

Pedagogical Methods through the Lens of Communication:  
Examining the Relationship between Critical Thinking and Asynchronous  
Discussion in Chinese Cultural Context

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**Abstract**

Critical thinking skill is an essential component of higher education. It can be developed through reading, observing, questioning, and analyzing. Yet, due to limited access to instructor resources and class time, improving critical thinking skills can be difficult. To address it, many scholars have looked into technologically-mediated education—more specifically—asynchronous discussion. The study explores the relationship between CT skills and asynchronous discussion within the educational context of contemporary China through experiments and content analysis. Drawing support from communication and educational theories, the study finds that asynchronous discussion is positively correlated with critical thinking. However, within the setting of asynchronous discussion, interaction and reasoning is limited. The study bears implications for interdisciplinary research on education and communication while shedding light to a contextualized understanding of mediation and discussion.

*Keywords:* asynchronous discussion, China, critical thinking

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**Introduction**

Western higher education often includes critical thinking into core learning objectives as it often indicates the maturity of one's thought (McGraw-Hill Education, 2016; Wals & Jickling, 2002; Pithers & Jickling, 2000; Garrison & Anderson, 2004). In the Delphi report (1990), an outcome of a worldwide two-year project on the definition of critical thinking (CT hereafter), the definition of CT has three dimensions including skills, dispositional, and normative. In the skill dimension, core elements of critical thinking include interpretation, analysis, evaluation, inference, explanation, and self-regulation (Facione, 1998). Dispositional dimension concentrates on intellectual virtues and conducts while the normative dimension concerns with proper use of CT manifested through "political freedom and intellectual fair-mindedness" (Facione, 1998, p.100).

Conventionally, cultivation of CT skills depends on face-to-face communication between teachers and students, or among student groups (Dejnozka & Kapel, 1991), and regular participation in communication helps with the performance of the learning experience (Kolb, Boyatzis & Mainemelis, 2001). However, face-to-face interaction in offline settings may not always be available, prompting educational scholars to pay attention to online communication. When it comes to the online environment, Information and Communication Technologies (ICTs) encourage peer interaction and development of CT skills through new means such as "asynchronous discussion groups" (Guiller, Durndell & Ross, 2008, p.188). The advent of asynchronous discussion mediated by technology breaks down the boundary of space and time; learners now can communicate with each other online.

Asynchronous discussion refers to the discussion that traverses across time and space when students contribute discursively (Condon & Cech, 1996; Davis, Brewer & Brewer, 1997). Its promises lie in its ability to facilitate learning through human interaction (Feenberg, 2001). In practice, asynchronous discussion works as postings on an online discussion board at the time of a students' choice. In most cases, teachers use this in hopes of encouraging more independent thinking and critical reflection on the materials. Scholars including Oliver and Naidu (2007) have found that the use of explaining, elaborating, and defending one's points in computer-mediated discussion can facilitate effective learning. In addition, asynchronous discussion affords instant archiving and retrieval of students' discursive input, something that is often absent in face-to-face communication. Nevertheless, some scholars contend that the lack of nonverbal cues including body languages undermines the richness and integrity of the conversation (Maurino, 2006). Meyer (2003) further argues that asynchronous discussion is short of energy, spark, as well as dynamic interaction compared to face-to-face communication.

Taking the same inquiry to the Chinese context, Chinese education is heavily based on the assessment of students' performance and intellects through standardized testing (Özturgut, 2011). Especially for seniors in high school, students engage in repeated studying and reviewing so as to prepare for the once-a-year National College Entrance Examination. High school teachers for seniors are also evaluated on the percentage of students admitted by universities, particularly first-tier universities (Zhang, Zhu, 2007); this goes the same for middle school teachers in times of admission examinations to high schools.

Nevertheless, educational reform in recent years has advocated for the inclusion of CT in the learning objectives. In September 2017, the *Opinions on Deepening the Reform of*

*Education System and Mechanism*, a report issued by the General Office of the CPC Central Committee and the General Office of the State Council pointed out that it is necessary to focus on cultivating the “key capabilities” that support lifelong development and adapt to the requirements of the times, CT included. In the year after, the Ministry of Education issued the *Ordinary High School Curriculum Program and Language Curriculum Standards* (2017 Edition) to put forward more specific requirements to strengthen the CT skills of middle school students. In addition, the Higher Education Law of contemporary China stipulates that “the task of higher education is to cultivate specialized personnel with innovative spirit and practical ability” (Number 5).

Despite reformative effort, the complex geopolitical situation of China in representation of ethnic diversity and population size has posed various challenges and brought out substantial stress both on students and instructors. Consequently, numerous studies have found that Chinese students scored lower on most dispositional scales of critical thinking in comparison to the scores of western students (Luo, 2002; Wittenburg, & Shen, 2002b; Tiwari, Avery, & Lai, 2003; Liu, 2010, as cited by Zhou, 2012)

Responding to the reality, this study explores the relationship between asynchronous discussion and critical thinking in the context of China. Citing interdisciplinary scholarship from both communication and education, the study situates a pedagogical issue within the landscape of digitalization. Contextualizing the issue within Chinese higher education, this study also contributes to more dialectical understanding on how to realize CT pedagogy in a culture that still prioritizes standardized way to evaluation. The rest of the paper begins with a synthesized account of literature and a theoretical framework centering upon social constructivism and co-construction of knowledge. It is then followed by the method part

outlining the experimental design and coding structure. Results and discussions are presented thereafter.

### **Literature Review**

#### **Critical thinking**

Derived from western educational environment, critical thinking (the skill dimension) referred to the ability to make sense of complex or contradictory information (Bowell & Kemp, 2002). The conceptualization of critical thinking mainly went through three stages (reviewed by Buraphadeja, & Dawson, 2008). It started with Bloom's taxonomy (reviewed by Krathwohl and) that categorize skills related to critical thinking into lower-order (remember, understand and apply) and higher order (analyze, evaluate, and create) .In the second stage, in critique of Bloom's taxonomy, Ennis (1993) put forward eleven interdependent attributes of critical thinking including "a critical thinker is openminded and mindful of alternatives, judges well the credibility of sources, asks appropriate clarifying questions, formulates plausible hypotheses, and draws conclusions when warranted"(p.131). Lipman (2003), then, expanded upon Ennis's definition by putting more emphasis on social interaction. Currently, reference of CT often cites core elements including interpretation, analysis, evaluation, inference, explanation, and self-regulation (Facione, 1998).

Historically speaking, critical thinking is developed through two-way interaction. Socrates' philosophical account of teaching encouraged answering to a question via the form of questioning, eliciting early evidence of teaching tactics for critical thinking. Echoing such account, Confucius, an Asian philosopher also advocated for learning through discussions and questions, albeit in a different approach. As Confucius was regarded as "wiser and elevated" than his students, he often offered declaratory answers to student questions at the end. Hence, the traditional set-up of teaching in Chinese culture has always



centralized around passive-reception lecturing instead of co-construction of knowledge-making (Ryan, Shuai, Ye, Ran & Li, 2013, p.306).

Such cultural baggage was further heightened through the test-oriented educational system in modern China. In increasingly competitive educational environment, social mobility and social approval predominantly depends on structured evaluation. Yet, the stakes remain that test-based evaluative system could not equip graduating students with the needed ability to cope with the complex informational conditions often associated with professional development and labor market (Farrell & Grant, 2005). Despite recent educational reform facilitating CT, the situation remains unsatisfactory, and practical barriers in pedagogy have posed substantial challenge for implementation. (Zhai, 2014; Lu, 2015; Zhou, 2015).

### **Computer-Mediated communication for critical thinking**

Interactions between two humans through the medium of electronic devices are forms of computer-mediated communication (CMC; Walther, 1996). Walther (1996) analyzed the CMC in terms of impersonal, interpersonal as well as hyper-personal. Impersonal communication focuses on “getting the job done,” namely to complete communicative tasks (p.5). Interpersonal communication involved “reaching out to touch someone” (p. 10). In this domain, CMC afforded faster exchange of social information and ideas (Walther, 1996). Hyper-personal communication concerned with social collaboration and group work. To this end, CT was realized through the establishment of a CT community (Garrison, Anderson, & Archer, 2001)

More specifically, one form of CMC is asynchronous discussion. According to the review by Abdul and colleagues (2018) on the impacts of asynchronous discussion over education setups, asynchronous discussion concerned with a synergy of “locus-of-control

(who controls the learning), the relationship or balance of prompts, scaffolding structures, and discussion strategies and studies dealing with citation and plagiarism issues in ODF (online discussion forum)” (p.371). Among them, eliciting interaction was often brought up to the frontline of pedagogical approaches. Analysis and overview of the trends in the asynchronous discussion in educational context (De Wever, Schellens, Valcke, & Van Keer, 2006) pointed out the need for more rigorous and systematic analysis of various factors associated with the outcome of asynchronous discussion, especially in different environments.

As for empirical studies in China, Wu (2015) analyzed online discussion in Peking University and found that four elements including characteristics of learners, familiarity with mediated technology, instructor guidance, and evaluation system were crucial for online discussion. Another study conducted by Gerbic (2005) claimed that a comparative study between Chinese students and Kiwi students enrolled in online classes suggested general effectiveness of CMC in cross-cultural settings. The author further concluded that “reading and writing messages helped them develop their thinking and understanding, and assessment was a significant influence for them” (p. 241). Moreover, the study revealed that Chinese students anticipated fewer critical comments from peers as they engaged in online discussion (Gerbic, 2005). This was echoed in another study when the researcher found that Confucian-heritage learners, when compared with their western counterparts, tended to hold a more positive attitude towards CMC in terms of interpersonal community. In such light, the study confirmed the importance of culture awareness related to research about the CMC in educational field (Ramsay, 2005, p.271).

To sum up, the relationship between critical thinking and asynchronous discussion in China (Confucian-heritage culture) invites more scholarly endeavor. In response, the first

research question is put forward to investigate the relationship between asynchronous discussion and critical thinking:

RQ1: Does asynchronous discussion correlate with critical thinking?

### **Social Construction of Knowledge via Symbolic Interaction**

According to social constructivism, learning is not just the assimilation of new knowledge but interaction within a learning community on the basis of knowledge-making (Vygotsky, 1980). Knowledge is co-constructed, and the following are its characteristics (Vygotsky, 1980). First, knowledge is appropriated. Appropriation means recognizing instructor guidance, legitimizing knowledge transmission, and internalizing via psychological tools (Leontiev, 1981). Second, knowledge is internalized. Internalization, in a synthesis of Steiner and Mahn (1996), refers to “the transformation of communicative language into inner speech and further into verbal thinking” (Vygotsky, 1978, p. 279). Third, it is transmitted or transformed, passing through generations and across borders and cultures. Fourth, it is in the social settings, which means that knowledge cannot be disassociated from the sociocultural environment of a given society.

Contextualizing the analytical framework to classroom learning, Brooks (1999) believed that constructivist classrooms took shape when students were encouraged to ask questions to each other and make sense of our world interactively. Herein, the effectiveness of learning rested upon the symbolic interaction between and among participants through mostly language (Vygotsky, 1962). Symbolic interactionism views meaning as emerging from the interaction between two people through symbols (Blumer, 1986). Language conveys cognitive messages and is often regarded as the most prominent and adopted symbol in human communication (semiotic means; Steiner & Mahn, 1996). Vygotsky (1962) further posited that “thought development is determined by language” (p.51).

Educationally, language is the major medium of knowledge transmission (Luckmann, 1975), and considerable number of empirical studies focusing on knowledge making through discussion have demonstrated the strong connection between language and knowledge transmission (e.g. Hautala, 2011; Mondahl, & Razmerita, 2014; Donahue, 2004).

In the process of asynchronous discussion, students also engage in co-knowledge construction via symbolic interactions. In concomitant with the rise of critical thinking, the most prominent and celebrated forms of symbolic interactions in western educational settings often include exchanges and articulation of viewpoints, reasoning, doubt, and even debates ((Perry 1988, King & Kitchener 1994). Resembling a virtual public sphere, students are empowered to rationally and logically articulate opinions and engage in discussion in deliberative and critical manner in classroom discussions (Habermas, 1964). Taking such ideal to the cultural environment of Chinese educational setting, very few studies have paid attention to deliberative and critical interaction among students. Thus, the second research question explores the extent of deliberate articulation of viewpoints and discursive presentation of doubt and reasoning:

RQ2: To what extent do students interact with each other via agreement, disagreement, and doubt?

In addition to the interactive aspect of co-constructing knowledge, the fourth characteristic of knowledge emphasizes on situating knowledge within the social setting (Vygotsky, 1980). In the empirical environment of discussion boards, this signifies eliciting external information to back up one's argument. Citing information from external sources shows the open-mindedness assists in more rounded understanding of a certain problem or topic. Practically, external sources can be participant's experience, literature, formal data collected, or proposal of relevant cultural metaphor or analogy. Prompted by the above

statement, the third question is put forward.

RQ3: To what extent do students use external information in asynchronous discussion?

## **Methods**

### **Participants**

84 undergraduate students from a joint program studying in all-English learning environment were recruited in February 2019 from undergraduate courses. 26 students did not take part in the study and were thus removed from the sample, leaving a total of 58 participants included in the preliminary sample. A first round of coding of students' discussion threads removed 18 students out of the preliminary sample due to the tardiness, incompleteness, and irrelevancy of their discussion threads. Ultimately, 40 students' discussion threads (three threads for each student) were included for the final sample, making a sample size of 120 threads to be included for coding. To ensure confidentiality and privacy of participants, students, upon recruitment, drew a random number out of a draw box and used it as their unique ID in the study. Consent forms were collected from all students upon recruitment.

### **Equipment**

Electronic devices with access to the Internet were needed for the task. Participants were directed to download a digital application called Dingtalk and register for an account in the virtual learning environment of Dingtalk. Dingtalk was strategically selected as the platform for this study for its ability to give message read status, security, watermark features, and recalling of messages within 24 hours.

### **Stimuli**

Three articles from *The Washington Post* were selected as the stimuli for the experiment. These articles covered topics of technology, national politics, as well as international relations (See Table 1 for the titles of the articles). These three articles were distributed to participants one-by-one over a period of six weeks. Participants were given a

week to post their discussion threads between distribution of articles (See Figure 1 for a timeline).

	Topic	Title	Introduction
Article 1	Technology	<i>Microsoft workers call for canceling military contract for technology that could turn warfare into a 'video game'</i>	It debates about the pros and cons about technology.
Article 2	National Politics	<i>When Trump declared national emergency, most detained immigrants were not criminals</i>	Chinese students could provide outsider's "insights" for the US's nation news.
Article 3	International Politics	<i>Trump says he expects to meet with China's Xi and finalize new trade deal</i>	It is relatable to Chinese students.

Table 1: Titles and Introduction of the Articles.



Figure 1: Research Timeline

### Task

For each of the three articles, participants were asked to read the article and post three paragraphs: a summative paragraph of the article, a response to the article, and a response to another participant's discussion thread via Dingtalk.

### Coding Scheme for CT

To generate a quantifiable index representing participants' CT skills, this study adopted the method of content analysis to code participants' discussion threads along a coding scheme adapted from the one developed in Yang and colleagues (2005)'s study. Herein, content analysis was chosen for its "objective, systematic and quantitative description

of the manifest content of communication” (Berelson, 1952, p. 18). Yang and colleagues (2005)’s coding scheme of CT entailed six distinct indicators of CT including Relevance (R), Importance (I), Accuracy (A), Novelty (N), Justification/Logic (JL), and Critical Assessment (C). Each indicator can be coded with a “+” when strong evidence exists and coded with a “-” when little evidence exists to suggest presence of that indicator.

A pilot study was conducted to adapt Yang and colleagues (2005)’s coding scheme to the cultural communication of Chinese students and the particular design of this study. The first adaptation was that Novelty (N) was not coded for the first five threads for the reason that it was not evident to tell if novelty really existed when there were only a few threads. Second, Accuracy (A) was replaced by Awareness (A), as the researcher found that it was very difficult to objectively code the accuracy of information. Justification (JL) was broken down into two indicators which are Justification (J) and logic (L) for the purpose of clearness. In addition, critical assessment (CL) was adapted as C(connectness) since it covered part of the critical assessment and was more concrete.

The adapted coding scheme of CT in this study included Relevance (R), Novelty (N), Awareness (A), Justification (J), Logic (L), and Connection (C) (See Table 2 below for a complete coding scheme for CT). An index illustrating the depth of CT was calculated using the following formula:

$$\text{CT Index} = (\text{positive indicator} - \text{negative indicator}) / (\text{positive indicator} + \text{negative indicator})$$

R+-	R+	Relevance statements to the issue discussed
Relevance	R-	Totally irrelevant statements to the issue discussed
N+	N+	Provide new information, ideas, or solutions that have never been mentioned (even they are not important or useful)
Novelty		
A+	A+	Awareness of quoting information from the discussion material
Awareness		
J+-	J+	A statement of opinion, agreement, or disagreement with supporting reasons/examples/justifications/proof.
Justification	J-	A statement with simple agreement, disagreement, or alternative opinions without elaboration.
L+-	L+	Logic statement

Logic	L-	Illogical statement
C+-	C+	Reasonable connection to one's own precious statements/reflections or others' contributions toward the issue.
Connection	C-	Unreasonable connection to one's own precious statements /reflections or others' contributions toward the issue.

Table 2: Coding Scheme for CT

### Coding Labels for Interaction and Inclusion of External Information

This study selected three coding labels from Yang and colleagues (2005)'s Interaction Analysis Model to generate quantifiable data representing interaction emerged out of agreement, disagreement, and doubt: The first coding label (IB) refers to statement of agreement from one or more participants; the second coding label (IIA) suggests stating and contending over areas of disagreement; the last coding label (IIB) concerns with clarifying and articulating doubt through reasoning and questioning.

As for inclusion of external information, the study relies on a particular coding label developed out of the same model in Yang and colleagues (2005)'s study. This label (IIC) seeks to document any references to the participant's experience, literature, formal data collected, or proposal of relevant metaphor or analogy to illustrate point of view.

### Coding Procedure and Data Analysis

Two coders coded participants' discussion threads along the finalized coding schemes for CT and interaction. The unit of analysis was a sentence. Inter-coder reliability was calculated, and the final coding process yielded coding results with an agreement rate of 90%. All coded data were entered into Excel for analysis. To analyze the correlation between asynchronous discussion and CT, the CT index of the first discussion thread was compared with the CT index of the third discussion thread through a paired-sample *t*-test applying Stata, a data analytical software. To analyze the extent of interaction between and among discussion threads, frequency tests were run to depict degree and patterns of interaction.

## Results



**RQ1: Correlation between Asynchronous Discussion and CT**

A paired-sample *t*-test was conducted to compare CT1(index generated from the first discussion threads) and CT3. There was a significant difference in the scores for CT1 (M=0.82, SD=0.02) and CT3 (M=0.87, SD=0.01) conditions; mean(diff)<0, *p* (0.0082) <0.05. These results suggested that asynchronous discussion was correlated with CT skills on a 95% confidential level. Specifically, our results suggested that the more students participated in discussion, the higher were their CT indices (See Figure 2 and 3). Thus, the first research question is answered. (See Table 4 for frequencies of specific indicators)

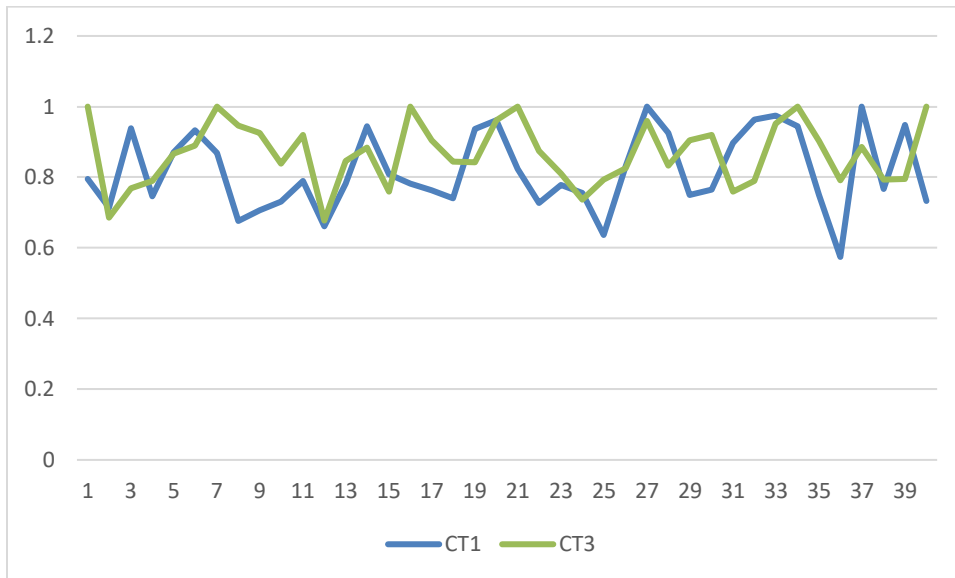


Figure 2: Visual illustration of Coding Results for CT

	NO.1	Percentage	NO.3	Percentage
Total	2202	100.00%	1951	100.00%
R-	2	0.09%	0	0.00%
R+	537	24.39%	506	25.94%
N+	48	2.18%	4	0.21%
A+	61	2.77%	33	1.69%
J+	345	15.67%	363	18.61%
J-	194	8.81%	144	7.38%
L+	533	24.21%	506	25.94%
L-	6	0.27%	0	0.00%
C+	468	21.25%	395	20.25%

C-	8	0.36%	0	0.00%
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Table 4: Specific indicator and percentage

**RQ2: Deliberative Interaction between and among Discussion Threads**

As shown in Figure 3, the occurrence of *agreement* as a manifestation of deliberative interaction is extremely low with 10 for discussion 1, 4 for discussion 2, and 0 for discussion 3. Table 5 shows that out of all the units of analysis (N=1592), which are sentences from all 120 discussion threads, there was not a single one of disagreement or doubt.

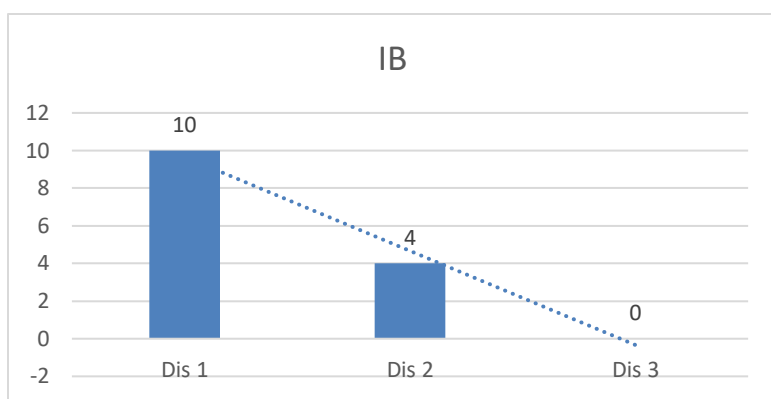


Figure 3: Change of IB from Discussion 1 to Discussion 3

	NO.1	Percentage	NO.2	Percentage	NO.3	Percentage
Total (N=1592)						
IB	10	0.63%	4	0.26%	0	0.00%
IIA	0	0.00%	0	0.00%	0	0.00%
IIB	0	0.00%	0	0.00%	0	0.00%

Table 5: Specific indicator and percentage

**RQ3: Citing External Sources and Experiences**

IIC concerned with supporting an argument by referencing to the participant’s experience, literature, formal data collected, or proposal of relevant metaphor or. As shown in Figure 4, the amount of external information cited went up as students engaged in more discussion with each other. However, the overall percentage is still low compared to the whole sentences generated throughout the discussion.

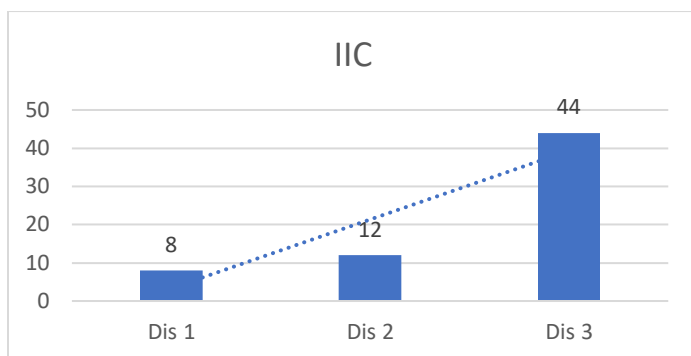


Figure 4: Change of IIC from Discussion 1 to Discussion 3

### Discussion

According to this empirical study, critical thinking skills can be reinforced through asynchronous discussion. Yet, within the cultural environment of classroom discussion and the general culture of knowledge construction, interaction centered around critical thinking via asynchronous discussion is very limited, especially in terms of disagreement or doubt. In addition, the amount of external information and personal experiences shared is also low, despite a slight increase as students engage in more discussion time.

### Practical Implications

The study confirms that discussion is an effective method for promoting critical thinking in Chinese educational settings. When space and time poses limitations, asynchronous discussion offers promising alternative to increase students' ability to process complex information. Such finding contradicts with the results of a study of Chen and Zimitat (2014), which suggests that face to face communication (blended learning) outperforms online discussion for students who shares Confucius Educational culture. Nevertheless, the study shows that, despite advancement of computer-mediated learning, asynchronous discussion lacks effective interaction signified by disagreement and agreement with doubt and reasoning. According to social constructivism, meaning is constructed through interaction, so the limited interaction may suggest a low level of knowledge internalization.

Contextualizing the finding to the broader cultural ground of China, one of the possible reasons for the decreasing pattern of agreement in terms of Chinese context is that Chinese culture tends to promote harmony and agreement in the first encounters and interactions among people. Overall, the findings corroborate that East Asian culture tends to value consensus and try to avoid confrontation, sometimes at the cost of truth-seeking (Hofstede & Bond 1984). The fact that there is not any statement in the discussions suggesting disagreement or doubt suggests the lack of reasoning and negotiating interaction in this virtual public sphere.

Looking into some possible solutions, to achieve better knowledge internalization and more sophisticated critical thinking, Hung (1999) suggests that appropriation needs to happen first with learners recognize interacted and applied knowledge. This is also a process highlighting questions and negotiations, which are fundamental components in the process of deliberate interaction. In China, the relaxation of censorship in discourse and the influx of western culture affords Chinese college students more courage in terms of speaking up. In addition, Chinese learners are familiar with digital devices. Asynchronous discussion should be an option when challenged by time and space.

Therefore, if computer-mediated communication is going to develop and become one of the main pedagogical methods in China, it is essential to put more emphasis on encouraging articulation of viewpoints and offering safe and inclusive environment for reasoning and doubts. Educators need to think about ways to overcome social desirability factors, which are ingrained in the cultural norms of China and encourage debates and questioning among co-knowledge construction. More specifically, as evident in the results, as the critical thinking skill increases, the general ability to process complex information is improving. However, more sophisticated “reading” and “comprehension” skills do not mean

that students will engage in more expression of viewpoints or contentions around competing viewpoints. Educators need to be aware that lack of guidance and feedback may undermine interactive participation in debate, reasoning and doubt. Therefore, in order to have a better-quality discussion, educators need to provide more guidance feedback and encourage Chinese students to cite references.

### **Theoretical Implications**

This study is at the intersection of communication and education theories. Social constructivism and symbolic interactionism challenges traditional set-up of knowledge transmission in China. The emphasis on critical thinking also helps resolve various issues associated with Chinese education before college and the overall obstacles due to the Chinese language. Chinese students lack of logical and reasoning ability to back up their points, and this is partly due to the vague Chinese language and heavy use of euphemism. In other words, students can build up the inner speech, but they cannot deliver the verbal thinking due to subtleness of Chinese language. Meaning is more understood in the cultural and social settings compared to western language. It is acceptable to say general and abstract when having the conversation with others at default. Others tend to have less curiosity to explore the reasoning behind a statement since it is less relevant to people's life especially in the case that is not instruction.

### **Methodological Implication**

This research adopts systematic coding over discussion threads to infer CT through participants' own communicative actions instead of obtrusive measurement of CT given to students. It represents investigator's effort in honoring and giving power to participants' communicative actions. The selection of three indicators from interaction analysis model also reflects the consideration of deliberative and effective interaction as well as Chinese

harmonious context.

### **Limitations and Future Directions**

The study's limitations lie in the sample size and the repeated and multiple verification of the authenticity of the codebook. Also, because of the limited length of discussion threads, only three coding labels from the interaction analysis model are selected. Therefore, the deeper level engagement did not appear in the discussion process. In addition, participation in discussions is not the core of the assignments of participants' course, future researchers can turn them into the core and analyze them.

### **Conclusion**

Coming back to research questions raised by the investigator, asynchronous discussion indeed facilitates critical thinking. Given recent emphasis put on critical thinking within higher education objectives, this study previews promising ways to fill in the gap between the objectives and current educational practices. Nevertheless, the study finds that referencing external sources and deliberative interaction was extremely rare amidst the discussions. Chinese culture greatly mediates the nature and characteristics of the discussions. Due to the euphemism of the language, the formation of critical thinking which mostly reflected through backing up opinions with logic and reasoning remains lacking. It is hoped that this empirical study replenishes and sheds light to a more dialectical understanding of the relationship between technology, culture, and communication.

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