Research on Online Classroom Language between Teachers and Students

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Abstract

Under the new situation, online live teaching has become one of the important teaching methods. The verbal interaction between teachers and students is an important explicit behavior in online live teaching. To further improve the quality of teacher-student verbal interaction in an online live classroom, this study constructs a speech interaction behavior coding system for teachers and students in an online live classroom, which is based on the ITIAS teacher-student interaction coding system and Bellack's interaction structure theory. By observing the online live class of Luoyang No.56 middle school, conclusions are found in terms of interactive structure, the level of interaction, the interactive atmosphere, and the interactive dynamics. Online Classroom Language Between Teachers and Students infulences the effectiveness of the classes greatly. According to the study, the researcher put forward some strategies to improve the effectiveness of teacher-student verbal interaction in online live classrooms. The researcher believed that this research will give important guidance for the development of the school-based online live curriculum, and promote the development of the school-based online live curriculum.

Keywords: online live classroom, teacher-student verbal interaction, classroom behavior observation, the development of school-based online live curriculum

1. Introduction

Under the background of the "Internet" era, the deep integration of information technology and teaching is the inevitable trend of educational development. As an embodiment of the integration of information technology and teaching, an online live classroom is a real-time interactive teaching method through the Internet. It mainly relies on the real-time teaching system to realize the live classroom.(Wu & Yang, 2006) Because teaching and learning is an interactive process between teachers and students, the effectiveness of teacher-student verbal interaction in an online live classroom is closely related to the effect of live classroom teaching(Bai, 2000). Teacher-student verbal interaction mainly emphasizes the communication activities and the flow state between teachers and students in the classroom. It runs through the whole classroom dynamically, so it contains many teaching value orientations and becomes the tension aggregation domain of many teaching behaviors in concealment (Mao & Chen, 2019).

At present, the research on online classrooms mainly focuses on three aspects. First, in terms of effect evaluation, social platforms and school-level platforms have advantages in the mixed and interactive classrooms where students' initiative is given full play (Ningsih et al, 2022). Different models have their advantages in time synchronization, stability, teacher-student interaction level, and social presence, and the applicable objects are also different (Yang, 2020). Second, in terms of strategy research, some researchers have built a teaching model of organic integration of theory and practice, reality and virtual for chemistry online classrooms (Xie & Li, 2020). Third, in the aspect of classroom element analysis, the researcher Yuan Bo analyzes the classroom organization of graduate students' online live classroom and believes that it has prominent characteristics in shaping the learning atmosphere, designing model activities, and maintaining the teaching order (Yuan, 2020). The learning environment of geography online live classroom was analyzed and it could be seen that it has its characteristics in teaching resources, interactive tools, situation creation, and teaching mode (Silalahi, Silalahi & Herman, 2021). The researches on online classroom are still in its infancy, and most of them are macro research. Online classrooms started late in China. Analyzing the effect of online classrooms simply or putting forward improved strategies is difficult to analyze deeply the problems existing in the current online classroom.

In language learning environments, out of the four targeted skills, speaking is the one most in use as it is through speaking that teachers and learners communicate(Thao et al., 2021).Compared with the traditional classroom, teacher-student verbal interaction is an important explicit behavior in the online live class. Because it is carried out at the same time and in different spaces, it has unique forms and characteristics. To explore the characteristics and existing problems of teacher-student verbal interaction in the online live classroom, this study constructs a classroom interaction coding system in line with the actual situation, which is based on the current situation of the online live classroom. This study explores the characteristics of teacher-student verbal interaction from the four dimensions of teacher-student verbal interaction structure, interaction atmosphere, interaction level, and interaction dynamic, to provide references for the effective implementation of online live classrooms.

From the perspective of the current situation in the world, due to the instability of the COVID-19 outbreak, any area can be designated as a lockdown zone at any time. In the lockdown zone, people have to stay at home, and students cannot go to school to have classes. Schools have to hold online live classes to continue students' education. The increasing of using the media in learning process such as android become a new phenomena, but the motivation of students in learning become less since the teachers did not meet and face-to-face with the students in the learning process(Silalahi et al., 2022). As mentioned above, online live classes are different from traditional ones. Therefore, it is urgent and necessary for local schools to develop their online live curriculum. That is to say, schools have to develop a school-based online live curriculum to deal with a possible outbreak. The researcher hoped that this research will give important guidance for the development of the school-based online live curriculum, and promote the development of the school-based online live curriculum, which is the further implication of this study.

2. Method

2.1 Samples

This research selects the No56 middle school in Luoyang city, China. The researcher is working in this school, and it is convenient to carry out the study and collect the data. No.56 middle school in Luoyang city selects the "Ding Talk" platform according to the needs of school information-based teaching and students' learning situation. From the perspective of platform functions, it has three advantages. First, it has complete classroom teaching functions, such as the submission of questions and answers, speech in the discussion area, and playback after class, which can mobilize every student to participate in the class fully. Second, it has the function of data acquisition. Teachers can generate relevant data in the background to provide a basis for students' process evaluation and teachers' teaching reflection after class. Third, it has set up a "teaching assistant" to help the teacher teach online and expand the form and scope of verbal interaction between students and teachers. From the perspective of teaching procedures, students can participate in the part of practice before class, learning during class, and the part of homework after class through the platform, which reflects the complete learning process. Therefore, the "Ding talk" platform has strong teacher-student interaction functions and complete teaching functions. It meets the needs of the online live classroom and can improve the efficiency of online teaching effectively (Chen & Liang, 2020).

Firstly, the researcher selected 20 classes from Luoyang No.56 middle school on the "Ding talk" platform by random sampling, observed the verbal interaction between teachers and students, and eliminated the defective samples such as incomplete and fuzzy videos. The amount of students in the 20 classes is 900, and the number of students in each class is 45. Then, the researcher coded the remaining 10 classes preliminary and counted the amount of time of students' language in one whole class, which is shown in table1. According to the percentage of the amount of time of students' language in each class, it is found that they can be divided into two classes roughly, the class with fewer students' language and the class with more students' language. The first two classes with the highest percentage of the amount of time of students' language in each class are defined as classes with more students' language, which is compared with the other left 8 classes. To ensure the scientificity of the research results, the researcher selects two typical lessons from each type of the two classes according to the equal number distribution method. The research samples are shown in Table 2.

Table 1. the Amount of Time of Students' Language in the Selected 10 Classes

	Class Time	the Amount of Time of Students' Language Time	Percentage(%)
Class 1	23.10min	3.20min	13.85
Class 2	22.16min	8.06min	36.37
Class 3	23.70min	4.61min	19.45
Class 4	26.12min	16.20min	62.02
Class 5	22.42min	9.31min	41.53
Class 6	25.26min	10.10min	39.98
Class 7	23.63min	7.28min	30.81
Class 8	24.00min	15.60min	65
Class 9	26.23min	6.80min	25.92
Class 10	22.78min	8.21min	36.04

Table 2. Selected Class Videos

	Class type	Content of Classes	Class Type	Class Time
Class A	Classroom with Fewer Students' Language	Geography in Grade 8	New Teaching	21min
Class B	Classroom with Fewer Students' Language	English in Grade7	New Teaching	26.7min
Class C	Classroom with More Students' Language	Chinese in Grade 8	New Teaching	25.15min
Class D	Classroom with More Students' Language	Politics in Grade 7	New Teaching	24.93min

2.2 Methodology

The type of this research design was an explanatory sequential mixed method. It was also known as a two-phase method. In the first phase, the researcher collected and analyzed the quantitative data. Then the researcher used the results to plan the second phase - the qualitative phase. The quantitative results typically informed the types of participants to be selected for the qualitative phase and the types of questions that were asked to the participants purposefully. The overall intent of this design was to let the qualitative data help to explain the initial quantitative results in more detail.

2.2.1 Research Instrument and Its Validity and Reliability-- Quantitative Method

This study improved the ITIAS coding system, which was based on ITIAS(Interactive Analysis System based on Information Technology), combined with the characteristics of an online live classroom, and referred to the interactive structure theory of A.A. Bellack, a famous American scholar. Through a large number of empirical studies, A.A. Bellack found that "teacher induction - student response - teacher feedback" was the general tendency of the interactive structure between teachers and students in classroom teaching(Bellack, 1966). In terms of coding the samples, it was based on the interactive structure theory of A. A.Bellack. The researcher made preliminary improvements in the coding content and had a deep discussion with 9 teachers with rich experience in teaching. Then the researcher consulted with 5 experts with rich experience in the field of education. 2 of the experts are from universities in China. 3 of the experts are from the universities in Malaysia and UK. According to Creswell (2009), validity threats could be in any form from the factors of treatment procedures, behavior, experiences, and research sample, that may threatened the ability of researchers to obtain correct and accurate inferences of the data. Therefore in this research, 14 teachers and experts in the field of education were involved in measuring and modifying the coding system. They were asked to measure if the coding system could meet the requirements of the research. After the repeated evaluation and improvement of the coding system, the researchers constructed a coding table of teacher-student verbal interaction in the online live classroom from three dimensions: teachers' language, students' language, silence and chaos(Table3). The researcher regarded "elicitation" and "feedback" as the main contents of teachers' language, and "answer" and "students' question" as the main contents of students' language. At the same time, "silence and chaos" in the classroom were added as the third category of coding. In this coding table, the researchers made the following modifications to ITIAS. First, the speech evoked behaviors of teachers in live classrooms include teaching, questioning, and instruction mainly. Second, teachers' questioning and answering existed in the live online classroom, it was helpful to judge the extent to which teachers guide students to conduct in-depth learning. Therefore, the codes of "questioning" and "answer" were added to the teachers' language. The "answer" here included the teachers' self-questioning and self-answering and answering the students' questions. Third, in online live classrooms, due to the limitation of teaching space and the function of the live platform, students could not have discussions with each other, so the code of "this discussion" was deleted. Fourth, in the dimension of "silence or chaos", the "thinking" and "doing exercises" in the original ITIAS code were combined into "silence conducive to teaching". Compared with the traditional classroom, the online live classroom had the problem of chaos caused by the equipment technology. Therefore, it was divided into two secondary indicators under the "chaos of helpless teaching". Fifth, since the use of technology by teachers and students was an accompanying behavior in the online live classroom, the dimension of "technology" was deleted.

Table 3. Code table of speech interaction between teachers and students in online live classrooms

classification		code	index
Teachers' Language	Induction	A Teaching	
		B Put forward the closed questions	Memorizing Questions(B1) Understanding Questions(B2) Applying Questions(B3)
		C Put forward the open questions	Analyzing Questions(C1) Comprehensive Questions(C2) Evaluative Questions(C3)
		D Instruction	
	Feedback	E Accept Affection F Praise or Encourage G Adopt Advice H Question Closely I Answer J Criticize	
Students' Language		K Answer	Effective answer(K1) Invalid answer(K2)
		L Ask	Questions Related to Knowledge(L1) Questions Unrelated to Knowledge(L2)
Silence and Chaos		M Helpless Teaching Chaos	Caused by instruments and Technology(M1) Not Caused by instruments and Technology(M2)
		N Helpful Teaching Silence	

As for the improved coding system, the researcher did a pilot study. A pilot study is one of the stages that involve an important investigation. It can improve the quality and refinement of the instruments used in this study. It refers to the feasibility study to prepare for the main research. A pilot study can also be the pre-testing or "trying out" of a particular research instrument (Polit, Beck, & Hungler, 2001). Before the formal research, the researcher selected 35 class videos from the Ding Talk platform to use the coding system to collect the data of these videos to test the feasibility and accuracy of the coding system.

2.2.2 Interviews and Its Validity and Reliability-- Qualitative Method

The interview is the most widely employed method to collect data in qualitative research (Bryman, 2004). By doing interviews, the researcher can achieve abundant, deep-going, and minute information to reveal the views of participants. As Patton (1990) quoted, "The purpose of interviewing is to allow us to enter into the other person's perspective" (Patton, 1990). Merriam (1998) stated that "It is also necessary to interview when we are interested in the past events that are impossible to replicate" (Merriam, 1998). Therefore, through

interviews, the researcher can achieve more data about teachers' practices and their real feelings about the online live classroom.

In this research, the researcher conducted the individual interview after collecting the data from the coding system. Class videos were from No.56 Middle school. Hence, the participants in this research were the teachers who had the online live lessons. They were selected purposefully to make sure that they are within the scope of the representative background of the samples involved in the first stage of quantitative research. The 10 teachers were from multiple disciplines and agreed to involve in the interviews. Before the individual interviews, the researcher explained this research clearly to the 10 teachers. They showed great interest in the research. They consented to accept the interviews. Two consent forms were given to them. One form was kept by the participants themselves. One form was signed for this research's purpose.

Table 4. Ten teachers involved in interviews

Name	Age	Sex	subject	Years of Teaching Experience
Li Shanshan	33	female	English	6
Jiang Wen	53	female	Chinese	31
Li Xiaona	44	female	English	20
Wang Wulin	34	female	English	8
Fang Yan	38	female	Chinese	13
Xu Xiaohong	45	male	Biology	18
Jia Xi	32	female	Politics	5
Gao Heng	31	male	Physics	3
Shang Xiaowei	37	female	Math	13
Zhao Yu	29	male	Geography	4

The interview content is designed by the researcher to perceive the teachers' online teaching experiences (positive or negative), challenges, and views on online live classes. As shown by Valenzuela and Shrivastava, the interview is used widely to widen and add our knowledge about individual(s) thoughts, feelings and behaviors, meanings, and interpretations (Valenzuela & Shrivastava, 2002). The interview part was conducted after collecting the quantitative data from the coding system. To validate the interview questions, four experts were invited. The researcher designed the primary interview questions and then gave them to the four experts. Based on the research purpose, the experts revised the interview questions and gave comments on the questions. Through reading the comments of experts for reference, the interview questions were modified to make them valid in the interview meetings.

3. Results

3.1 Quantitative Data Analysis

After coding and counting the samples, this study uses the combination of quantitative research and qualitative description to analyze the speech interaction between teachers and students in the classroom.

3.1.1 Teacher-student Verbal Interaction Structure

In the online live classroom, "inducing - answering - feedback - asking questions by students" is the main language interaction behavior chain between teachers and students, and there will be "silence and confusion" in the occurring process of the behavior chain. Therefore, the proportion of teachers' language, students' language, and silence and chaos can reflect the structure of teacher-student interaction in an online live classroom. The researcher coded and counted the interactive behavior between teachers and students in four classes. The results show that there are great differences in the Ratio of teacher-student verbality in the classroom with more students' language and the classroom with fewer students' language. The ratio of class A and class B is 18:1 and 10:1 respectively. The ratio of class C and class D is 2.6:1 and 1.7:1 respectively.

Compared with the general classroom language norm established by Flanders (Flanders, 1970) through large-scale classroom teaching analysis, the norm between the teachers' language and the students' language is higher than the general norm of 3:1. It shows that in classes A and B, teachers mainly give lectures and ask and answer questions by themselves, and seldom give the right of speaking to students. The structure of classes C and D is better than that of general classes, and the teacher-student verbal ratio of the two classes is lower than the norm of 3:1, which shows that teachers can hand over the discourse right to students consciously and reflect the students' subject status.

Table 5. Comparison of the amount of time of teachers' language and students' language($\overline{X} \pm S$)

Categories	n	the Amount of Time of Teachers' Language(min)	the Amount of Time of Students' Language(min)	t Value	P Value
Class A	45	21.85±1.49	5.03±0.72	27.569	0.000
Class B	45	20.79±1.53	5.42±0.65	24.036	0.000
Class C	45	13.27±1.85	12.75±1.39	1.635	0.158
Class D	45	13.51±1.97	12.63±1.16	1.952	0.104
F Value		14.895	10.317		
P Value		0.001	0.012		

The researcher imported the data of the two types of classes into spss25.0. Measurement data were expressed as mean ± standard deviation. Multiple groups were compared by one-way ANOVA. Lsd-t-test was used to compare the language time of teachers and students within one group. $P<0.05$ was considered statistically significant. The results showed that the amount of time of teachers' language and students'

language was significantly different in statistics among the four groups of classes (P<0.05). The amount of time of teachers' language in class A and class B was significantly longer than that on students' language, and the difference was statistically significant (P<0.01). The amount of time for teachers' language in class C and class D was significantly shortened, and the amount of time for students' language was significantly prolonged. There was no significant difference between teachers' language time and students' language time in class C and class D (P>0.05).

According to the results and norm, the researcher classified class A and class B as the teacher-centered class and class C and class D as the student-centered class. The rate of ineffective silence and chaos in some classes exceeds the norm of 10%, which is due to equipment and network problems. By observing the sample video, the researchers found that there are two situations of chaos caused by equipment and network problems. First, when a teacher turns on one student's microphone and asks him to answer a question, it is easy for one person to fail to hear the other person clearly due to network and equipment problems. Second, during the class, the PPT was blank due to software problems. The teacher stopped teaching temporarily and restarted the software.

3.1.2 Level of Teacher-student Verbal Interaction

The level of teacher-student verbal interaction refers to the depth of interactive dialogue between teachers and students through the voice function in the live platform, which can be divided into shallow interaction and deep interaction. Teachers put forward closed questions with fixed answers, and students follow the process of finding, determining, and answering the answers from a directional perspective. That is the shallow interaction between teachers and students. Teachers put forward open questions with multiple structures and no unique answers, and students mobilize analysis, synthesis, innovation, and other thinking to answer. That is the deep interaction between teachers and students(Jiang, 2019). The researcher collected statistics from the level of teacher-student interaction in four classes. The results show that the proportion of deep and shallow interaction in classes A, B, C, and D is 6:1、3.7:1、1.8:1, and 1.2:1.

The research shows that when the behavior required by the teaching content is less complex, the best proportion of closed questions and open questions is 7:3. When the behavior required by the teaching content is more complex, the best proportion of closed questions and open questions is 6:4. In class A and B, the proportion of deep and shallow interaction between teachers and students exceeds the optimal proportion, and the proportion of closed problems is too large. In classes C and D, the proportion of deep and shallow interaction is close to the optimal proportion. Through the observation of the class videos, it is found that in class A and class B, teachers have arranged more course contents. To complete the teaching contents in a limited time, teachers only designed questions that students can answer by recalling what they have just learned, to consolidate their new knowledge. Teachers rarely put forward difficult problems that need high-level thinking to solve. In these two classes, the chaos caused by equipment problems lasts for a long time, which reduces the opportunities for students to speak in class, and the interaction between teachers and students is less, shallow and ineffective. In classes C and D, teachers promote students' thinking by asking questions constantly. After putting forward each closed question, teachers use the "roll call" function to let students answer, and consolidate new knowledge through shallow interaction between teachers and students. On this basis, open questions are put forward, and many students are invited to answer. The answers of each student are asked and commented on by teachers, which creates a relaxed and open interactive environment between teachers and students. Therefore, the interactive effect between teachers and students is better.

3.1.3 Verbal Interaction Atmosphere between Teachers and Students

The atmosphere of teacher-student verbal interaction is formed based on teacher-student interaction. While affecting the effect of teacher-student interaction, it further affects and strengthens the mode of teacher-student interaction with strong external forces(Ye & Pang, 2009). It is an important indicator of the effectiveness of classroom interaction. This study takes positive reinforcement (coding E ~ I), negative reinforcement (coding J), and students' effective response rate (the ratio of K1 and K) as the main basis to judge the verbal interaction atmosphere between teachers and students, and analyzes the three variables.

Table 6. Analysis of teacher-student verbal interaction atmosphere in online live classrooms

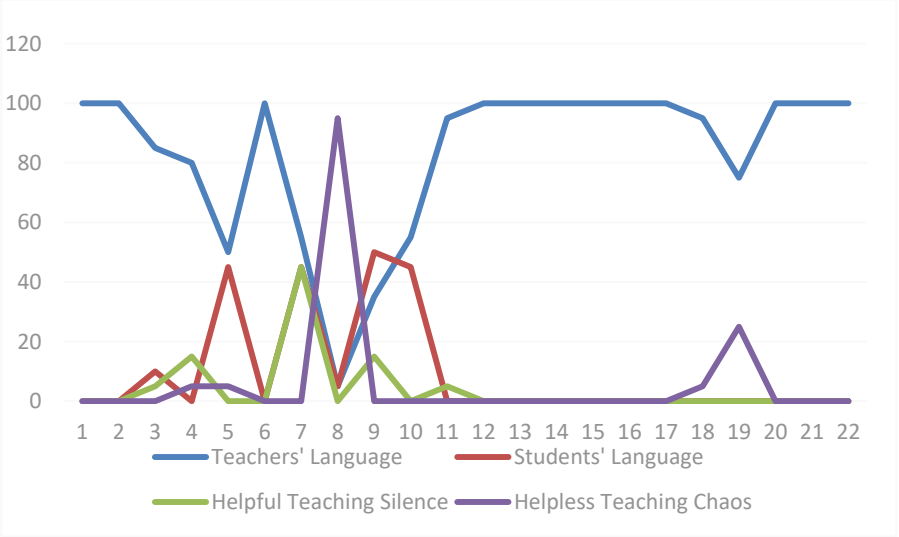
Classification		Rate of Students' Effective Responses	Rate of Positive Reinforcement (coding E ~ I)	Rate of Negative Reinforcement (coding J)
Teacher-centered Class	Class A	97%	7.75%	11.75%
	Class B	100%	7.94%	18.41%
Student-centered Class	Class C	100%	9.75%	13.72%
	Class D	100%	8.42%	12.83%

It can be seen from table 5 that for each question raised by the teacher, the named students can answer it. In class A, the rate of students' effective responses is 98%. on the one hand, By observing this class, the researcher found that several students said they were not clear about the question after being called by the teacher to answer the question. The researchers believe that this is related to the excessive arrangement of curriculum content and teachers' fast speaking speed in class directly. On the other hand, from the rate of helpful teaching silence, it can be seen that the teachers in class left less time for the students in class. After explaining the knowledge points or asking questions, the teachers did not leave enough thinking time for the students, which resulted in the students' ineffective responses. It reduces the effectiveness of the teacher-student verbal interaction. From the perspective of teachers' behavior, the negative reinforcement ratio of the four classes is greater than its positive reinforcement ratio. It reflects that teachers have more negative reinforcement to students,

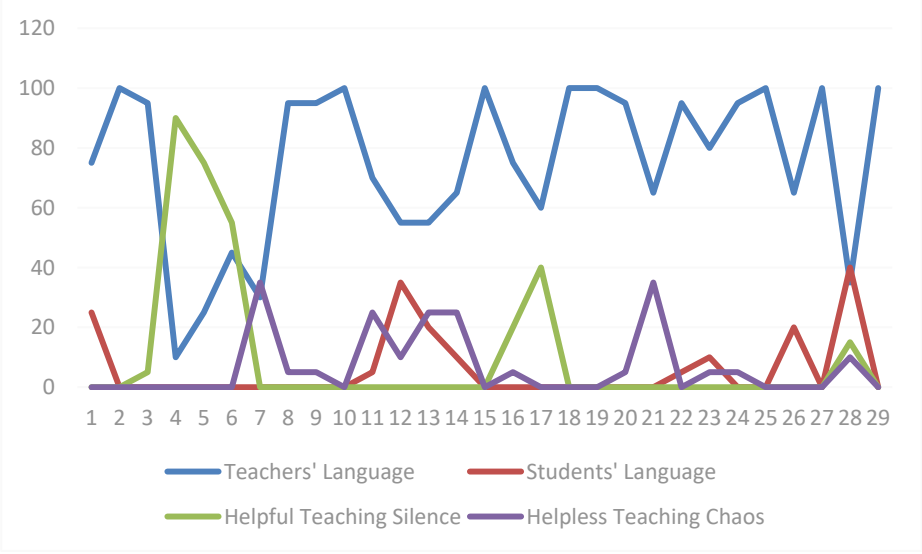
which is reflected in Teachers' instructions to students, and the "criticism" ratio is 0. The results show that there are many instruction languages in the live classroom. On the one hand, it is to organize students' learning, on the other hand, it is to attract students' attention as much as possible and prevent students from being distracted. From the rate of positive reinforcement, it can be seen that the questioning frequency in student-centered classrooms is higher than that in teacher-centered classrooms. Asking questions constantly is conducive to the deep learning of students' knowledge, and improves students' cognitive ability and learning efficiency through the deep interaction between teachers and students.

3.1.4 Dynamic Analysis of Teacher-student Interaction

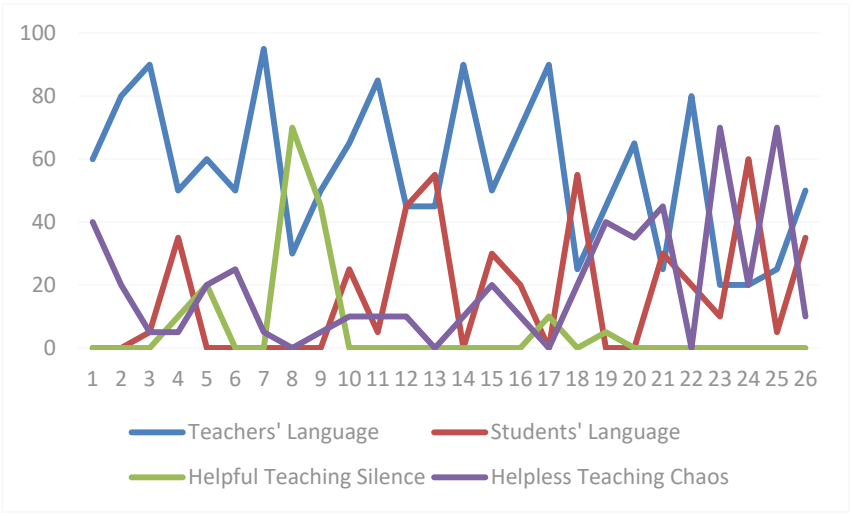
Dynamic line charts can convey the changing process of classroom interaction between teachers and students with the changing time intuitively. The dynamic curve characteristics of teaching behavior in the four classes are shown in Figure 1.



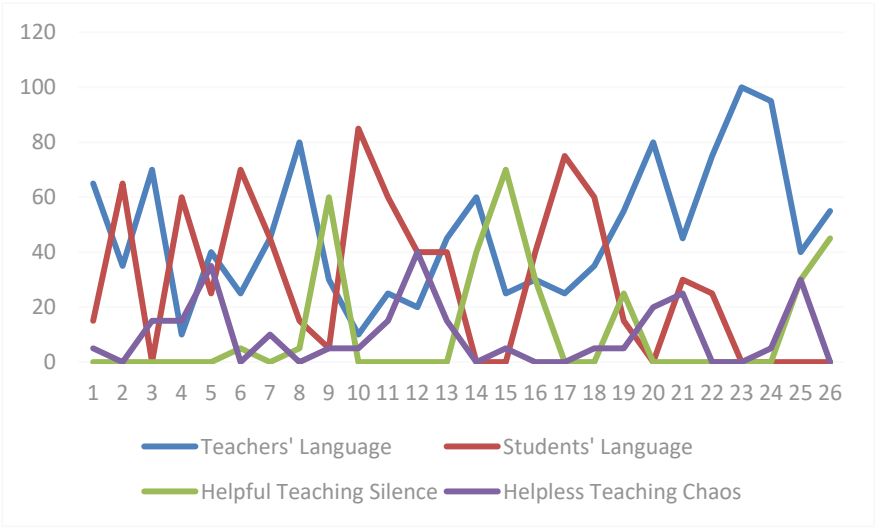
Class A



Class B



Class C



Class D

Figure 1. Dynamic Analysis of Teacher-student Verbal Interaction

From the aspect of teachers' language, the proportion of teachers' language in the two teacher-centered classroom classes is more than 60%, which shows that teachers have mastered the absolute discourse right for a long time in class A and class B. In addition, the proportion of teachers' language in high proportion areas fluctuates little. About 50% of the time at the "bottom" of teachers' language is at the "top" of silence or chaos, which indicates that teachers may give students less thinking time in these two classes, adopt the "self-question and self-answer" teaching mode or "self-directed and self-acting" teaching mode, and give students fewer opportunities to speak. In the student-centered classroom, the percentage of time of the teachers' language is less than 50%, which fluctuates greatly. In the "bottom" of the teachers' language, about 70% are at the "top" of the students' language, which shows that in classes C and D, the teacher is not "self-directed and self-acting" teaching, but allows the students to participate in the exploration of problems, and gives students more opportunities to express their opinions.

From the perspective of students' language, the proportion of students' language in student-centered classes fluctuates greatly, and the "wave top" of students' language appears with the "wave bottom" of teachers' language, which indicates that there are more interactions between teachers and students, but the duration time of students' speech is short. By observing the videos, the researchers found that most of the students in the four classes answered the teachers' questions passively. In the process of answering questions, students' language was single, the duration time was short, and students lacked the initiative to ask questions. In terms of silence and chaos, there will be chaos of helpless teaching in every class. When there is "students' language", there will always be "the chaos of helpless teaching". By observing the videos, the researcher knew that before the emergence of "students' language", it is always accompanied by the operation of

teachers' "opening microphone". Establishing a dialogue between teachers and students, it will always cause chaos because of network or equipment problems. In short, the four classes show a relatively consistent law in the process of time. That is, Teachers' teaching and students' speaking behaviors appear alternately, and the main characteristic behavior sequence pairs in the online live classes. The frequency and time of students' speech are closely related to teachers' teaching design and their ability to use the live platform.

3.2 Qualitative Data Analysis

For qualitative data, the researchers analyzed the data obtained from the interviews. The interview data was collected in the form of transcripts. In the process of interviews, the researcher recorded the audio of the interviews, which were transcribed in the form of text from the audio. The analysis of qualitative data further proves the speculation of quantitative data on the research topic. Teachers were asked to say their experience of having the online live classes. They were asked the same interview questions to examine their experiences and the effective factors that led to their experiences. This study analyzes the theme of the interview text. This is a process of identifying and analyzing themes that are covered in the data. The themes were related to the research question and they represented similar patterned responses (Braun & Clarke, 2006). The analysis of the interview data is based on the following table.

Table 7. *Phases of Thematic Analysis*. (Source: Nowell et al, 2017)

Identify and familiarize with data	Read the data and get familiar with the data type and content Check for any mistakes in data recording or any loophole in data collection Check the overall credibility of the data
Identify codes	Identify interesting elements in the data Document anything that seems interesting Keep a documented trail of each step Document the main codes that you find in your data
Find themes in data	Look for the themes in the data Document these themes Look for data that is relevant to each theme Keep a record of every each step
Finalize themes	Finalize your themes and their names Look for the data that can be analyzed under each theme
Review each theme	Review each theme for its credibility Check that no data is missing from being sorted in some theme Check that each theme should have a specific identity
Document analysis	Analyze the resultant themes and draw inferences Document data electronically or manually Make sure that no data that is importantly related to your research question is left unanalyzed

In this analysis of data, the researcher organized the data text based on the coding or theme(Ryan& Bernard, 2003). To analyze the interview data, the researcher examined all the transcribed data texts, shaped wider classifications, and added the generating themes(Ryan& Bernard, 2003). the 5763-word interview data texts were read and examined again and again. In the final reading, the themes were emerging. Then the researcher coded all the interview data transcripts based on the classification of the themes(table 7). In the process of analyzing the interview data, the researcher made efforts to make sure the researcher's views will not affect the analysis of interview data.

Table 8. Interview Part: Thematic Analysis

Categories	Themes	Samples of Interview Transcripts
Structure of Interaction	Computer Equipment Internet Technology	*"The network of the online live class is not good enough sometimes. And students can't hear my voice, so they can't interact with me well. "* *"I am not proficient in computer operation, so I have to spend a certain amount of time opening the course resources and adjusting the volume in every class, so students don't know what to do at this time."* *"When I used the live platform to ask students, I didn't know how to open the microphone and let them answer the questions. I was not proficient in the operation of the platform functions."*
Level of Interaction	Closed Questions Open Questions Content of Curriculum	*"In terms of course content setting, I set a lot of tasks. In order to complete the task of a class, I will just ask closed questions to let students answer, so as to save the time to continue the class."* *"I don't teach much in class. I will leave open questions for students to think and solve."* *"When I set questions in class, I mainly started from easy to difficult. Finally, some open questions need to be explored, and more students will be encouraged to answer these questions, so as to practice their thinking ability and consolidate the learning of new knowledge."*
Atmosphere of Interaction	Answer Questions	*"I have arranged a lot of content in the online live class, so I rarely leave time for students to think. When I ask students questions, they often fail to answer."* *"I arranged little content in my online live class. I leave enough time for students to consolidate their new knowledge. When I ask students closed questions, they can answer them well."*
Dynamics of Interaction	Discipline in Class Initiative of Students	*"In online live classes, students rarely ask questions. In traditional offline classes, students often ask teachers questions."* *"Occasionally students talk in class, especially when I open or switch the course resources."* *"At the beginning of online live classes, several students always spoke when I was debugging the live platform."*

As for the first category the structure of interaction, when teachers have difficulty with computer equipment, the Internet, and technology, students in online live classes will be in passive chaos. In that case, the interaction between teachers and students will be affected. Students cannot hear the teacher's voice because of the bad network, so they cannot have a good interaction with the teachers. It will waste the time when teachers adjust the equipment and the platform. Through the thematic analysis, it can be seen that problems with the equipment and the internet are the main reasons to cause the negative chaos in class. In terms of the level of interaction, teachers have interaction with students by asking closed questions and open questions. The arrangement of the ratio of the closed questions and open questions in online live classes will affect the interaction between teachers and students. Through analyzing some transcripts of interviews, compared with the class observation, some teachers can reasonably design open questions and closed questions to gradually guide students to deepen their learning of new knowledge. The enthusiasm of students to answer questions is high. The verbal interaction between teachers and students is good, which is the so-called student-centered classroom. Therefore, in a student-centered classroom, the setting of closed questions and open questions is reasonable. In the atmosphere of interaction, teachers in student-centered classes will leave more time to let students think. Once questions are proposed, students can always answer them. The verbal interaction between teachers and students is very active. Besides some teachers arrange a lot of content in one online class and don't leave much time for students to consolidate their knowledge. When students are asked to answer some questions, they always fail to answer them. In this kind of online live class, the verbal interaction between teachers and students is passive. As the dynamics of the interaction are mentioned, some teachers said that some students will talk in class when they are busy with the operation of equipment. Verbal interaction between teachers and students is closely related to teachers' teaching design and their abilities to use the live platform.

4. Findings and Discussion

4.1 Findings

This part shows the summary of the research findings according to the four analysis dimensions, the structure of interaction, the level of interaction, the atmosphere of interaction, and the dynamic of interaction.

By designing an interactive analysis coding system based on online live classes, the researcher analyzes the actual video records of online live classes and finds that its verbal interaction has the following characteristics. First, in terms of interaction structure, taking teachers' language as the dominant component, the verbal interaction between teachers and students in classes is greatly affected by equipment, network, and technology. In the article Research on Influencing Factors of College Online Live Courses From the Perspective of Teacher-student Interaction, Jin Zhengmei proposed the influencing factors from the teaching and non-teaching perspectives. Especially in the non-teaching aspect, the equipment and the internet are the main factors affecting verbal interaction between teachers and students (Jin, 2015). The finding of this research is that the verbal interaction between teachers and students in classes is greatly affected by equipment, network, and technology, which is in line with the research findings of Jin Zhengmei. Second, through an in-depth look at the research samples from the perspective of the level of interaction, there are differences among different types of classes. The level of verbal interaction includes shallow interaction and deep interaction. Deep interaction is proposed compared with shallow interaction in current teaching activities (Liu, 2013). Traditional teacher-centered classes with question-and-answer shallow interaction not only hurt students' enthusiasm for learning, but also hurt teachers' teaching confidence (Liu, 2013). Liu stated the teacher-centered class with shallow interaction in his article, which is consistent with the finding of this research. Third, in terms of interactive atmosphere, teachers often use indicative language to strengthen classroom management in online live classrooms. In class, teachers use indicative language to guide students, which is conducive to the in-depth knowledge learning of students and improve the learning efficiency through the effective interaction between teachers and students (Sarıçoban, 2005). Too much arrangement of the course content will lead to a negative and inefficient interactive atmosphere. Fourth, in terms of the teaching process, the frequency of teacher-student interaction is affected by teachers' teaching design and their ability to use the live platform. Teachers give lectures and instructions mainly, and students mainly answer teachers' questions passively. The main reason for the orderly question and answer between teachers and students in class is the design of the class conducted by teachers (Hall & Walsh, 2002)

4.2 Discussion

Based on the results of data analysis, this study puts forward the following suggestions.

First, add more students' activities appropriately to improve the frequency of interaction between teachers and students. This study shows that good interaction between teachers and students can improve students' enthusiasm for classroom participation. When designing online live teaching, teachers can increase the design of student activities appropriately, and increase student-centered teaching modes appropriately such as problem-based teaching and program-based teaching in the class organization. In the teaching process, teachers should try to give more rights to the class to students.

Second, design classroom questions scientifically to increase the effect of interaction between teachers and students. The level of teacher-student interaction is an important factor affecting the effect of teacher-student interaction. Closed questions can enhance the structure of knowledge, while open questions can exercise students' divergent thinking and create a proactive class atmosphere. Teachers should set questions according to the needs of the class contents and the situation of students, and increase open questions appropriately with the advancement of the class process, so as to further cultivate students' knowledge, thinking, and ability. In the process of teachers' verbal interaction with students, students can be properly questioned to promote students' in-depth thinking.

Third, improve the class organization and management and shorten the psychological distance between teachers and students. In the online

live teaching environment, the physical distance between teachers and students is large, and the psychological distance between them will be alienated accordingly. This study shows that teachers often use indicative language to improve students' attention in the process of live teaching. The use of indicative language should depend on the specific situation of the students. For groups with strong self-control ability, we can attract students' attention through the choice of teaching forms and the use of positive language to shorten the psychological distance between teachers and students.

Fourth, improve teachers' information literacy and give full play to the joint force of education. In the post-epidemic era, the challenge of network teaching still exists. For schools, we need to pay attention to and strengthen the deep integration of information technology and teaching. Education should receive technical support and ensure continuous investment. On this basis, high-quality teachers should be established and obtain pre-service training. In addition, from the perspective of the curriculum, we should pay attention to changing the curriculum content, formulating effective implementation plans, and carrying out educational evaluation reform regularly. For teachers, they should improve their application ability and innovation ability in the information environment. In addition to participating in the training of equipment use and practical exercise in advance, they should also innovate in the teaching design, teaching implementation process, and teaching evaluation of the online live classes.

Although the research has made many achievements, the limitations cannot be ignored. Therefore, for the following study on verbal interaction, I proposed some recommendations. First, further research can widen the scope of the samples. In this research, the samples are selected from a specific population, therefore the results of this research may be not suitable for other regions or schools. Different regions and schools may be influenced by a different environment, different teaching and learning experience, and a different teaching method. Second, the research is just on middle schools. How about the primary schools? Therefore, further research can focus on primary schools or high schools, and even universities. Third, this research is mainly based on the ITIAS coding system to collect the data and analyze the data. There are other factors affecting the verbal interaction between teachers and students in online live classes. Hence, further research can conduct the study based on other variables(factors), such as the different platforms of online live classes, the teachers' teaching design or the teachers' teaching methods, etc.

5. Conclusions

Currently, almost all countries in the world are facing the problem of a virus outbreak called the Corona Virus Disease CoViD-19(Triana et al., 2021). During covid-19, all teaching and learning process have been conducted from offline to online methods(Silalahi et al., 2022). Compared with the traditional classroom, language interaction between teachers and students is an important explicit behavior in the online live classroom. it has unique forms and characteristics of expression because these two kinds of classrooms are carried out at the same time but in different spaces. According to the present situation of online live classes, this research improved the ITIAS coding system, and find the characteristics of verbal interaction in online live classes. Based on these typical characteristics, the researcher put forward some effective strategies for the online live classroom. The implementation of this research has important reference value for the development of a school-based online live curriculum. Due to the temporary lockdown in some areas, schools in the affected areas have to continue their classes by having online live classes. Traditional courses are generally based on face-to-face, which is not suitable for online live courses. In addition, due to the regional epidemic lockdown, it has become particularly important to develop online live courses with the characteristics of local regions and schools themselves. This research will give important guidance for the development of the school-based online live curriculum, and promote the development of the school-based online live curriculum. It can be shown in the following aspects. First, teachers can pay more attention to the silence and chaos, and prepare the additional course design for the appearance of the silence and chaos in online live classes. For example, teachers can prepare some online small class games related to the subject. When it appears silence and chaos, teachers can let students play the games to leave some time for teachers to solve the silence and chaos. Second, in terms of verbal interaction, teachers can design the lead-in part and the questions in online classes to meet the characteristics of online live classes. Third, in online live classes, teachers should pay more attention to the resources of the curriculum. Curriculum resources are a necessary condition for the effective implementation of online teaching. Resources of online live classes include micro videos, ppts, tests, etc(Pacheco, 2020). According to the characteristics of online live classes, teachers can select appropriate resources of curriculum to suit the online live class, so as to increase the effective verbal interaction between teachers and students. Fourth, as for the group work in online live classes, teachers can set the tasks that are easy to continue in online live classes. Because teachers and students cannot face each other, teachers design the learning tasks with more interaction in a language, not in body language.

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