUND LITERATURE

Previous Studies on CMC-based Teacher Professional Development

Computer Mediated Communication (CMC) is defined as communication that takes place between human beings via networked computers (Herring, 1996; Warschauer, 1997). Research into CMC focuses largely on the social effects of different computer-supported communication technologies. For language teachers, CMC has the potential to contribute to nurturing their professional growth in productive and practical ways. On the one hand, CMC provides a context whereby teachers can interact personally, socially, and professionally (Vrasidas & Glass, 2004). On the other hand, it creates opportunities for teachers to reflect on their teaching practice (Hawkes & Romiszowski, 2001), engage in discourse with teacher educators (Meskill, 2009), share expertise (Job-Sluder & Barab, 2004), and promote collaborations with their peers (Dooly & Sadler, 2013). More importantly, CMC can foster the formation of communities of practice that can promote teachers' professional development (Riordan & Murry, 2012; Yang, 2009).

Weblogs and online videos are two forms of CMC platforms that have been amply documented in the literature of online teacher development. The former was found to be very valuable in engaging teachers in reflective practice or pedagogical knowledge construction in teacher training or teacher preparation programs (Hou, Chang, & Sung, 2009; Yang, 2009), while the latter was recognized as playing a crucial role in influencing teachers' professional vision (Sherin & van Es, 2009), developing their analytical thinking skills (Sherin & Han, 2004), improving their teaching discourse and establishing links between teaching theories and practice (Koc, Peker, & Osmanoglu, 2009). CMC platforms have been found to be particularly beneficial to pre-service teachers in that they can provide them with such professional supports as modeling online instructional conversations and practice, developing pedagogical content knowledge, linking theory and practice, sharing and assessing their internship or practicum experiences, improving the quality of mentoring and promoting ongoing professional engagement (Chai, Koh, & Tsai, 2010; Dooly & Sadler, 2013; Meskill, 2009).

As can be seen from this brief review of the literature on research of CMC-based teacher development, most of these studies were cross-sectional and were based on the examination of pre-service teachers' online activities on asynchronous CMC platforms such as weblogs and video clubs, while the longitudinal investigations of the in-service teachers' online communication and interactions on synchronous CMC platforms was limited. This is the area to which the present study attempts to make a contribution. More specifically, the purpose of the present study is to examine the professional growth of three Chinese teachers of the English language firstly by analyzing their interaction patterns with other participants and their social and cognitive presence in a CMC-based professional community, and secondly by analyzing the content of their postings in an online forum. The key research questions this study will address are:

What is the interactional pattern of the Chinese EFL teachers in a synchronous CMC community?

What characterizes the Chinese EFL teachers' social and cognitive presence in their online

communication with other participants?

To what extent do the teachers' online interactional pattern and social and cognitive strategies change over time?

Studies on Teachers' Social Interaction in Online Communities

Participation in interactional activities has been argued to be an intrinsic part of learning wherein professional knowledge is co-constructed, negotiated and improved (Wenger, 1997). Since communities of practice are able to provide opportunities for teachers to learn from peers, both interactively and collaboratively, studies on social interaction in online communities have become an emerging perspective on teacher learning. The aim of these studies is to understand the nature of connectedness and engagement in online interactional processes—of ties, relations, roles and network formations—by asking how teachers develop and maintain a web of social relations (De Laat, 2006). In the field of teacher professional development, some studies showed that teacher networks add value to the implementation of innovations, teacher development, and improved teaching practices (Dresner & Worley, 2006; Earl & Katz, 2007). Both weak ties between new acquaintances, and strong ties in long-lasting friendships and community memberships were found to play crucial roles in gaining access to new knowledge and maintaining commitment to joint activities in the online communities (Haythornthwaite & De Laat, 2010). It was also observed that network prestige and network centrality were both robust predictors of cognitive learning outcomes in an online community (Russo & Koesten, 2005). Engaging teachers in an online community, therefore, is in essence empowering them to work constructively and creatively with professional knowledge building and experience sharing.

Studies on Social and Cognitive Presence in Online Communities

It was argued in early communication studies that participants in online communities would be less sociable because CMC was considered as a depersonalized medium because it lacks nonverbal cues, a perspective called 'cues-filtered-out' theory (Culnan & Markus, 1987). However, many later studies suggest that relationships in CMC context developed in the same way as face-to-face situations did, though interpersonal impressions were formed more slowly with CMC.

Garrison and other scholars (Garrison, 2007; Garrison, Anderson, & Archer, 2000; Garrison, Anderson, & Archer, 2001) developed an influential model of a community of inquiry that combines three elements: cognitive presence, social presence, and teaching presence. Social presence is a concept that has its base in telecommunication literature (Short, William, & Christie, 1976), and is defined as the sense of being together with other people in a networked environment. According to Garrison and his colleagues' framework of Community of Inquiry (CoI) (Garrison et al., 2000; Garrison et al., 2001; Rourke, Anderson, Garrison, & Archer, 2001), social presence can further be classified through a series of indicators that fit into the following categories: affective, interactive, and cohesive. Researchers have found that online social presence of participants is a significant predictor of their perceived learning satisfaction and learning outcomes in an online community (Asoodar, Atai, Vaezi, & Marandi, 2014; Dede et al., 2009; Gunawardena & Zittle, 1997; Tsai, 2012). Different dimensions of social presence emerge as important elements in making connections to other peers and establishing a sense of community among online learners (Arnold, Ducate, Lomicka, & Lord, 2005; Tu & McIsaac, 2002). Social presence, according to these studies, serves as the base for the successful building of communities of inquiry and the other dimensions of cognitive and teaching presence. Also noteworthy in the literature is that social presence is not a stable attribute of a community of inquiry and it is susceptible to some external factors, such as time (Swan & Shea, 2005) and participants' local cultural beliefs (Tu, 2001).

Cognitive presence is a notion based on Dewey's model of inquiry and reflective thinking (Dewey, 1963). It is conceptualized as progressive development of a community of inquiry where participants move deliberately from understanding the problem or issue through to exploration, integration and application

(Garrison, 2007; Garrison et al., 2000; Garrison et al., 2001). Accordingly, some models involving different stages of cognitive presence have been proposed in order to measure its effect in an online community, including Garrison et al.'s well-known four-stage model of triggering event, exploration, integration and resolution (Garrison et al., 2000; Garrison et al., 2001).

There have been many reports of successful implementations of CMC with different cognitive benefits. For instance, discussion boards and computer conferencing with dense information exchanges often reflect in-depth processing, critical thinking and higher-order knowledge acquisition (Bullen, 1997; Garrison et al., 2001; Newman, Webb, & Cochrane, 1995; Shea & Bidjerano, 2009). Reading others' comments, ideas and experiences also helps to broaden the participants' knowledge and deepen their understanding (Gunawardena, Lowe, & Anderson, 1997). The opportunity to build on each other's ideas and to learn from each other in a CMC community can result in the co-construction of knowledge (Hull & Saxon, 2009; Pena-Shaff & Nicholls, 2004) in the process of collaborative learning and scaffolding. In addition, becoming involved in online conversations has been found to help future language teachers to reflect, evaluate, solve pedagogical problems and progress in their cognitive understanding of the pedagogical topics (Arnold & Ducate, 2006). However, a number of studies of the cognitive presence note that participants have great difficulty moving beyond the exploration phase (Garrison, 2007; Garrison et al., 2001; Newman et al., 1995).

CONTEXT OF THE STUDY

The context of this study is China Education Resources and Services Platform (henceforth referred to as CERSP)². Starting with its launch in 2005, CERSP provides a cyberspace for Chinese teachers in primary and middle schools to participate in online training modules and to share professional experiences and resources with a network of teachers nationwide.

There are five major components in CERSP: teachers' blog, educational forum, distance training programs, resource sharing, news and views in education, and other featured sites. The present study focuses on the posts published in the English teaching forum³ which is one of the ten sub-forums in its educational forum component. This study draws on 35,829 messages for its analysis, which had been posted by over 200 contributors by the end of September, 2012.

A noticeable feature of this forum is thematic online discussion, which is a regular, synchronous discussion on a broad range of topics about English language teaching, such as teaching reading skills, textbook use, cooperative learning, and pathways to teacher development, to list just a few. The participants in the discussion voluntarily meet online, at 20:00 on the 8th day of every month, where they discuss a central topic decided through online voting. The forum administrator posts reading materials on the topic that serves as 'food for thought' prior to the discussion. A registered participant can post a new message, reply to a message, or send a message with attached files. Some top educational consultants and teacher educators in China are invited to communicate with the teachers in the monthly online discussion. The online discussions in CERSP purportedly provide a context in which participants can interact personally, socially and professionally, by raising practical problems, sharing thoughts and experiences, and seeking advice and solutions. The present study endeavors to examine the online communication of three English teachers who actively participated in the monthly online discussions between 2006 and 2011 by analyzing their social interactions with other participants and the posts they published in the forum.

METHODS

Data Sources

The primary sources of data for this study were the posts published in the thematic online discussions of the English teaching forum of CERSP. Two major sources were particularly relevant for the purposes of

this study and these were the data for social network analysis (SNA)—the data pertaining to *who speaks to whom* in the online discussion, and data for the content analysis—the data concerning *who says what* in the thematic discussion. While we have data samples for SNA analysis for the six years between 2006 and 2011, the data sampled for content analysis only covers the scope of four years between 2008 and 2011. The reason for the difference in period for social network analysis and content analysis is that these two approaches require different types of data. In SNA, we only need to measure the frequency of each participant's online interactions with their interlocutors, while the content analysis requires that the cross-case comparison of different categories of social/cognitive presence be done when all teachers are participating in the same online discussion. Because the online conversations in 2006 and 2007 did not contain simultaneous presence of all three teachers, consequently, their postings during these two years were not sampled and coded for content analysis.

Additionally, in an online interview with one of the forum administrators and another with two of the case teachers via e-mail, or QQ (a popular instant messaging service in China), the case teachers were asked about their experiences, motivations, and professional outcome of participating in the computer-mediated communication.

Participants and Case Teachers

The sampled data set contained 1,352 post entries by 123 participants in the online forum, with each contributing 10.99 post messages on average. Table 1 presents the top 10 active contributors to the forum and their social roles in the physical world. They contributed 64.50% of the total post entries sampled.

Table 1. Profiles of the Top 10 Active Participants in the Forum

Username	Social Roles in the Physical World	Number of Post Entries
linhong_bnu	Forum administrator	194
马欣_eblog	Forum administrator, University Teacher	150
Newsense	Middle School Teacher	120
陈越	Middle School Teacher	113
孟雁君	Middle School Teacher, Researcher and Consultant.	78
f20010825	Unidentified	57
陈则航	Forum administrator, University Teacher	57
Shirleyju	Unidentified	52
刘莹老师	Middle School Teacher and Consultant	51
france1981	Unidentified	43
Total		872

Note: The shadowed participants were selected as the case teachers in this study.

Three out of the 123 participants were selected as case teachers for further study, *Newsense*, 陈越 (*Chen Yue*, henceforth referred to as *Chen*), and 孟雁君 (*Meng Yanjun*, henceforth referred to as *Meng*). As shown in Table 1, these three teachers were selected because they were both middle school EFL teachers and ranked among the top 10 contributors to the online discussion. Table 2 shows the profiles of these teachers⁴.

Table 2. Profiles of the 3 Case Teachers

Teachers	Professional careers and CERSP activities
Chen	Female with 17 years of teaching experience now working as an English teacher in a junior high school in a remote rural area in Shandong Province. Registered to CERSP in April 2008, posting 734 messages, 212 logins, last login on September 24, 2012.
Newsense	Male with about 20 years of teaching experience now working as an English teacher in a senior high school English teacher in a county of Shandong Province. Granted the title of Teacher of Distinction by Shandong Province in 2006. Registered to CERSP in December 2006, posting 1,011 messages, 1,775 logins, last login on September 30, 2012.
Meng	Female now retired but still playing an active role teaching research, consultancy and teacher training. Used to work as an English teacher in a senior high school in a county of Beijing city for 20 years and as a researcher and consultant in a teaching research institute for 10 years. Granted the title of Teacher of Distinction by Beijing Municipal Government in 1991. Registered to CERSP in April, 2006, posting 459 messages, 45 logins, last login on September 8, 2012.

Data Analysis

The present study investigated the interactional patterns and socio-cognitive presence of the 3 case teachers actively participating in online discussions in a virtual community of practice. The study involved both social network analysis and content analysis of the participants' postings in the thematic discussions of CERSP. Both of these two approaches prove to be conducive in revealing the complex relationship involved in the development of higher order thinking and meaningful learning in online environments (Martinez, Dimitriadis, Rubia, Gómez, & De La Fuente, 2003; Shea et al., 2010). Social Network Analysis was adopted to explore the patterns of social interactions between participants in online discussions, and the content analysis was used to examine how the three case teachers built their professional knowledge through social and cognitive presence in the synchronous CMC context.

Social Network Analysis (SNA).

Social network analysis (SNA) is an approach to examining, quantifying and visualizing the patterns of relationships that arise among interacting social entities, typically among individuals (Scott, 1987; Wellman, 2001). It views social relationships in terms of network theory, consisting of nodes (representing individual actors within the network) and ties (which represent relationships between the individuals, such as friendship, kinship and organizational position). In general, SNA enables researchers to understand how individuals are connected within a network. This is often depicted in a social network diagram known as sociogram, and the network patterns generated by SNA may thus form the basis of many further investigations. With the increasing popularity of online communities in the recent years, SNA has been used to shed light on some important social features in CMC contexts. For example, SNA has enabled researchers to identify central and peripheral actors, to investigate the influence of group cohesion in an online community and to clarify the impact of social structures on knowledge construction in an asynchronous learning environment (Aviv, Erlich, Ravid, & Geva, 2003).

There are two broad approaches to SNA: whole-network/sociocentric network approach and personal network/egocentric network approach (Scott, 1987; Wasserman & Faust, 1994). The former approach focuses on the patterns of connections in the network as a whole by measuring the structural patterns of those interactions and how those patterns explain, for example, the concentration of power or other resources within the group. The egocentric approach, on the other hand, focuses on a focal actor or object and the relationships in its locality and seeks to anchor social networks around particular points of reference. This form of SNA is almost always about individuals rather than about groups.

The two key indicators of SNA are “density” and “centrality.” Density provides a measure of the overall ‘connections’ between the participants. The more participants connected to one another, the higher the density value of the network will be (Scott, 1987). The notion of centrality indicates the extent to which an individual interacts with other members in the network (Wasserman & Faust, 1994). Using this measure, we can identify who, for instance, is a central participant of a particular social network. This can be done for each participant by measuring the number of connections with the other members and generating “in-degree” and “out-degree values.” In-degree measures provide information about the number of people who respond to a message from a certain participant. Out-degree gives an indication of the number of messages a person has sent to other individual members of the network (Scott, 1987; Wasserman & Faust, 1994). Since the egocentric approach is more germane to the purpose of the present study, it is therefore adopted as our primary analytical SNA approach.

In this study, UCINET, a comprehensive software package developed by Analytic Technologies for SNA was used to analyze and visually represent the interactional patterns of the participants in the online forum (Borgatti, Everett, & Freeman, 2002).

Content Analysis.

Content analysis is a technique widely adopted to unlock the information captured in transcripts of online discussion groups (Garrison, Cleveland-Innes, Koole, & Kappelman, 2006; Rourke et al., 2001). The present study adopts eCAF (abbreviation for electronic conversational analysis framework) developed by J. Duncan-Howell (2009) as a new methodological tool of content analysis which has its origin in the Community of Inquiry (CoI) model proposed by Garrison and colleagues (Garrison, 2007; Garrison et al., 2000; Garrison et al., 2001). One of the strengths of eCAF is that it incorporates the unique virtual/real worlds that individuals participate in and links these two locations to the phases of cognitive presence in electronic discussions. The eCAF provides codes relevant to this context at each phase of online discussion, as shown in [Table 3](#).

Table 3. *Connecting Locations and Phases of Online Discussions (adapted from Duncan-Howell, 2009)*

Phase of discussion	Location of discussion
Generating phase	Real/authentic world entering the virtual world
Elucidating phase	Virtual world
Integrating phase	Virtual world linking with the real/authentic world
Resolution phase	Virtual world re-entering the real/authentic world

[Appendix A](#) provides the coding scheme of eCAF with more detailed descriptions of the subcategories and examples for each phase.

It is also noted that eCAF does not have a social dimension since its primary concern is to bridge the unique virtual/real worlds that individuals participate in and to link these two locations to different phases of cognitive presence in electronic discussions (Duncan-Howell, 2009). However, most of the existing frameworks investigating interactions recognize the crucial role played by social interactions between participants in a CMC context (Garrison et al., 2006; Gunawardena et al., 1997; Hara, Bonk, & Angeli, 1998; Henri, 1992), which, unfortunately, can hardly be incorporated into a phase-wise model that focuses more on the cognitive development of the participants over time. Therefore, another important adaptation to eCAF was to include a social dimension independent of the four phases. The social cues in our adapted version of eCAF include self-introduction, affective responses, expression of feeling (e.g., *"I'm feeling great... "*), greeting (e.g., *"Hi, everyone"*), closure (e.g., *"That's it for now"*), jokes, the use of emoticons such as: :) or :-), as well as compliments to others.

Coding Procedure

The messages were coded with the aid of winMAX, a software package for coding and analyzing texts in social sciences which enables the combination of qualitative and quantitative procedures. The basic unit of analysis was the unit of meaning. That is, a category was coded if a consistent “theme” or “idea” was identified in the message. One third of the coding was done collaboratively by two researchers to ensure coding consistency. They negotiated with each other where disagreements arose in the process of coding. The remaining two thirds of the messages were coded by one of the two researchers, following the coding scheme of eCAF and the adaptations the researchers had made. They coded two out of the twelve monthly thematic discussions each year during the years between 2008 and 2011. These two months were chosen based on the following principles. First, the two months should be evenly assigned to the first and second half of the year. Second, all three teachers must have participated in the discussion so that their participation could be quantified on equal conditions. The online conversations in the years of 2006 and 2007 did not contain the simultaneous presence of all three teachers and, consequently, their postings during these two years were not sampled and coded for content analysis, as has been mentioned earlier.

RESULTS AND DISCUSSIONS

Results from the Social Network Analysis (SNA)

As indicated earlier, SNA offers both visual and statistical analyses of human relationships. In the present study, SNA was adopted to analyze and visually represent the interactional patterns of the case teachers and the other participants in the online forum as a response to the first research question of the study: “What is the interactional pattern of EFL teachers in a synchronous CMC community?” We examined the participants’ involvement in the network at two different periods, that is, the early period (between 2006 and 2008) and the entire period (between 2006 and 2011).

A General Description of the Network at Different Phases of Development

Presented in [Table 4](#) are some key indices that give a general description of the CERSP network at different stages of its development.

Table 4. *Descriptive Indices of CERSP Network at Different Stages of Development*

Network Properties	Early period 2006–2008	Entire Period 2006–2011
Nodes	37	123
Ties	131	428
Density	.101	.029
Components	14	63
Connectedness	.613	.342
Fragmentation	.387	.658
Average Distance	2.165	2.280
Diameter	5	4
Breadth	.676	.835
Compactness	.324	.165

It can be seen from the table that more participants were involved in the monthly thematic discussion of CERSP as the network evolved, and the number of the nodes and ties increased over three times after the

Table 5. Centrality Measures of the Case Teachers

Teachers	Early Period			Entire Period		
	Degree	Outdegree	Indegree	Degree	Outdegree	Indegree
Meng	11.111	1.157	1.389	13.934	1.639	1.198
Newsense	50	7.870	8.102	26.230	2.480	2.501
Chen	8.333	1.157	.926	20.492	2.354	2.900
Mean	13.664	1.539	1.539	3.852	.227	.227
SD	13.877	1.906	2.737	7.211	.581	.800

According to the results in Table 5, except for *Newsense*, who was actively involved in the thematic discussion of CERSP from the outset of the monthly online discussion, the centrality measures of the other two case teachers, *Meng* and *Chen*, were lower than average in the earlier period of the computer-mediated communication. However, all of them eventually became central figures of the network, owing to their increasing involvement in the online discussion. They not only posted more messages than most of the other network participants, but their messages were more frequently responded to by others as well, as were indicated by indegree and outdegree measures.

A comparison of the egocentric networks of the three individual teachers in the early stage and the entire period of the online communication further reveals the interactional patterns of these teachers. These networks are respectively depicted in Figure 3 to Figure 8.

It can be seen from these egocentric networks that the case teachers, *Meng* and *Chen* in particular, were peripheral participants with a limited number of interlocutors in the community at the initial stage of their online communication. Closer examination of these interlocutors indicated that most of them were university professors or the forum administrators with greater academic reputation or social prestige in the ELT field in China. For instance, *Chen* had 15 interlocutors in the early stage of her online discussion, 8 of them were the invited consultants or the forum administrators. The information flow at this initial stage was primarily vertical, flowing between participants with more power and those with less power since the teachers preferred to ask questions or share ideas with the central and influential figures at the initial stage of their online communication in the community. It seems the users wished to benefit more from communicating with the “consultants” in the community before they themselves were ready to offer or share ideas with other peer teachers. At this initial stage of online communication, the three teachers under examination were inclined to seek immediate solutions to their problems in language teaching from more capable members in the community, rather than contribute to or construct knowledge with their peers (Haythornthwaite & De Laat, 2010; Russo & Koesten, 2005; Zhu, 1996).

As they became increasingly involved in the online communication in the later stage, these two teachers themselves became key players in the community and had a broader circle of interlocutors in the online thematic discussion. Their information flow at this stage was both vertical and horizontal. On the one hand, these teachers asked questions and sought suggestions from teachers with greater expertise in the community, and on the other hand, they also tended to share experiences and offered suggestions to other peer teachers, rather than resorting to more authoritative participants. A similar shift of interactional patterns at different stages of online networks was also observed by other researchers (e.g., De Laat, 2006; De Laat, Lally, Lipponen, & Simons, 2007).

Using SNA alone, however, does not provide a full picture of these teachers' participants in the online forum. It is also useful to combine these findings with the outcomes of content analysis to interpret to what extent the increasing social presence of these three teachers in the network, as determined by SNA, contributes to their cognitive presence and professional development.

Results from Content Analysis

In this section, the results of the content analysis are presented in two major parts. The first part is mainly concerned with the examination of the social presence codes, whereas the second part gives a more detailed analysis and discussion of the phase-related codes of cognitive presence, as a response to the second research question of this study.

Table 6 tabulates the distribution of these codes across the categories of social and cognitive presence. A total of 836 codes were obtained from eight sampled thematic discussions that the three teachers were involved in between 2008 and 2011.

Table 6. Distribution of the Codes Across Categories

Teachers (Number of Codes)	Year	Freq. of Social Codes	Cognitive Codes								Sum Freq.
			Phase I Generating		Phase II Elucidating		Phase III Integrating		Phase IV Resolution		
			Freq.	%	Freq.	%	Freq.	%	Freq.	%	
Newsense (410 codes)	2008	36	32	38.1	27	32.1	22	26.2	3	3.6	84
	2009	33	16	32.0	28	56.0	4	8.0	2	4.0	50
	2010	14	10	18.9	33	62.3	2	3.8	8	15.1	53
	2011	50	25	27.8	53	58.9	5	5.6	7	7.8	90
Chen (274 codes)	2008	19	16	28.6	28	50.0	6	10.7	6	10.7	56
	2009	32	7	12.1	34	58.6	11	19.0	6	10.3	58
	2010	18	10	22.2	21	46.7	5	11.1	9	20.0	45
	2011	20	10	30.0	13	39.4	2	6.1	8	24.2	26
Meng (152 codes)	2008	1	2	9.1	9	40.9	4	18.2	7	31.8	22
	2009	10	1	2.7	25	67.6	5	13.5	6	16.2	37
	2010	3	3	13.6	8	36.4	5	22.7	6	27.3	22
	2011	13	5	11.4	25	56.8	5	11.4	9	20.5	44
Total		249	17	23.0	304	51.8	76	13.0	78	13.3	587

Results of the Social Presence Codes

There were 249 messages coded as social cues, accounting for 29.78% of the total codes. This fairly high

percentage of the social codes agrees with the findings of some previous studies. Hara et al. (1998), for instance, found that 27% of the total message content in their online course consisted of such social expressions as self-introductions, jokes, compliments, greetings, and closures. It was also observed in our study that *Newsense* and *Chen* used social presence codes more frequently than *Meng* (32.44% for *Newsense*, 32.5% for *Chen*, and 17.76% for *Meng*). The reason *Meng* used fewer social presence codes than the other two teachers might lie in the fact that *Meng* worked and lived in Beijing and was physically close to the kernel members of the community, most of whom were forum administrators or university teachers in Beijing. The intimate *guanxi*⁵ of *Meng* with other active members in the physical world may mean she refrained herself from extending their special and private personal relationship to a public online forum. Other researchers have also observed that social presence tends to decrease with the establishment of a sense of community between participants (e.g., Swan & Shea, 2005). The other two teachers in our study, on the contrary, employed a great variety of social codes in order to build interpersonal relationships with other active participants in the virtual community. However, no visible or linear patterns of developmental changes in social presence codes were detected from the coded messages between 2008 and 2010.

It is true that socio-affective strategies have little direct relevance to the cognitive process of knowledge construction and meaning negotiation in the CMC context, as was maintained by early communication theory (Culnan & Markus, 1987). However, just as Lave and Wenger (1991) argued, the learning process should not be viewed as simply the transmission of abstract and decontextualised knowledge from one individual to another, and learning is also a social process whereby knowledge is co-constructed. According to Vygotsky's socio-cultural approach to mind, higher mental functions in an individual have their origins in social life and human learning is a socially mediated process constructed through dialogic interaction (Vygotsky, 1978). In this social learning process, social presence can play the vital role of interpersonal lubricator that helps the participants feel more comfortable working together. It serves as a mediating variable between cognitive presence and teaching presence (Garrison, Cleveland-Innes, & Fung, 2010), or as a positive predictor of learning satisfaction within CMC environments (Gunawardena & Zittle, 1997; Tsai, 2012). It can also give each member a sense of belonging or group commitment, and it enables them to become "insiders" in the community (Wegerif, 1998). It is likely for this reason that the social presence codes were used fairly frequently by all three teachers in the study, in particular by the two teachers who were physically further away from the center of the administration and CERSP's consultancy cohort. This interpretation is supported by *Chen's* reflection in the subsequent interview excerpt:

When I first joined the forum, I felt like an outsider while 'they' were talking cheerfully and intimately because they knew each other so well. Guided and encouraged by Mr. Lin, the forum administrator, I began to muster up my courage and said hello to them, and gradually they accepted me.

Results of the Cognitive Presence Codes

The results concerning the codes of cognitive presence will be presented, interpreted and discussed in the following three sections, that is, (a) the general trend of the distribution of cognitive codes; (b) the interpersonal comparison of the cognitive presence codes; and (c) the development of cognitive presence codes over time.

The General Trend of the Distribution of Cognitive Codes

According to Table 6, there were 587 cognitive presence codes, accounting for 70.22% of the total codes. One immediate observation was that most of these codes clustered in Phase II of the eCAF framework, i.e., the elucidating phase, which accounted for 51.79% of the total number of cognitive codes. This observation is congruent with a number of similar studies in which the exploration codes (equivalence to

elucidation in eCAF) were found to be much more frequent than the codes of other categories, ranging from 41% to 53% (e.g., Garrison et al., 2000; Garrison et al., 2001; Rourke & Kanuka, 2009; Vaughan & Garrison, 2006). This result is not surprising because, among the four phases in the eCAF framework, the elucidating phase is the only one taking place totally in the virtual world, with little direct relevance to the real/authentic world. That is to say, the online community of the CERSP forum is in the first place used as a virtual platform for brainstorming ideas, co-constructing knowledge, negotiating meaning, thinking critically and sharing experiences, etc. . Another reason might lie in the open and democratic nature of the online community where people feel free to share their insights and contribute relevant information.

The findings in the early studies have consistently revealed that the development of cognitive presence in the online community has great difficulty moving beyond the elucidating phase (known as exploration stage in CoI model, see Garrison, 2007; Garrison et al., 2001; Newman et al., 1995; Rourke & Kanuka, 2009; Vaughan & Garrison, 2006), and the distribution of cognitive presence in this study also supports this observation, with the codes of Phase III (integration) and Phase IV (resolution) accounting for only 12.95% and 13.29% of all the cognitive presence codes respectively. Among many alternative explanations of this phenomenon, researchers convincingly argue that integration and resolution is more cognitively demanding than elucidating/exploration and generating/triggering, and as a result, increased time for offline reflection is also required (Meyer, 2003), which is particularly the case in a synchronous CMS context like that of the present study.

The Interpersonal Comparison of the Cognitive Presence Codes

To further reveal the interpersonal comparison of the codes of cognitive presence categories in a more straightforward way, we present the percentage of cognitive presence codes of the three teachers in [Figure 9](#).

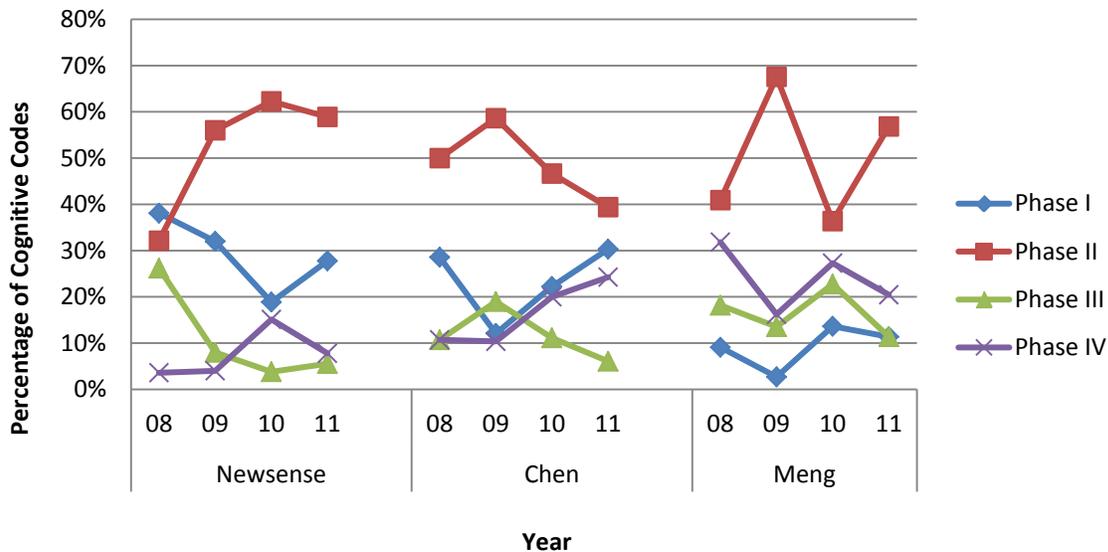


Figure 9. Interpersonal comparison of the cognitive codes for each phase.

According to [Figure 9](#), the Phase II codes (elucidating) constituted more than 40% of the phase-related codes for all the individual teachers under investigation, which has been shown and discussed in the preceding section. While the results of the other categories presented a mixed picture, some interesting patterns emerged. First, *Newsense* and *Chen*, two teachers working in remote areas in Shandong province, had more messages coded as Phase I (generating) than *Meng*, accounting respectively for about a quarter of their codes in the cognitive presence category (29.19% for *Newsense* and 23.29% for *Chen*). This is an

indication of their attempt to bring to the virtual community the real-world problems they have encountered in their authentic language teaching context. They wish to seek solutions by communicating with the consultants otherwise inaccessible in their own working milieu.

Second, *Meng*, a veteran teacher with more than forty years of English language teaching and researching experiences, took the initiative to offer more solutions to the problems raised during the online conversations with her Phase IV (resolution) codes amounting to 23.94% of her stage-related codes. The other two teachers, *Newsense* and *Chen* refrained from giving immediate resolution responses, with resolution codes accounting for 7.61% of interactions for *Newsense* and 16.33% for *Chen*. This is partly because suggesting solutions to problems requires more reflection and the latter two users were not ready to provide practical resolutions to real-time problems during the two-hour synchronous online discussions. As *Chen* reflected in her online interview,

When involved in the forum discussions, I've improved myself in the dynamic and spiral cycle of "problems, solutions, higher-level problems, higher-level solutions." Some of our puzzles can be resolved in the online discussion whereas no immediate answer can be found to some others. But participating in the online discussion has inspired me to get them solved by myself offline, so I will try to find some time to seek answers to the problems unsolved online by reading more books or seeking resources during the offline time. In this way I find solutions to the problems in my own teaching practice, and I can improve myself as well.

The Development of Cognitive Presence Over Time

Figure 9 does not seem to reveal a clear and consistent pattern in the development of cognitive presence codes for three individual teachers for the length of time between 2008 and 2010. No linear, gradual or incremental changes were observed in the individual teachers' codes of cognitive presence across the phases, as is often anticipated from a longitudinal study. There might be several reasons for the absence of such a developmental pattern. First, the data obtained from this study was not sufficient to draw a generalization about the changes in the teachers' cognitive presence in the electronic discussion. The present study sampled and analyzed only eight online discussions which met the study's data-collection requirement, accounting for one sixth of the total number thematic discussions.

Second, the occurrence of the cognitive presence codes is highly contextualized and susceptible to the influence of many external and extraneous variables that may confound the possible effect of time in our study, such as the three teachers' workload at school, family duties, availability of computers and internet access, institutional expectations, teachers' prior experiences and knowledge, participants' motivation and willpower, and sometimes, even other people's skeptical attitudes towards their "inconceivable but unfading enthusiasm in online discussions about English language teaching with a lot of unknown people in the evening time", to quote one of the case teachers' words in the subsequent online interview. The existence of so many unpredictable, dissonant and uncontrollable variables would lead researchers to interpret any quantifiable patterns with caution, even when they ever occurred in a longitudinal observation of an individual's online communications.

Third, and most importantly, the development of a teacher's cognitive processes, including the attributes of their online cognitive presence is a slow, complex, indeterminate and non-linear process. The dynamic and complex nature of the development of teachers' cognitive processes has not been noticed until the past decade (Feryok, 2010; Tudor, 2003). As Swan and Shea (2005) rightly recognized, "Online discussion does not evolve linearly through time, ... but rather seems to grow like crystals from multiple conceptual seeds in many dimensions at once."

Profiles of the Teachers' Social Presence and Cognitive Presence

Figure 10 summarizes the percentages of the teachers' social and cognitive codes with the variable of

time removed for the reasons stated above.

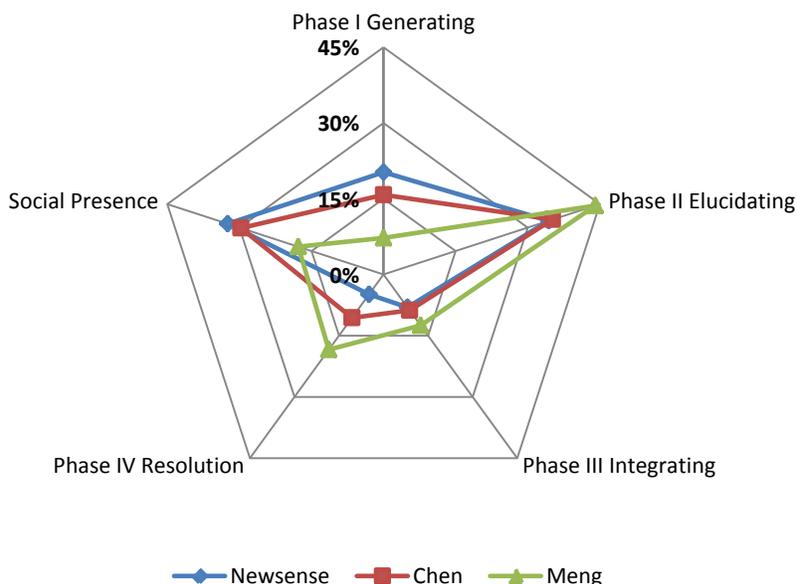


Figure 10. The individual teachers profiles of the social and cognitive presence.

Figure 10 indicates that the distribution of the eCAF codes varies across individual teachers. While all three teachers had a considerably high percentage of Phase II (elucidating) codes, *Meng* exhibited different patterns from the other two teachers concerning the other four categories of codes. First, she had fewer codes of social presence than *Newsense* and *Chen*, owing to her close and special personal relationship with the most active figures in the forum, as has been described earlier.

Second, as a veteran teacher with over 30 years of teaching and consulting experience, her Phase I codes were also fewer than the other two teachers, which suggested that she brought fewer problems into the online community than the other two younger teachers with less teaching experience. Nonetheless, her codes on the other two higher-order categories of cognitive presence, that is, Phase III (integrating) and Phase IV (resolution), were markedly higher in percentage than those of the other two teachers, accounting for 40.39% of her cognitive presence codes and 36.18% of all her coded messages. This is noteworthy since it differs from other research findings claiming that participants have great difficulty moving beyond the second phase of elucidating/exploration (Garrison, 2007; Garrison et al., 2001; Meyer, 2003; Newman et al., 1995).

The existing literature has offered several explanations for the lack of higher order thinking or deep learning in the online community of inquiry, such as participants' metacognitive awareness, the lack of a well-pronounced goal, the desired function of the online network. The validity of the CoI model itself is even called into question (see Garrison, 2007 for a review). The unique case of *Meng* in the study provides an alternative perspective to look at the issue.

The data from this study's social network analysis and content analysis does not contain straightforward evidence about *Meng*'s frequent use of higher-level cognitive presence codes in the online communication. However, an analysis of her responses in the online interview and some of her own posts in the online forum may shed light on the subject. First, *Meng* was very "medium-sensitive". That is, she had a clear understanding of different functions between online and offline teacher learning, as she reported in the following excerpt of the online interview,

Many-to-many networked communication (in online discussion) is a powerful and delightful tool to communicate about a great variety of dynamic, personalized, and practical problems encountered by teachers, many of which cannot be solved by one-to-many offline teacher training programs, the latter of which can only handle the common and static problem in teaching. The real-time problems being negotiated in the colliding communication online may disappear in a flash, but getting to grips with these problems can help us to solve our puzzles or eliminate difficulties in teaching. Communicating, sharing, and counseling online will help teachers to convert 'what-knowledge' to 'how-knowledge'.

In Meng's opinion, there is a clear distinction between offline and online professional discussions. The former scenario is characterized with "one-to-many communication" where an invited consultant lectures to a hall of audience on "static teaching knowledge", while the communication in the latter case is more problem-oriented, where the participants can share ideas about, and seek solutions to problems they have encountered in real-time teaching situations. The recognition of this difference explains Meng's increasing use of solution codes in the CMC community.

Another feature of her online communication was that her discourse was "product-oriented". She focused more on getting her prior knowledge and experiences articulated, explicated, shared, and published, which, according to Meng, should be translated into practical strategies or teaching actions. Meng made this explicit in her posts on the theme of "More on teacher development and growth" in the forum discussion of on July 8, 2009:

I personally think a good teacher should do three things, and all of them are indispensable for teacher development: (1) one must orientate oneself in the direction of future development; (2) one must reflect very frequently on his/her teaching and derive his/her own micro-theories from the reflection; and (3) a teacher need also convert his/her reflections into tangible outcomes. That is, she/he needs to publish his/her ideas in papers or books. Unfortunately, many teachers fail to take this last step.

It is this awareness of the benefits of 'the tangible product' in the professional development that drives her to integrate theories with teaching practice and seek solutions to problems in teaching, hence accounting for a marked increase in higher-level thinking codes in her online discourse. However, it remains open to further investigation whether she has developed this awareness through communicating online, or through prior knowledge and experiences developed in her professional career.

CONCLUSION

CMC creates new opportunities for teachers to interact personally, socially and professionally with other fellow teachers otherwise inaccessible in their own working milieu. Our longitudinal case study investigates the social interaction between participants and the development of their socio-cognitive presence in an online community. This study yields the following findings:

First, at the initial stage of online communication, the newcomers were more likely to develop vertical relations, preferring to interact with people with more expertise or power in the virtual community. New horizontal, peer-to-peer relationships were established with their increasing involvement in the online community of inquiry.

Second, strategies of social presence were used by the participants fairly frequently, especially by the peripheral members who had a strong desire to communicate with the key figures of the community. Like the findings of earlier studies, elucidating turned out to be the category of cognitive presence codes most frequently used by all the participants while the codes of the other three phases vary with individual teachers. Also like earlier findings, two out of the three case teachers ceased to move beyond the

exploration/elucidating phase in the development of their cognitive presence. However, one case teacher with self-reported medium-sensitivity and product-orientation in online communication was involved in higher-order cognitive processes fairly often.

Third, time proved to be a significant variable giving rise to the changes in the interactional patterns among individual teachers in this study. However, it did not contribute to marked and incremental development of socio-cognitive presence within the time scope of this study.

Fourth, this study contains a case with a low level of social presence but a high level of cognitive presence. This finding, nonetheless, needs to be accepted with caution, owing to the unique interpersonal relationship between the case teacher and other active members in the online community. The result, however, was congruent with the claims of some previous studies wherein socio-emotional communication is not positively correlated with CMC effectiveness (Walther, 1996).

Finally, early studies suggest that some forms of asynchronous CMC, such as video club or weblogs were very valuable in engaging teachers in reflective practice or pedagogical knowledge construction in teacher training or teacher preparation programs. Our study has proved that synchronous online discussions also increases the social interaction between teachers with shared vision of professional development, and their social presence in the online communication also gives rise to the increase of their cognitive presence, which in turn has significant implications on their professional careers. Computer-mediated communication, such as the thematic discussions on CERSP, turns out to be professionally rewarding for secondary school teachers in China, in particular for those teachers in the less developed areas of the country where local professional support is not readily accessible.

The present study also suggests that heterogeneity of community members is crucial for the sustainable and healthy growth of an online professional development community in which participants can establish both vertical and horizontal relationships by sharing ideas, feelings and experiences with people with diverse voices but shared vision of professional pursuits. It would be inconceivable that the thematic discussion in the online community of CERSP would have evolved for seven successive years without the voluntary and active involvement of a cohort of participants with different roles to play in the physical world, that is, secondary school English teachers, university teachers, educational consultants, forum administrators, language teaching researchers, etc.

This study is subject to a few limitations. First, the data obtained for this study are not sufficient for the researchers to draw solid generalizations, for instance, the effect of time upon the development of a socio-cognitive presence in an online community. Besides, the length of time for SNA and content analysis was not consistent, owing to the different requirement of data collection for these two approaches. Second, the absence of a sound categorization of the social presence codes precludes the possibility of further exploring the relationship between different subcategories of social presence and cognitive presence. Third, the lack of testing for inter-rater reliability is also likely to have an impact on the rigor of message coding.

In this case study we have identified some key factors crucial for the online professional development of teachers in China. The authors feel that future research on a larger scale will broaden our vision of teacher development in an online community. Besides, focusing on the development of a threaded topic, rather than on individual participants will also reveal the relationship between teacher learning and socialization in the professional development community.

Appendix A. *Coding Scheme of eCAF (adapted from Duncan-Howell, 2009)*

Phase	Subcategory	Examples from CERSP
Phase 1 Generating	G1: Question/problem presented	I have a question here: why can holidays be included in the list of the seven wonders of the modern world?
	G2: An issue is proposed	What I want to ask is whether we should put emphasis on the content, or new ideas in the content?
	G3: New question-extending discussion on the same subject/topic	but what we need to explore might be "why to teach with textbooks" and especially "how to teach with textbooks". And if not the textbooks only, what else will we have to teach.
	G4: New question-moving discussion in new direction	Even if the textbook IS the bible, we also need to challenge this bible... and can any teachers provide some teaching cases for us to discuss ?
Phase 2 Elucidating	E1: Asking for clarification or further explanation of question/problem	In addition, encouraging students' divergent thinking is a manifestation of teaching principle of "student centeredness".
	E2: Brainstorming ideas	To import new knowledge, some kinds of exercises can be presented. Teachers can get Ss to do exercises in activity, or drill of word conversion in advance, or use given words to write a dialogue.
	E3: Suggesting solution	When teachers are designing lesson, they should organise and arrange teaching procedure according to the teaching activities based on task.
	E4: Offering personal opinion	I think that the key to developing critical thinking in the teaching is to give students something available to think about.
	E5: Sharing experiences	When teaching every grammar item, I would tell students the usage of it, then design some of the scenarios to allow students to use it
	E6: Misunderstanding/ disagreement	Ms. Chen, should we learn how to teach the English language from Chinese teacher? I didn't mean that.
	E7: Mediating contribution	I think, however, we need to...from a different perspective ...
	E8: Using metaphor	However, we should treat textbooks as the vegetables that we bought at the local market, we need to select, match, process and cook them.
Phase 3 Integrating	I1: Building on ideas	I agree with Ms. Meng...we also need to summarize, analysis, practice
	I2: Applying discussion	Teachers is supposed to organizers, participants and evaluators in teaching activities. I must try it in my teaching practice.
Phase 4 Resolution	R1: Solution to question	Students can combine what they learned from articles and daily life to solve some specific problems

		independently through cooperation and exploration.
R2:	Issue-consensus reached	Right, we teachers need to challenge the textbooks, and meanwhile encourage our students to question what is printed in the textbooks.
R3:	Issue-divergence	Yes, teaching aims of a lesson contains targets of knowledge and ability emotion and attitude ... we cannot achieve so many goals in every single lesson.

NOTES

1. This figure was obtained from the official site of the Ministry of Education of China: <http://www.moe.edu.cn/publicfiles/business/htmlfiles/moe/s4645/201105/120285.html>.
2. The internet portal to CERSP is <http://www.cersp.com>.
3. This forum can be visited via this link: <http://bbs.cersp.com/index.asp?boardid=16>
4. The profiles of these teachers were based on the personal accounts these teachers posted to CERSP, and the statistical data on their CERSP activities were updated until October 3, 2012.
5. *Guanxi* is the Chinese word describing the basic dynamic in personalized networks of influence, and it is a key idea in understanding the interpersonal relationship of Chinese society (Gold, Guthrie, & Wank, 2002).

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