



What does the online chat box tell: a mixed study of student participation indicated by online chat data and other variables in a university English course

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Abstract

Student participation is essential to both teaching and learning. The present study aims to examine student participation and their relations with other variables such as learning outcome and teaching performance in an online English course. Participants were 84 sophomores of English Education majors at a university who learned an English course on an online learning platform. Both qualitative data from the chat box of the online learning platform and quantitative data of students' final scores and their scores of course evaluation were employed. Follow-up semi-structured interviews were also conducted to provide further insights into the findings. Results showed that student participation indicated by the online chat data was extensive and active, with all participants engaged and an average of 112 messages sent per student over the semester in the online English course. Further correlational analyses found that student participation was not significantly correlated with either learning outcome indicated by students' final scores or teaching performance indicated by their course evaluation scores. However, interview data revealed that online chat box had contributed to the lower-risk and more active online participation in several ways including attenuating participation apprehension, improving concentration on instruction and building learning community. Implications of the findings were discussed and suggestions of future research were provided.

Key words: student participation, online chat box, online chat data, learning outcome, teaching performance

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I. Introduction

Student participation is regarded as an essential part of teaching and learning across all instructional settings (Rubio, Thomas and Li, 2018; Haniya and Paquette, 2020). Researchers hold that participation serve to bring students effectively into educational process, enhance teaching and bring life to the classroom (Ozkara & Cakir, 2018). With active participation, students might become more motivated and learn more actively (Weaver & Qi, 2005). They may be engaged in more critical thinking and higher levels of thinking such as interpretation, analysis and synthesis (Dewan et al, 2019). Due to its significant impact, student participation has been investigated from diverse perspectives. For instance, researchers have looked into the effectiveness of student participation on learning (Crosthwaite et al, 2015; Chou & He, 2016). They also examine different kinds of student participation such as voluntary participation, (Dallimore et al, 2012), anonymous participation (Latham & Hill, 2013) oral participation and silent participation (Frymier & Houser, 2016) as well as online discussion (Kim et al, 2021). In addition, student participation is often surveyed in relation to various variables like course activities (Tsai et al, 2021), students' learning styles (Crosthwaite et al, 2015), teacher presence (Rubio et al, 2018), teacher-student rapport (Frisby et al, 2014) and class size (Stamm et al, 2017)). However, researchers think that it is difficult to exhaust all variables in relation to student participation. The picture becomes even more complex when online participation is added into the mix since student participation in one medium either differs or might not work in the same way in another medium (Rocca, 2010). Actually, on examining online participation, researchers have incorporated a wider array of variables and data types (Araka et al, 2020). Among them, few studies have taken short written text messages sent to the chat box of online learning system as the main data to uncover students' online participation. Students' free chat in the online box is often causal but voluntary and spontaneous in nature and it is regarded as a natural and direct indicator of online participation (Author, 2022). Researchers hold that it is significant to look beyond the current focuses so as to provide broader insight into understanding student participation (Theriault, 2019). Accordingly, the present study aims to bridge this research gap by way of

utilizing such data of online chat messages. The primary research goal is to examine and measure student participation through chat box of the online learning platform in an online English course and to investigate how it might relate to other variables such as students' learning outcome and their evaluation of teaching performance in online learning.

II. Literature Review

Prior to measuring student participation and examining its relations with other variables, researchers have attempted to conceptualize and categorize student participation in numerous ways. The interpretations may vary depending on different contexts and quite often overlap with one another. For example, Chou and He (2016) referred participation to a number of unsolicited responses volunteered. Dancer and Kamvounias (2005) regarded it as an active engagement that incorporated five elements of participation, contribution to discussion, group skills, communication skills and attendance. In addition, more conceptualizations include students' responses to teachers' questions, students' engagement in course by readily speaking, reading, thinking, taking role and taking risk (Peterson, 2001; Czekanski & Wolf, 2013). Compared with the conceptualizations of researchers and faculty, students seemed to understand participation in different ways and extend its range. While active students defined participation as only voluntary interaction in class, quiet students included more elements of participation such as attendance, active listening and being prepared (Frymier & Houser, 2016). Regarding the online learning mode, Hrastinski (2008) considered online participation to be a process of learning by taking part and maintaining relations with others, which emphasized connection with others as the foundation of online participation. Luo et al (2017) thought that online participation comprised all activities of reading, reflecting, writing and interacting with peers during online learning. Finally, the author (2022) provided a more encompassing explanation -- "learners attend to learning that might persist in numerous ways and through various media in the online environment".

On top of the conceptualizations, student participation is also classified into different categories and summarized into various patterns and levels depending on how or how much they participate in class. In particular, Theriault (2019) found that students engaged themselves in class by way of oral participation to demonstrate interest and silent participation when they felt less confident. With oral participation, students shared information and personal experiences with each other to signal interest and asked questions to ensure compliance in class. Unlike oral participation that was easy to be detected, silent participation such as physical actions of nodding head, shrugging shoulders, raising a hand or giving two thumbs up were more likely to miss. Other examples of silent participation included use of course materials and technology, which demonstrated a less public approach to respond and participate in class. Shi and Tan (2020) also categorized similar two groups of student participation: vocal participation and silent participation especially in regard of classroom discussions. Furthermore, Sedova (2017) unraveled that student participation in classroom discourse followed the IRF pattern -- teacher's initiations, students' replies and teacher's feedback.

Apart from traditional classroom discussions, online discussions also generated different patterns of student participation: full participation, inbound participation and peripheral participation (Kim et al, 2021). More varied patterns included advanced participation, balanced participation, early participation, limited participation and delayed participation in online course (Haniya and Paquette, 2020). Kizilcec et al (2013) summarized four patterns of participation as follows: completing, auditing, disengaging and sampling patterns. Anderson et al (2014) concluded five patterns: viewers, solvers, all-rounders, collectors and bystanders. On describing the online participation patterns, researchers not only depicted how students participated but also indicated how frequently students had participated, which may range from complete engagement in the majority of assessment to infrequent completion of assessment or from primary participation in the assignment to low activity profiles (Kizilcec et al, 2013; Anderson et al, 2014)

So far student participation has been surveyed more often in the context of classroom discussions and online discussions. However, the present study holds that students participate in a myriad of learning activities that go well beyond the constraint of discussions both in physical classrooms and online. For example, the short written messages sent by students to the chat box of online learning system also constituted a unique way of online participation. Very few studies have utilized online chat data to examine student participation. Among them, one previous research (Author, 2022) revealed that student participation indicated by such online chat data might fall into five categories: students' responses of factual information, social interaction, phatic communication, tech-related messages as well as class schedule. The findings indicated that students voluntarily engaged and interacted online in different ways other than mere discussions. Indeed, online student participation may feature both domains of traditional class participation and online participation. It may traverse from the traditional options of asking & replying questions, presentation, discussions, comments, role-plays and dialogues (Tsai et al, 2021; Frymier & Houser, 2016; Hrastinski, 2008; Handelsman et al, 2005) to online-specific engagement like online posts, online text messages, trace data, log data, page views, click-through rate and winning digital badges (Cheng & Lei, 2020; Chou & He, 2016; Heaslip et al, 2013). Moreover, these also serve as the data that are employed by researchers to examine student participation. Basically the data consist of two main types: one type of data

pertaining to online learning involves reflection logs, discussion posts, viewing videos online, online submission, editing submission, blog articles & comments and hits on the online courses ((Hew and Cheung, 2010; Kim et al, 2021; Rubio et al, 2018; Stamm et al, 2017; Luo et al, 2017). Then the second type of data that is more traditional covers self-report surveys, Likert-scale questionnaires, field notes of classroom observation and interview data (Therault, 2019; Ozkara & Cakir, 2018; Frymier & Houser, 2016; Crosthwaite et al, 2015; Frishy et al, 2014; Heaslip et al, 2013).

These data types have been used to reveal various participation patterns, measure their levels and uncover their relations with other variables. Empirical studies are mainly concerned about what factors have impacted student participation and how student participation might affect teaching and learning (Rubio et al, 2018; Haniya and Paquette, 2020). Researchers have found that many factors contribute to student participation. Some are extrinsic or external factors like offering credits, badges, certificates, grades, shortening online learning sessions as well as classroom climate, class size, instructor participation and teacher presence (Frymier and Houser, 2016; Khalil and Ebner, 2017; Rocca, 2010; Stamm et al, 2017). Others are intrinsic factors covering learning styles, motivation, expressed emotions and personality traits (Crosthwaite et al, 2015; Rocca, 2010; Haniya and Paquette, 2020; Kim et al, 2021). As to how student participation affects learning, the most common research concern lies in its impact on students' performance generally measured by final scores, oral reading proficiency, discussion board grades and group wiki grades (Liu et al, 2019; Kim et al, 2021; Luo et al, 2017). Nevertheless, findings in this regard have been mixed with inconsistent findings (Rubio et al, 2018; Luo et al, 2017; Crosthwaite et al, 2015; Tsai et al, 2021). In particular, Rubio et al (2018) found a strong correlation between low levels of online participation and low grades in the course. In the study of Luo et al (2017), students who were more active in learning management system had higher final course grades. On the contrary, Crosthwaite et al (2015) held that participation even included as a measure of course achievement, had little impact on performance.

Overall, review of the relevant literature indicates that very few studies have investigated student participation indicated by the short written text messages that students send to the chat box of online learning system (Author, 2022). Furthermore, studies that have looked into the relations between student participation and learning performance produce inconsistent findings and studies that probe into student participation and other variables like teaching performance are scant. Thus, the present research thus aims to measure student participation through chat box and to explore how the online student participation relate to variables like learning outcome and teaching performance. To this end, three research questions are addressed in the present study:

1. What does chat data from the chat box of the online learning platform indicate about student participation in the online English course?
2. How does student participation indicated by the online chat data relate to students' learning outcome and their evaluation of teaching performance?
3. What are the reasons behind the phenomena?

III. Methods

Study context

The present research was conducted in the context of an online English course at a university. Due to COVID-19 pandemic, this comprehensive English course was instructed online for a complete semester through the online learning system of Zoom Meeting, an online audio and video conferencing platform. Users are allowed to set up virtual video and audio meeting, webinars, live chats, screen-sharing and other collaborative capabilities. In addition to speaking up to microphones, users can also communicate with each other by sending synchronous written text messages to all in the chat box of the platform. Chat box functions well especially when learners are not particularly called on by the instructor to answer questions in class and when they spontaneously and voluntarily send and share messages with all in the online learning system. It is these short written text messages, free chats and casual utterances collected from the chat box online that make up the primary data to measure and examine student participation in the present study.

As to the comprehensive English course in question, it was an EGP course (English for general purpose) for English Education majors at university. It aimed to develop English language knowledge and competence of learners. The English course was conducted face to face in physical classrooms and then changed to online mode during the pandemic. With 4 sessions arranged in two days a week, the online English course spanned 64 credit hours of 16 weeks in one semester. In this semester, four units were instructed covering "Food and Drink", "Health and Medicine", "Advertisement" and "Sports". The online English course of the three classes was instructed by one English teacher, using the same course book, the same course schedule and the same course evaluation.

In terms of evaluation, the online chat was not evaluated as it was the free chat in the chat box of the online learning system. There was no requirement from either the teacher or the course on the online chat, making it a direct indicator of online participation in a most natural, intact and spontaneous context.

Participants

Participants of the study were 84 English sophomores from three classes of English Education School at a university. They had the same course curriculum and learnt the same comprehensive English course through the same online learning system of ZoomMeeting. The three classes were similar in class sizes of 29, 27 and 28 students. Among them, 6 were male students and 78 were female. They were of similar age of 20. Among them, 9 students were later interviewed depending on their participation levels in the online English course. In particular, 3 students were singled out for the lowest participation level and 6 students were selected for their active participation.

Data types and data collection

Two main types of both qualitative data and quantitative data were employed in the present study. First of all, qualitative data consisted of two groups. The primary qualitative data were collected from the written text messages that participants had written and sent to the chat box when they had online lessons on the online learning platform. So far previous studies using online chat data to examine student participation are very scant (Author, 2022). The current study holds that online chat data actually makes up a more direct and relevant indicator that mirrors student participation online. Consequently, in the online English course, the chat data were gathered for 12 sessions each week over three months from April to July and finally amounted up to 145 credit hours of valid chat data. The total data set consisted of 58,191 words.

The second group of qualitative data were the scripts of the follow-up and semi-structured interviews. After analyzing the online chat data, the researcher selected 9 participants for the follow-up semi-structured interviews. The interviews were conducted in paper-pen versions rather than in a face-to-face mode. In other words, these participants were required to write down on paper their responses to two open-ended questions. The written responses to the two open-ended questions were collected by the researcher and the interview script served as the second group of qualitative data. Below are the two interview questions:

1. As an active/ a less active participant, why did you frequently/rarely send text messages to the chat box in the online English course?
2. In your opinions, why do students tend to be more active in online class especially in the chat box but more silent in physical classrooms?

Then quantitative data used the final scores of students to measure the learning outcome and their scores of course evaluation from the official online course evaluation system to indicate teaching performance. Final scores were collected at the end of the semester after students finished their final exam and the teacher finished marking the final papers. Then the course evaluation scores of the online English course were obtained from the official online course evaluation system where all courses administered at the university were evaluated and scored by students.

All data were obtained with the consent of the participants and the administration of the university. The researcher assured all participants that all data were to be used solely for academic purpose and the study would not affect the evaluation of either students or the teacher in any way.

Data analyses

Upon collecting both the qualitative and quantitative data, the researcher counted and analyzed the data in different ways. First of all, the numbers of the qualitative online chat data were calculated. To count their numbers, the present study took one line of written utterance sent in the chat box as one complete message. This could be either words, phrases, sentence fragments or complete sentences in the chat box. For example, “peel”, “pills”, “Super Bowl”, “diamond-studded ring”, “grilled sweet potato”, “because of hot temperature”, “good afternoon”, “see you”, “Egg plants must be eaten with skin”, “Professor, my camera is not working now” etc. Then based on counting the numbers of the messages, the researcher conducted further statistical analyses. The analyses included descriptive statistics and correlational analyses to measure student participation indicated by the online chat data and to explore its relations with variables like learning outcomes and teaching performance. Finally, the scripts of the semi-structured interview were analyzed and generalized to disclose possible reasons behind the phenomenon.

IV. Findings

Research question 1

In this part, the results will be presented according to the research questions. For research question 1, statistical analysis such as descriptive statistics was utilized to depict student participation indicated by the online chat data.

In the present study, one line of written utterance sent in the chat box counted as one complete message. This could be either words, phrases, sentence fragments or complete sentences in the chat box. Therefore, the

entire 58191-word online chat data made up 9433 messages in total. On scrutinizing all the 9433 messages, the researcher found no trace of messages irrelevant to the online instruction. In other words, all chat data were highly course-related and learning-oriented.

In order to measure more precisely student participation in the online English course, further statistical analyses were conducted based on the counting of the messages. First of all, descriptive statistics was used to analyze the online chat data. On calculating the total number of messages sent to the chat box by each student over the semester, the researcher found that the total messages sent by each student ranged from the highest number of 382 to the lowest number of merely 4. Table 1 lists the results of descriptive statistics and Figure 1 presents the numbers of total messages sent per student in the random order. With all 84 participants engaged and an average of 112 messages sent per student over the semester, the results showed extensive and active participation indicated by the online chat data in the online English course.

Table 1. Descriptive statistics of online chat data by each student

N.	Means	SE	Median	SD	Variance	range	Min.	Max.
84	112.2976	9.3116	86.5000	85.3422	7283.296	378.00	382.00	4.00

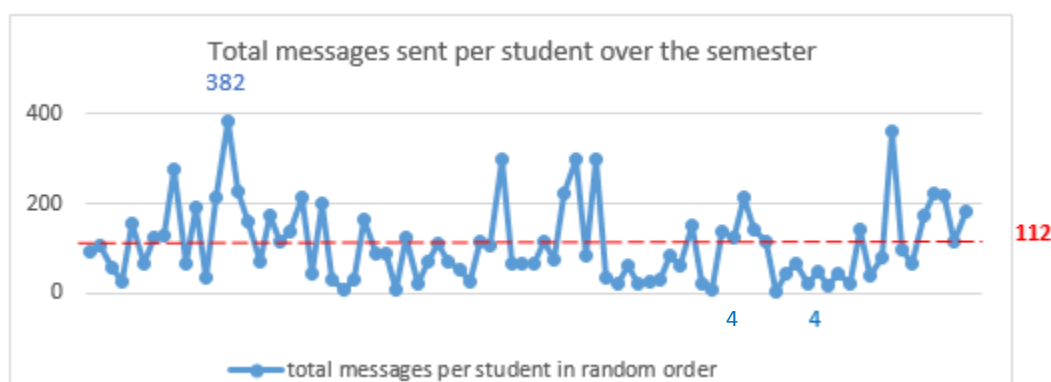


Figure 1. The total messages sent per student in the random order

Then Figure 2 shows the total numbers of messages sent by each student in the descending order as well as different participation levels. In Figure 2, the descending line of the chat data dropped from the top 382 to the bottom 4 and was divided into three sections, indicating different levels of participation. Regarding participation levels, previous literature shows no fixed criteria and no clear-cut line for dividing different levels (Rubio et al, 2018; Dewan et al, 2019; Tsai et al 2021). Some researchers (Wu, 2012) tend to divide three levels based on such criteria: 30% for both high level and low level while 40% for the level in between. Taking into account of the minimal online participation in previous literature (Haniya and Paquette, 2020; Ebner, 2017) and the present research context including the average 112 messages per student, the current study decided to set the dividing line by 150 and 50. In other words, sending more than 150 messages was regarded as dynamic participation and sending less than 50 messages was considered to be passive participation. Then the group sending messages between 150 and 50 was taken as the normal participation. As indicated in Figure 3, passive participation represented 26% while active participation took up 27% and normal participation accounted for 47%. In combination, both dynamic and normal participation made up 74% of all, indicating an active participation in the online English course. In short, data in Table 1 and the three figures combined together manifested that student participation indicated by online chat data was active and extensive in the online English course.

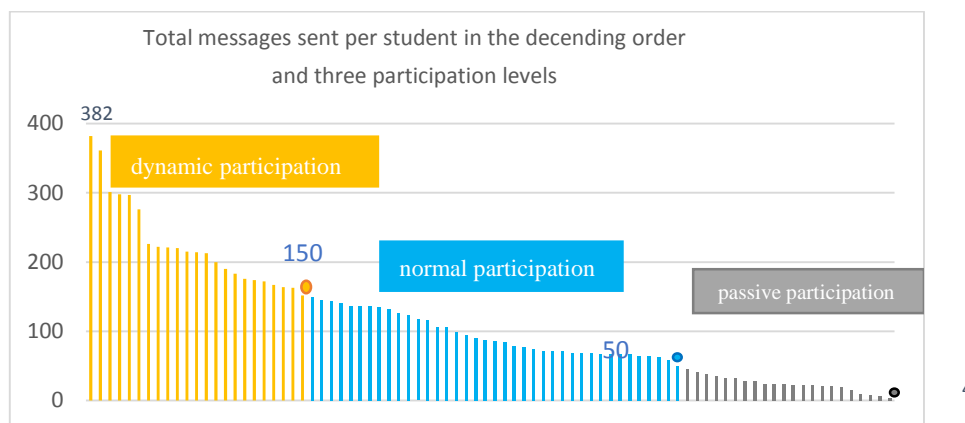


Figure 2 The total messages sent per student in the descending order and three participation levels

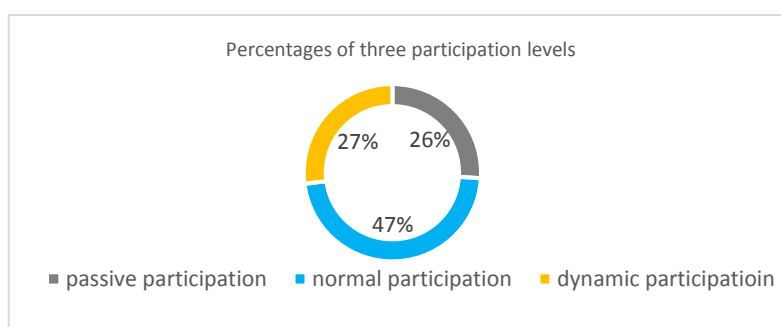


Figure 3 Percentages of three participation levels

Research question 2

To answer research question 2, correlational analyses were conducted to examine how student participation related to other variables of learning outcome and teaching performance. To this end, the total number of messages sent by each student over the semester was used to measure their participation. Their scores of final exam were employed to manifest learning outcome and students' course evaluation scores were utilized to indicate teaching performance. Spearman correlational analyses were run and results showed that no significant correlation was found either between student participation and learning outcome ($r=.187, p=.635 > .005$) or between student participation and teaching performance ($r=.203, p=.170 > .005$).

Research question 3

Finally, qualitative data from the follow-up semi-structured interviews provided some insights into the reasons for students' online participation in the online English course. In the first place, the chat box of the online learning platform seemed to contribute to active participation in that it helped to lessen participation apprehension and face fear that often held students from speaking up in physical classrooms (Frishy et al, 2014). Chat box also served to attenuate the calling-on preference of the instructor, creating a less threatening and safer climate for communication. This is confirmed by student M who was the most active participant and sent 382 messages over the semester. She admitted that she was much more active in sending text messages to the online chat box than speaking up in physical classroom. She explained why:

Student M (382-message): "I am often rather silent in classroom, not because I am shy but because I am worried about making mistakes and how the other students might look at me. However, the online chat box protects me with the computer screen from others' look, making online "speaking" so much easier. Back in physical classrooms, teachers might prefer only a few particular students to speak over others. Even when I feel like speaking, I seldom have the chance. This is completely different in the online chat box where all students are free to "speak" online."

Additionally, student M (382-message) pointed out that this condition was not only limited to her but was actually found with other students: "Online chat box does reduce some students' fear of 'speaking' in class. According to my observation, some students seldom speak in physical classrooms but in online chat box they 'speak' much more often and communicate with the teacher much more actively in the online class". Student L, who sent 361 messages and was the second active participant, also acknowledged this "speaking anxiety": "... chat box mainly displayed written messages, which helped reduce speaking anxiety in physical classrooms".

In fact, this “fear” was not only recognized by all the six active participants but also shared by passive participants in the interview. Among the passive participants, student C sent only 7 messages through the semester. She had similar opinions: “Face to face talk tended to make me embarrassed but online “speaking”, with the protection from computer screen, was quite different. People quickly forgot whatever mistakes you made. The mistakes would soon be covered and replaced by the coming new messages.” Student D (4-message) added to the idea that chat box produced less pressure by freeing students from the trouble of raising hands and the worries of pronunciation and intonation.

Obviously, speaking up in front of the whole class triggered much pressure and stress among all interview respondents whether they were active or passive. In contrast, by typing in words and short messages in the online chat box, interviewees said they were more relaxed and thus more willing to communicate with the teacher, with their peers or simply to voice their opinions freely and spontaneously.

Furthermore, online chat seemed to play a meaningful role in forming affective bonds and building learning community online by creating a less isolated virtual climate. Student Q who sent 226 messages wrote:

“Personally speaking, I felt a bit lonely while having online class at home all by myself. Without the company of classmates, it simply didn’t feel like we were having class. ... but all the text messages rushing into the chat box from classmates made me feel warm and connected to the class. I felt I was still together with the whole class.”

This was agreed by passive participants as well regardless of the limited number of messages.

student C (7-message): “...sending messages in the online chat box brought students closer to the teacher”.

On top of satisfying students’ affective needs, online chat also contributed to improved their concentration on instruction and higher degree of cognitive engagement during online learning. For example, interviewees mentioned that frequently sending messages to the chat box could make them focus better on instructional contents and follow more closely the instruction flow.

Student Q (226-message): ... in my own case, by sending more messages to the chat box, I could become more attentive in class, especially more cognitively active in class.”

Student Y (221-message): “Sending more messages to the chat box helps prevent us from being absent-minded and keep our minds from wandering away in the online class.”

Finally, interviewees of active participants specified one more merit of chat box. Both student L (361-message) and student Z (215-message) mentioned that chat box allowed more freedom of communication. It was quite convenient to type in the chat box as the messages sent were generally short and brief. It was easy and quick.

Contrasting active participants, passive participants sent very few messages to the chat box. Interview data from passive participants showed that the main reason for passive participation was attributed to participation apprehension, which was shared by active participants as well. In addition to this main reason, other minor causes included slow typing, inadequate preparation and reluctance to repeat or copy others.

In all, qualitative interview data generated the following findings:

- Online chat box played a meaningful role in facilitating student participation
- Online chat box helped attenuate participation apprehension and made communication and interaction easier and more convenient
- Chat in the online box assisted concentration on instruction and maintained learning community.

V. Discussion

So far, results of both quantitative and qualitative data of the present study have generated three main findings. First, the online chat data indicated that student participation in the online English course was active and extensive over the semester. Then reasons behind this active and extensive student participation online were mainly attributed to the significant role of the chat box of online learning platform. Respondents of the interviews explained that the online chat box served to alleviate participation apprehension, improve concentration on instruction and build learning community. Finally, student participation was not found to be significantly correlated with either learning outcome or teaching performance.

Then these findings are to be discussed in relation to previous studies. Previous studies show that the major problems with online learning often lie in lower participation and higher drop-out rate (Author, 2019; Allen and Seaman, 2014). For example, Haniya and Paquette (2020) have found that only 5.4% out of all learners in their study were advanced participants who were most committed toward online course activities including accessing video lectures, submitting quizzes and joining in discussion forums throughout the online course. However, over 76% of learners were limited participants who were much less active. In some studies, the drop-out rate of low participants in online courses went up to 86.80% (Ebner, 2017) and only one third students were regular participants (Rocca, 2010). Nevertheless, in this study, around 74% of students were normal and active participants

whereas passive participants took up only 26%. The percentages of passive participants of the present study were much less than those in the previous studies. With all 84 participants sending messages to the chat box and an average of 112 messages per student, the present study showed that the online student participation was active and extensive. The researcher holds that calculating the actual message numbers sent to the online chat box actually enables more precise and direct measurement of participation frequency and level rather than general classifications in previous studies (Kizilcec et al, 2013; Anderson et al, 2014).

The primary findings of interview in the present study associate active online student participation with the role of online chat box. The chat box of online learning platform collects short written text messages sent by students both to the instructor and to their peers during online classes. Without deterring the instruction flow, the online chat data were often causal utterances that were extemporaneous and unrehearsed. They were largely free but on-task responses to the teacher's instruction or free on-task chats among students on the spot (Author, 2022). Unlike intended responses to the teacher after being called on or formal speeches-like oral presentations in front of the whole class, online chat were less likely to face evaluation of the teacher or judgement from the peers (Frisby et al, 2014) and thus created a lower-risk method of being engaged in class (Therriault, 2019). Respondents of interviews in the present study stated that sending text messages in the chat box served to free them from worries of how others might look at them and comment on them. With the quick flow of online messages in the chat box, nobody would care who sent the messages or whether the messages were correct or not. Consequently, online chat tended to create lower-risk anonymous participation which generated less communication anxiety and participation apprehension. The present finding corresponds to some of the previous research. For example, Heaslip et al (2013) found that students preferred to answer questions in an anonymous way and this anonymity enabled students to answer questions without feeling embarrassed if their answers were wrong. The anonymity feature was said to increase students' willingness to participate in class and make the class more interactive. Latham and Hill (2013) also confirmed similar preference of students for anonymity in their study and encouraged students' anonymous participation in the classroom. The present research differed from the two previous studies in that it was the online chat box that brought forth anonymous participation in this study while similar engagement was accomplished by electronic responses systems in the two previous studies (Heaslip et al, 2013; Latham and Hill, 2013).

In fact, class participation has been regarded as potentially threatening especially to students with strong face needs (Frisby et al, 2014). Students are often concerned about evaluation from both the teacher and their classmates. They are also worried about losing face once they turn up wrong answers or make mistakes especially when speaking up in front of the whole class (Freeman et al, 2006; Tang et al, 2020). Students were also found to have strong inclination towards correct answers, which in turn held them from active participation in class (Tang et al, 2020). Other contributing factors included concern about peer acceptance (Neer & Kircher, 1989) and lack of preparation (Fassinger, 1995). All of these worries unveiled in the literature correspond to the interview findings in this study. Researchers have found several strategies to overcome participation apprehension and one of them was avoidance strategy by simply not participating (Frisby, 2014), which was in line with one of the reasons identified by passive participants in the present research. In addition to strategies like seating arrangement in physical classrooms and instruction strategies (Fassinger, 1995; Frisby et al, 2014), the present research holds that online chat box plays a significant role in easing participation apprehension and thus promotes lower-risk and more active student participation. This is a finding that is so far less discussed in the literature (Author, 2022).

Additionally, the present research also found that online chat box helped students to concentrate better on online instruction. Active participants mentioned that sending messages to the chat box could enable them to catch the instruction flow and attend to the instructional contents all the time. By frequently responding to the teacher, volunteering their own answers or commenting on their peers' answers, participants were making efforts to keep themselves cognitively active and engaged in learning online over time. Thus such persistent and frequent online chat actually made up an optional practice of active learning beyond mere discussion or group work ((Kim et al, 2021; Haniya and Paquette, 2020; Dallimore et al, 2012). Such active online engagement was often preferred by students in online courses and were found to positively predict student participation (Cole et al, 2019).

The third main reason accounting for active participation indicated by online chat data was associated with students' affective needs to stay connected to the class and to maintain involvement in the learning community. Isolation constitutes one major problem of online learning that lacks face to face contact especially when students often refuse to turn on the video camera in online class (Cole et al, 2019). Online chat box in the present study made it technologically convenient and encouraging for students to communicate in the online class and allowed more freedom and options for interaction with both the instructor and the classmates. In addition, the influx of all messages displayed in the chat box seemed to be socially contagious and might motivate other students to follow suit and thus spurred on more extensive participation (Tang et al, 2020). Therefore, in addition to teacher-student rapport and confirmation behaviors of instructors (Frisby et al, 2014; Cole, 2019), online chat box also played a role in creating positive online learning climate and constructing learning community by alleviating isolations and building affective bonds among participants in online learning.

Finally, the present study finds no significant correlations between student participation and the two variables of learning outcome and teaching performance. In fact, research findings in this particular area have been mixed. On the one hand, some studies suggest that participation is associated with improved performances and achievement (Stamm et al, 2017). For example, Liu et al (2019) found that students' oral reading proficiency progressed along with their participation in a long-term digital collaborative storytelling activity. This is supported by more studies where either students with more active participation are more likely to have higher final course grades or students with lower participation are more likely to have lower grades in course (Luo et al, 2017; Rubio et al, 2018; Latham and Hill, 2013). On the other hand, other studies indicated that participation had little impact on learners' performance (Crothwaite et al, 2015), which parallels the present research.

Regarding the relation between student participation and teaching variables, the finding of the present research contradicted previous studies. For instance, Cheng and Lei (2020) found that student participation was influenced by various pedagogical elements. Another study by Stephenson et al (2020) also revealed strong correlations between learner engagement and teaching effectiveness. Due to these contradictory findings, more research is needed to examine the relationship between student participation and the two variables of learning outcome and teaching performance in the future.

VI. Conclusion and implication

In conclusion, the present research intended to examine student participation through chat data from the chat box of the online learning platform in an online English course as well as its relation with two variables of learning outcome and teaching performance. Results of both quantitative and qualitative data disclosed a few findings: in the first place, online chat data makes up a unique indicator of online student participation that added to the existing body of oral participation, forum discussions, watching video lectures, trace logs, reflection logs and other log data (Hew and Cheung, 2010; Theriault, 2019; Kim et al, 2021). Then student participation indicated by the online chat data was active and extensive over the semester although it was not significantly correlated with either learning outcome or teaching performance. Follow-up interviews further attributed the active and extensive student participation to the role of online chat box which helped alleviate participation apprehension, build learning community, improve students' concentration on instruction and fulfill participation evaluation.

Implications can be drawn from the main findings. One primary finding suggests that online chat box has been quite impactful on creating virtual class climate and has been technologically encouraging in promoting lower-risk and more active online communication and interaction. With its inherent advantage, the technology of online chat box is more likely to satisfy students' face needs by attenuating their face fear and freeing them from the worries about correct answers, making mistakes and speaking anxiety in class (Latham and Hill, 2013; Tang et al, 2020). This advantageous value of technology reminds researchers and instructors of translating similar class climate to other instruction modes such as traditional face to face instruction. To create class climate that is safe and encouraging for student participation, positive and supportive teacher-student rapport is needed (Frisby et al, 2014). Instructors should make efforts to construct caring and inclusive spaces to tolerate incorrect answers and to encourage learning through mistakes and continuous attempts. Students are believed to participate more actively if instruction can truly assist and support learning instead of evaluating learning and assessing performance all the time.

Limitation and future study

Due to the limited scope, the present research also reveals a number of limitations that provide grounds for future study. First, the small sample size suggests that one should be cautious about the generalizability of findings. Another limitation concerns the interpretations of the findings regarding the relations between student participation and the two variables of learning outcome and teaching performance. The fact that no significant correlation was found between them does not mean that student participation is not related to these variables. Instead, it points to the direction for further research in the future: more different research designs should be planned and more various data should be collected as the indicators to represent and measure students' learning outcome and instructors' teaching performance. Finally, future study might also take into account more variables such as instructional pedagogies and instruction contents to examine how student participation interacts with them.

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