Philosophical and Cultural Dimensions of Critical Thinking Development in EFL Public Speaking through Asynchronous Online Discussions: A Social Network Analysis

Peipei Chen
School of Foreign Language Studies, Wenzhou Medical University, Wenzhou, 325035, China

Yan Lin
School of Foreign Language Studies, Wenzhou Medical University, Wenzhou, 325035, China

Xinfang Ma
School of Foreign Language Studies, Wenzhou Medical University, Wenzhou, 325035, China

Yanle Zhang*
School of Foreign Language Studies, Wenzhou Medical University, Wenzhou, 325035, China
zhyl@wmu.edu.cn

Abstract: Asynchronous online discussions (AODs) are widely used in hybrid courses and online education. AODs with high levels of interaction can enhance students' cognitive development and knowledge construction, providing a solid platform for the development of deep learning and critical thinking skills. However, few empirical studies have been conducted on the effectiveness of asynchronous online discussion methods. In this study, AOD was used as the pre-class activity of offline oral output. With social network analysis (SNA) and quantitative analysis, we compared the effect of three different facilitation strategies in AODs on students' interaction level, as well as examined the correlation between individual students' interaction patterns in AOD and their critical thinking ability assessment in EFL public speaking. According to the study, peer-facilitated asynchronous online discussions can significantly improve network density and centrality, increase strong associations between members, and facilitate sub-group formation compared to teacher facilitation. Meanwhile, node strength had a more significant positive correlation with the subsequent performance of critical thinking ability in EFL public speaking than node degree.
Keywords: Discursive Development, Social Network Analysis, Asynchronous Online Discussion, Oral Language Teaching

1. INTRODUCTION

The development of critical thinking ability is an important goal of modern education and a research indicator of online learning effectiveness. Previous research has demonstrated that effectively organized AODs is an ideal tool for enhancing knowledge construction, promoting critical thinking abilities, and creating a collaborative learning community (De Wever et al., 2010) by eliminating the randomness, superficiality, and informality of offline classroom communication (Guiller et al., 2008). Studies have shown that peer-promoted asynchronous online discussion has a significantly higher level of interaction than teacher promotion and can better reflect the critical thinking process (An et al., 2009; Guiller et al., 2008); however, there is also evidence that online discussions led by active teachers can lead a higher level of inquiry (Alexander et al., 2010). What is the more effective facilitation strategy for enhancing students' critical thinking process in AODs? Can AODs with higher critical thinking processes benefit students' development of critical thinking ability in EFL public speaking? And to what extent can students' individual network interaction mode predict the improvement of their critical thinking ability in EFL public speaking? Due to the complexity of AODs research, few studies have examined how learners' interaction patterns relate to their development of critical thinking ability in EFL public speaking. Social network analysis (SNA), with its focus on binary phenomena and network structure, offers a novel and comprehensive analytical solution by using numerical data to quantify learner interaction (Borgatti et al., 2009). Based on this, we compared the effects of three different facilitation strategies on students' performance of critical thinking in EFL public speaking, and explored the correlation between students' individual interaction modes in AODs and their critical thinking performance in EFL public speaking.

2. LITERATURE REVIEW

2.1 Critical Thinking Teaching and Peer Interaction

There has been considerable progress in the field of critical thinking since the 1990s, particularly regarding its core concepts, models, and teaching applications. Scholars have not only put forward critical thinking models but also developed a variety of standardized and non-standardized rubrics to help educators evaluate critical thinking skills. To date, scholars have not only developed relatively mature critical thinking teaching

programs (such as the Critical Web Reader project of Indiana University) but also conducted a plethora of empirical studies based on specific curriculum settings to explore and verify the promoting role of critical thinking ability in teaching practice. Peer conversational interaction is widely recognized as a significant contributor to language acquisition, and is a widely used in the teaching of EFL classrooms. Long argues that learners' ability to comprehend and use a second language is driven by their ability to engage in meaning negotiation during bilateral communication (Long, 1996). Additionally, recent studies have also demonstrated that peer interaction can effectively promote the development of students' critical thinking abilities. The peer interaction could promote the change of key indicators related to critical thinking abilities in dialogues, which eventually made the writing output of students in the experimental group significantly higher than that of some indicators in the control group. A study by Guiller *et al.* indicates that critical thinking has been improved and exercised in the students' face-to-face discussions and online interactive discussions (Guiller et al., 2008). In her article, Wang Yan explains how participating in peer interaction allows listeners to find problems in the process of listening comprehension (Wang, 2019), promotes the development of listening ability, and can also lead to more meaningful negotiation, and exercise the listeners' critical thinking skills. The empirical research of Lin Yan showed that peer assessment can not only shift the focus of assessors but also contribute to assessors' better critical thinking performance in oral production (Lin, 2018).

2.2 Development of Critical Thinking Ability in Asynchronous Online Discussions

Compared with face-to-face communication, the advantages of AODs in promoting students' critical thinking ability are reflected in the following aspects. First, AODs create a more comfortable and open communication environment. By overcoming "pathological etiquette" that is common in offline face-to-face communication, this type of communication encourages students to participate more actively in the discussion, integrate and summarize information, and cite and refute each other's opinions. Secondly, AODs help teachers gain more time and space for teaching. Because teachers can track the progress and depth of each group's discussion and provide instant feedback, students no longer have to struggle to express themselves in limited time slots and receive fragmented guidance from their teachers due to large class sizes. Finally, the sustainability of AODs not only makes communication "more frequent"

(Blake, 2000) but also makes communication deeper. Since the content of the discussion is documented in written form, students will fully reflect on others' opinions, query information, and present their own opinions. Meanwhile, students are more likely to review, reflect and consider their own arguments and ways of arguing because their comments will also be repeatedly judged by classmates. It is considered to be an essential step in the development of critical thinking skills to engage in this process of inquiry, induction, judgment of others, and self-reflection.

2.3 Social Network Analysis in Asynchronous Online Discussions

Asynchronous online forums provide a learning space for learners to interact and engage with each other, where students can build collaborative learning communities through direct and indirect interactions with each other such as asking questions, critiquing and commenting, enhancing knowledge construction and promoting critical thinking (De Wever et al., 2010). Numerous studies have confirmed the correlation between positive online interactions and learners' final academic performance (Cheng et al., 2022; Flores et al., 2012; Romero et al., 2013; Russo & Koesten, 2005; Vaquero & Cebrian, 2013). It has been difficult, however, to evaluate and analyze the communication activities in asynchronous online forums. Social network analysis (SNA), by focusing on the relationships between individual network users rather than on the individual themselves, is a good approach to analyses students' interactions in asynchronous online discussions (Wang & Li, 2007). It focuses on the causes and mechanisms behind the positive outcomes of collaborative learning through the study of interaction process (Arvaja & Häkkinen, 2010; Kreijns et al., 2003), and provides a new paradigm and methods for the knowledge construction process in online learning communities (Wang, 2010).

3. RESEARCH PROCESS

3.1 Research Purpose and Question

The purpose of this study was to observe which facilitation strategy is more conducive to promoting student interaction in AOD, as well as to further investigate the relationship between individual student interaction patterns and critical thinking assessment in EFL public speaking. The following three different types of facilitation strategies are compared in this study.

Group 1: The teacher did not respond to each student's posting on the

topic, but asked students to make at least 2 posting responses to other students' statements and encouraged them to make questioning responses.

Group 2: Teacher responded to each student's first posting once, but students were free to post among themselves. Posting is voluntary.

Group 3: The discussion in this group was peer-moderated, that is, there was no posting requirements for students.

The following two questions guided this study:

Question 1. How do different facilitation strategies in asynchronous online discussion affect the level of student interaction in an online forum?

Question 2. Is there a correlation between an individual student's mode of interaction in an asynchronous online discussion and his performance on the critical thinking skill assessment in his public speaking assignment?

3.2 Subjects and Design

This study is based on the course "College English II" for non-English majors at a medical college in a province in southeastern China. The course has been offered to freshmen for the past four years, and 45 students participated in three naturalistic classes (second semester of the academic year 2021-2022). The experiment was conducted in three groups of 16, 14, and 15 students. A pre-experimental one-way ANOVA was used to analyse the differences in language proficiency between the three groups of students, and the results showed consistency between the different groups' scores ($F=0.012$, $p=0.988>0.05$), with no significant differences (Table 1), excluding the confounding factor of language ability on discursive output.

Table 1: Pre-Experimental Results

Analysis of Variance(ANOVA) Results					
	Group (Mean±Standard Deviation)			*F*	*p*
	15.0(n=16)	19.0(n=14)	23.0(n=15)		
score	535.94±20.89	536.21±30.38	537.53±37.72	0.012	0.988
* $p<0.05$ ** $p<0.01$					

The school's English course uses blended learning, where students learn the course content before class and use the online platform to engage in constructive learning activities. AODs are an important part of online teaching and learning activities, aiming to encourage collaborative, scenario-based learning through open topics based on real-life situations. By posting and replying, students can develop critical thinking abilities, analytical thinking, and logical expression of ideas. As follow-up to the online discussion, students worked in small groups to discuss similar topics in the offline classroom. Based on the discussion and their own reflections,

the students compiled their ideas into an oral presentation of around 1.5 minutes at the end of the class. A total of 12 weeks was covered by the course, with two asynchronous online discussions, each lasting for four weeks. Only the first discussion was debriefed for this study. All students had completed a semester of blended learning and were equipped with basic information literacy as well as the ability to learn in an online environment. The author began the first week of offline sessions on the topic with a teacher-led discussion. To facilitate online discussions, the teacher conducted a context-based, non-offensive discussion during class, and encouraged students to express their opinions to foster a sense of mutual respect, trust, and active communication among students.

3.3 Data Collection and Analysis

This study mainly used social network analysis and multiple linear regression for data analysis. The interaction data of each group was visually analyzed with UCINET. First, after crawling and coding the postings and replies of the AODs, the authors constructed a social network relationship matrix for SNA. The students are the actors and links between a pair of actors represent the amount of communication between them, i.e., the times of opinion exchange. Next, the authors examined the patterns and the quality of online interaction of three discussion groups on both micro- and macro-levels. Measures including network density, centralization, reciprocity and cohesive subgroups were investigated in whole-network analysis, for these are vital metrics indicating the degree of connectivity and stability of the structure, and Cohesiveness and interaction of the whole network are critical indicators for collaboration and deep learning within the network. In nodal analysis, degree centrality, node strength and node reciprocity were analyzed, and the predictive validity of these indicators on the performance of individual students' critical thinking assessment in EFL public speaking was observed by regression analysis. A multiple linear regression model was used to examine the extent to which different interactions among individual nodes could predict the performance of students' speaking output. First, Pearson correlations were used to test the correlations between the core indicators (i.e., dot degree, dot intensity, and reciprocity) of the individual nodes (students) and the scores of oral output; second, R-squared values and VIF values were analyzed to determine whether there was any covariance in the model; finally, the hypotheses were tested using multiple linear regression analysis to determine the predictive validity of the individual interaction model on the performance of students' oral output. The students' scores of critical thinking skill assessment in EFL

public speaking were obtained by two teachers who rated the logicality and reasoning of the transcribed speech text according to Professor Sun Min's "Public Speaking CT Skills Rubric" scale (inter-rater reliability check Spearman's coefficient was 0.857, showing a significant correlation), which has been tested for validity and reliability, can objectively assess students' discursive skills in English speech.

4. RESULTS

4.1 Overall Performance in Asynchronous Online Discussion

Table 2 shows the total number of online postings and the overall performance of the critical thinking ability assessment in the EFL speaking for the three groups. The table shows that the groups without teacher participation (Group 1 and Group 3) produced more postings than the group with teacher participation (Group 2). It was found that group B15 with minimal posting requirements had the highest number of posts per capita (9.63) and words per capita (405.31); while Group 2 with teacher involvement had the lowest number of posts and words per capita. Furthermore, Group 3, which did not require replies and was not subject to teacher intervention, demonstrated a relatively active willingness to post. When it comes to critical thinking assessment in EFL public speaking, the mean score of Group 1 (76.59) was significantly higher than the other groups(8.23 points higher than Group 2 and 6.16 points higher than Group 3), while Group 2 with teacher intervention instead had the lowest score (68.36). Additionally, Group 1 also had the largest standard deviation (7.62), indicating that this group displayed the highest degree of dispersion in scores and greater fluctuations in performance among its members. Since the teacher was only required to respond to each student's first posting in this experiment, it is important to note that the teacher did not actively intervene and guide the students in their subsequent online discussions after the first posting. Accordingly, it cannot be arbitrarily concluded that the teacher's intervention did not enhance students' critical thinking performance in EFL public speaking.

Table 2: Overall Performance

Group	Size	Total Number of Postings	Postings Per Capital	Words Per Capital	Mean	Deviation
Group 1	16	154	9.63	405.31	76.59	7.62
Group 2	14	90	6.43	282.14	68.36	5.19
Group 3	15	127	8.47	359.4	70.43	5.32

4.2 Social Network Analysis: the Dynamics of Overall Network Interaction

The present study examined four core metrics for whole network analysis, namely density, centralization, reciprocity, and cohesive subgroups.

Table 3: Analysis of Whole Network Characteristics in Three of AODs

Groups	Size	Density	Centrality	Centralization		Reciprocity
				Out-Degree Centralization	In-Degree Centralization	
Group 1	16	0.317	26.67%	23.556%	30.667%	0.4615
Group 2	14	0.276	78.02%	77.551%	77.551%	0.7059
Group 3	15	0.352	35.85%	38.776%	31.122%	0.3455

Network density indicates the number of ties between actors in comparison to the number of ties between actors that are possible. In an online learning community, density is an important indicator of the cohesion of communication between its members. By measuring density, it is possible to ascertain the level of engagement in the network, that is, how actively participants are involved in the collaborative discussion (De Laat, 2002). According to Table 3, the density of Group 2(0.276) is relatively low in comparison with that in Group 1(0.317) and Group 3(0.352), indicating that its actors are loosely connected and the learners' participation is relatively low. The reason for this is that in this group, most of the discussions revolved around the teacher's comments and less interaction was occured between students; that is, the online discussion in this group was teacher-centered rather than student-centered. A network's degree of centralization indicates how close it is to being a star network, in which a participant or an object acts as the center that controls or channels all activity in the network. The higher the centrality, the more centralized the power of this network is. According to Sparrow *et al.*, an overly centralized network structure results in poor knowledge transfer and exchange (Sparrowe et al., 2001), does not promote innovative thinking, and prevents students from developing critical thinking abilities. As shown in Table 3, Group 2 has a much higher centrality than the other two groups, suggesting that the discussion was centered around one individual (lecturer) rather than distributed among more students. The same pattern of interaction can also be observed in the measure of reciprocity.

Reciprocity deals with the inter-dependence between the members of each pair in a social network. It is a tendency to establish reciprocal ties in social life, and an indicator of balance and stability in social structure. As Table 3 shows, reciprocity was significantly higher in Group 2(0.7059) than in the remaining two groups(0.4615 in Group 1, and 0.3455 in Group 3), but it is important to note that in this group, the teacher was the main determinant of reciprocity outcomes. In contrast, in Group 1 and Group 3, many students' participatory interactions with each other contributed to this reciprocal outcome. To further investigate the effectiveness and depth of communication in each forum group, the author used Ucinet and netdraw to visualize and analyze cohesive subgroups in three groups. Cohesive subgroups are subsets of actors, among whom there are relatively strong, direct, intense, frequent, or positive ties (Wasserman, 1994). In online learning, the existence of a certain number of subgroups in online learning indicates that there is a "reply to a reply's reply" communication activity among its members, which allows knowledge to be exchanged smoothly and deep communication to be achieved. As shown in the Figure 1. below, in Group 1, there are four cliques, within which the number of interactions greater than three times, indicating that these members have in-depth discussions on the topic. Meanwhile, students WYJ, NCY, WQY and XYY in this group overlap in at least two small cliques, indicating that these students actively communicate with others in more than two directions in the asynchronous online discussion, facilitating the interactive activities of the whole network, and are important core members of the network. Compared to this group, neither Group 2 and Group 3 managed to form cliques, indicating that communication was loose and did not form active and effective in-depth communication. Furthermore, there were more isolated actors in Group 3, indicating that most students failed to form effective interaction with each other, which also confirms the finding that this group has high density but low reciprocity.

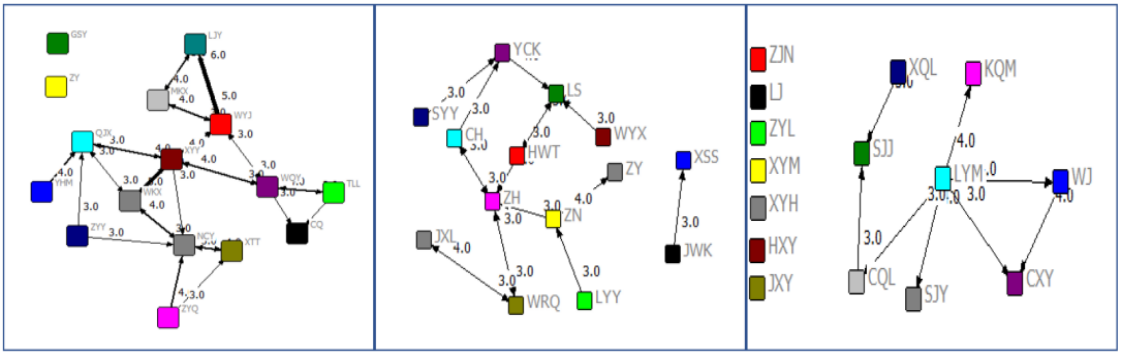

Figure 1: Visual Analysis of Three Small Groups

4.3 Students' Interactive Pattern and Critical Thinking Ability Assessment in EFL Public Speaking

This study examined three measures of nodal networks, namely degree, strength, and reciprocity, to assess the correlation between different interaction patterns of individual students and the evaluation of critical thinking ability in EFL public speaking. Degree refers to the number of other actors that are connected to one actor. In general, the higher the degree, the more connections the actor has in the network. Strength is a weighted measure of degree that takes into account the number of links that go from one actor to another. Unlike degree which only considers binary networks, strength can reflect not only the number of actors in the network with which the actor is connected but also the frequency and depth of the connection. In asynchronous online discussion, unlike node degree that reflects only how many students have interacted with in the discussion, strength represents the combined number of posts and replies from an individual student to other members, representing not only the breadth of communication but also the depth of communication. Reciprocity measures the degree to which two actors form a mutual connection and focuses on the reciprocal behavior established between learners. First, the correlations between the variables (Table 4) were tested and the VIF values were analyzed to determine whether the model had any covariance problems. As shown in Table 4, the correlation coefficient between students' critical thinking ability assessment in EFL public speaking and the point degree was 0.503, indicating a significant positive correlation; the correlation coefficient with the point intensity was 0.630, which had a strong positive correlation, and the correlation coefficient between the point intensity and the point degree was 0.830, which had a very strong positive correlation; the correlation coefficients of reciprocity and students' critical thinking ability assessment in EFL public speaking, point intensity and point degree were all less than 0.2, indicating that there was no significant correlation between reciprocity and other variables.

Table 4: Correlation Among Variables(Pearson)

	Score	**Degree**	**Weighted Degree**	**Reciprocity**
Score	1			
Degree	.503**	1		
Weighted degree	.630**	.830**	1	
Reciprocity	0.028	-0.188	-0.054	1

** The correlation is significant at the 0.01 level (two-tailed)

All VIF (variance inflation factor) values in this study are less than 5(see

Table 5), indicating that the independent variables were not highly correlated with each other. A D-W value of around 2 indicates that the model does not exhibit autocorrelation or correlation with the sample data, and the model is better.

Table 5: Collinearity Among Different Interaction Patterns

	Tolerance	**VIF**
Degree	0.291	3.435
Weighted Degree	0.301	3.324
Reciprocity	0.932	1.073
	D-W Value: 2.02	

Then, a multi-linear regression analysis method was used to predict learners' critical thinkng ability assessment in EFL public speaking based on three interaction patterns, namely degree, strength and reciprocity (in Table 6). A significant regression equation between students' interaction pattern in AODs and students' critical thinking ability assessment in EFL public speaking was found(F=9.154, p=0.000<0.05), i.e., at least one of the independent variables of point degree, point strength, and reciprocity could significantly affect students' critical thinking ability assessment in EFL public speaking. To be specific, participants' predicted critical thinking ability assessment in EFL public speaking is equal to 62.419-0.066*degree + 0.584*strength + 1.779*reciprocity, with a model R-squared value of 0.401, implying that degree, strength, and reciprocity can explain 40.1% of the variation in students' critical thinking ability assessment in EFL public speaking. Specifically, the regression coefficient value of -0.066 (t=-0.161, p=0.873>0.05) for the node degree means that degree does not have an effect on students' critical thinking ability assessment in EFL public speaking.

The regression coefficient value of point strength is 0.584 (t=3.008, p=0.004<0.01), implying that strength will have a significant positive relationship on students' critical thinking ability assessment in EFL public speaking; and every increase of 1 in strength will directly lead to an increase of 0.584 points in students' scores of critical thinking ability assessment in EFL public speaking. The regression coefficient value of reciprocity was 1.779 (t=0.459, p=0.649>0.05), implying that reciprocity does not have an influential relationship on oral output discursiveness. Therefore, point strength will have a significant positive relationship on students' critical thinking ability assessment in EFL public speaking, but degree and reciprocity will not have an influential relationship on students' critical thinking ability assessment in EFL public speaking.

Table 6: Linear Regression Analysis Results (N=45)

	Un-Standardized Coefficient		**Standardized Coefficient**	**T**	**P**
	B	**Standard Error**	**Beta**		
Constant	62.419	2.808	-	22.229	0.000**
Degree	-0.066	0.411	-0.036	-0.161	0.873
Strength	0.584	0.194	0.663	3.008	0.004**
Reciprocity	1.779	3.875	0.057	0.459	0.649
$F(3,41)=9.154, p=0.000$, $R^2=0.401$,					

5. DISCUSSION AND IMPLICATIONS

The purpose of this study was to observe and compare how different facilitation strategies (teacher replies, student replies, and free replies) in AODs affect students' level of interaction in an online forum and to further explore the relationship between students' interaction patterns and their critical thinking ability assessment in EFL public speaking. Three main findings were derived from this study. First, the group with peer posting and response requirements significantly outperformed the other two groups regarding posting volume per capita, words per capita, and mean score. The remaining two groups (group with teacher intervention and group without any intervention) did not perform satisfactorily in posting numbers per capita, words per capita, or mean scores. In particular, the group with teacher intervention did not only scored the lowest but also performed poorly in the subsequent analysis of the whole network measures (too low density and too high both centrality and centralization). A conclusion that teacher intervention did not facilitate students' critical thinking ability performance in EFL public speaking cannot be drawn arbitrarily, as mentioned above, because teacher intervention was only required at the beginning of each student's first posting rather than throughout the entire discussion process. Previous research has shown that positive teacher responsiveness and guidance can assist students in gaining a sense of security about where the discussion will go (Cheng et al., 2022) and can have a significant impact on student satisfaction (Chen, 2018) and student learning outcomes (Calvo-Ferrer, 2020). However, the results of this experiment may indicate that teachers who provide feedback only at the beginning of the discussion, but do not effectively guide and facilitate the discussion afterwards, may actually stifle students' willingness to post and express themselves. As the person who was expected to lead the discussion was suddenly absent, the default network center collapsed,

preventing students from forming cliques for subgroup discussions or engaging in in-depth discussion with the teacher, resulting in a disorganized state. Second, of the two groups without teacher intervention (Group 2 and Group 3), the group with mandatory minimum posting requirements produced more cohesive subgroups that can effectively promote students' critical thinking performance in EFL public speaking, while the group with no posting requirements, despite its members' higher willingness to post, actually displayed a looser network structure with more isolated nodes. This finding is consistent with previous results. Although student interaction is a key factor in fostering a successful learner-centered online learning environment, the study suggests that interaction does not appear to occur voluntarily. In fact, there are often "lurkers" who may never get involved (Beaudoin, 2002). For blended learning instructors, it appears to be a significant challenge to facilitate these lurkers' engagement in discussion, especially when students come from traditional introverted cultures. We found that when students were given appropriate mandatory tasks (responding to peer students' postings at least twice), not only did distinct subgroups emerge among them but also network hubs, central influencers or opinion leaders, across different subgroups. They actively participated in online interactions, facilitated positive and effective interactions among peers, guided the depth of topic discussions, and served network facilitators. Therefore, teachers should take steps to cultivate these clique leaders to actually lead group learning activities, promote deeper communication across subgroups, and make asynchronous online forums a repository for students' self-serving learning communities. Lastly, the study concluded that point degree, point strength, and reciprocity explained 40.1% of the variation in students' critical thinking ability assessment in EFL public speaking; and the regression coefficient of point strength was 0.584, suggesting a significant positive relationship on students' critical thinking ability assessment in EFL public speaking; however, degree and reciprocity did not have a significant effect on students' critical thinking ability assessment in EFL public speaking. Although previous research has shown a positive relationship between online interactions and learning performance, few studies have considered how individual students' specific interaction patterns in an AOD relate to the performance of critical thinking ability assessment in EFL public speaking. Meanwhile, previous researchers traditionally use a combination of content analysis and social network to examine whether the process of AOD activity reflects sufficient critical thinking performance. However, few studies have demonstrated a direct relationship between patterns of

interaction in AODs and the development of critical thinking ability assessment in EFL public speaking. In the present study, we found a significant correlation between different patterns of individual interaction and critical thinking ability assessment in EFL public speaking. Although more future research is needed to fully understand this relationship, one interpretation of this finding is that the depth of communication in an AOD is more predictive of student performance in critical thinking assessment in EFL public speaking than the breadth of communication.

6. LIMITATIONS AND FUTURE RESEARCH

While this study has produced significant findings, it is important to note that there are limitations as well. First, a quantitative analysis of SNA alone is not sufficient to provide a comprehensive understanding of why students engage in AOD in a particular way. Combing content analysis and SNA can provide us with insight into how students improve their soft skills in online courses, such as critical thinking, creativity and communication skills. However, the present study is primarily concerned with the correlation between students' AOD interaction models and development of critical thinking ability in EFL public speaking, setting the stage for future research. Future research can further enhance our understanding of the findings by including data such as surveys and interviews with learners regarding their perceptions of the discussion activities. Second, as this was not a true experimental design, the group setting could not be fully controlled. Our results would be more coherent if we had a group in which the teacher actively participated in AODs, so that we could better interpret the impact of each factor. Additionally, factors such as students' familiarity with each other and with the topic, their ability to self-regulate, and their autonomy all contributed to the study's results. There is potential for Future research to examine how these factors impact students' interaction models in AODs and their critical thinking performance in EFL public speaking.

7. CONCLUSIONS

This study empirically examined how three different facilitation strategies affect students' interaction levels in AOD and the correlation between individual students' interaction patterns in AOD and their critical thinking ability assessment in EFL public speaking. The findings indicate a

few suggestions. First, AOD can be a useful complementary tool to EFL speaking instruction. A highly interactive AOD addresses the deficiencies inherent in offline oral discussion (its transitory and fragmented nature), extends the spatiotemporal dimension for classroom discussions, and promotes students' deeper reflective thinking. Second, peer facilitation is a more viable approach in promoting students' critical thinking capabilities compared to teacher-facilitated and free-speaking groups. Based on the findings, the peer-facilitated group exhibited more critical thinking characteristics, produced more cohesive subgroups, and had more sub-group figures to facilitate deeper communication across subgroups. A moderate amount of mandatory tasks can facilitate this phenomenon. Finally, point strength showed a more significant positive effect on developing critical thinking ability in EFL public speaking than point degree. Teachers should, therefore, pay more attention to the depth of communication rather than the breadth of communication when organizing AOD activities, i.e., encourage "responses to responses of responses" rather than "responses to every individual response".

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