Exploring Middles School Students' Perceptions of Factors Affecting Teacher-student Interactions in Online Courses during Covid-19 in China

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Abstract

The purpose of this study was to express middle school student's' perceptions of the factors that influence online teacher-student interaction (TSI). We used a qualitative case study design in an effort to offer an in-depth description of the factors that students perceive as influencing TSI. Participants (N=12) were from 5 middle schools in Nanning, Guangxi, China. Information was collected with extensive semi-structured interviews and analyzed using a five-step method in mental research. Data analysis revealed three general themes about teachers' perceptions, including several components. We found that teachers' effective classroom skills, such as emotion-based information exchange, teachers' interactive initiatives, and giving students praise and encouragement, were identified as dominant factors influencing the quality of TSI. In addition, teachers discussed effective environmental factors, as well as attributes and behaviors of participants as influencers of TSI, to understand their perceived dimensions of TSI. The results of this study can be used in teacher education programs to develop positive interventions to enhance educators' understanding of factors associated with TSI.

Keywords: Middles School Students, Teacher-Student Interactions, Qualitative Approach, Online Course, Covid-19

Introduction

The teaching activity is a two-way interaction between teachers and students, who focus on the content and feel the rhythm and emotion incorporated into the teaching (Dang, 2005). Teacher-student and student-student interaction is an important element in the design of online courses (Picciano, 2002). Exciting studies had shown that online TSI has a strong impact on different students' positive outcomes, such as student satisfaction and motivation (Sason & Kellerman, 2021; Wang et al., 2022; Zheng et al., 2022), academic achievement, and performance (Sun et al., 2022; Sun & Wu, 2016; Zheng et al., 2022). Also, many studies have explored the strategies and factors influencing online TSI.

While online teaching and learning provide many learning resources for TSI, change the way of interaction, facilitate educational management, etc., it also brings significant challenges for TSI (Wang, 2020). Recent studies have shown that the lack of teacher-student and peer interaction is one of the great challenges of online learning (Dong, 2021; Lei & Huang, 2020;

Lytvynenko et al., 2022; Pu et al., 2021; Wang et al., 2022; Zhu, 2020). The lack of personal interaction in the learning environment increases the isolation and disconnection of online learners (Duraku & Hoxha, 2020; Sijia et al., 2021; Yuan & Yang, 2020). Bizi (2021)conducted an online interactive survey of undergraduate international students and found that the vast majority of students prefer face-to-face interaction. Similarly, You's (2021) study found that undergraduate students were less receptive to online courses. The survey showed that most students indicated they were more engaged in offline courses and wanted to finish their online classes as soon as possible. The reason is that, on the one hand, it is due to the disconnection of emotional connection with others.

On the other hand, it is trapped by the bad situation of the Internet, which affects their learning effectiveness. Jiang (2021) identified network technology as an essential reason for affecting TSI online. For example, when students collectively turn on the microphone to answer questions together, there are murmurs, echoes, and sometimes network lag, all of which can negatively affect classroom interaction. Secondly, Jiang believes that online teaching is in a virtual environment, and it is difficult to lack to create the same sense of group belonging as in an offline environment, which leads to a lack of teacher-student emotion. Cai and Tian (2016) argued that the "diversity" of data produced "disconnectedness" in TSIs, mainly in terms of the incomplete personality development of interaction subjects and the difficulty of interacting with participants to control the data. In summary, it has been shown from this review that TSI online has limited cognitive interaction and insufficient emotional interaction. The reasons for these mainly include the transactional distance, the technical issues, and the difficulty of selecting interactive content due to the massive teaching resources.

In summary, by reviewing and sorting through the literature on teacher-student online interactions, it is easy to find that there is a wealth of research on teacher-student online interactions. Current research on TSIs in online education has focused on situation-specific TSI studies. However, the factors of teacher-student online interactions are mainly conducted with quantitative methods. In addition, most of the existing studies on online TSIs have focused on undergraduate students and lack a focus on middle school students. In brief, this study aimed to explore how students perceive factors affecting their interactions with teachers. Therefore, this study aimed to provide insight into students' perceptions of the influential factors affecting TSIs

Method
This study uses a qualitative design to examine the phenomenon in the natural setting and gain a detailed understanding of the middle school students' interaction experiences (Creswell, 2013). By utilizing a case study, we intended to focus on the integrity of the middle school students' experiences and gain an in-depth understanding of their experiences (Creswell, 2013). According to the purpose of the study, to discover and describe the middle school students' lived experience, the researcher explored their personal experiences and perceived realities and functions with the phenomenon. This process involves systematic steps to set aside preconceived assumptions, previous experiences, current scientific knowledge and explanations, personal judgments of participants' views, and preexisting knowledge, including researchers' personal beliefs, values, emotions, and interests. We attempted to explicitly spot such preconceived notions in the research process and address

such personal assumptions in the analysis stage because "what matters is not to bracket the preconceptions but to acknowledge and identify, and make them explicit, through the act and work of reflexivity"(Sibeoni et al., 2020).

Creswell defined a case study as "an in-depth exploration of a bounded system (e.g., an activity, event, process, or individuals) based on extensive data collection" (p. 485). Bounded means studied separately in time, place, or at some physical boundary. Limitations can be established around the subject to be studied. The limitations of my case studies include the setting, which is limited to the Guangxi province, China. To ensure that data were manageable and to reduce the limitations of this study, the following strategies were employed as advised by the case study scholars (Yin, 2010). This study was bounded by:

a) space – the participants were students from middle schools in China;
b) time – the study was conducted within a specific time frame;
c) number of participants – 12 students initially participated in this study;
d) type of data to collect – the data sources came from interviews.

Participants and Context
The study was conducted at several middle schools in Guangxi, China. These schools are representative of the Guangxi Zhuang Autonomous Region and can provide a large number of student resources. A purposive sampling method was used to select students who have at least two months of experience with online learning during Covid-19. The sampling continued until data saturation was obtained with 12 students. To capture a diverse range of perspectives regarding the phenomenon in this study, students with different gender and age grades were selected, which helped the researcher to get a comprehensive view of the phenomenon and identify common and distinct patterns. Participant demographics are demonstrated in Table 1.

Table 1
Student participants' demographics

	Ages		Online experience	learning	Grade		Gender	
	15	14	between3-6 months	>6months	Seventh Grade	Eighth Grade	Male	Female
Lecturer	6	6	8	4	6	6	6	6

Procedure and Data Collection
First, we got the compulsory approval from the officials, principals, and participant middle school students by explaining the study procedure and delivering the letters containing information referring to the study (e.g., timeframe, method, and purpose). Then, we choose to show interested middle school students based on our criteria, such as from Nanning Region in Guangxi, China, different schools, and gender. In an exclusive session with the middle school students before the beginning of the study, we once again illustrated the study process and answered their concerns to clarify everything. In the end, the middle school students were asked to complete informed consent forms to inform them of their rights (e.g., withdrawing & confidentiality). Data was collected through in-depth semi-structured interviews after refining the initial questions through two experts and trial reviews. The interviews were conducted with middle school students after taking their daily classes and

finishing their homework. The interview questions were open-ended and used to get to develop a thorough understanding of students' experiences about interacting with teachers in online learning during COVID-19. The questions were developed and expanded during the interviews to elaborate on middle school students' perceptions. The interview questions were used to allow the researcher to build trust (e.g., How did you feel about learning online for the first time?), to allow the participants to describe their experiences and perceptions (e.g., How you describe your relationships with teachers.), and to reflect on their experiences and the phenomenon (e.g., How do you know that teacher care about you?). The interview process for each participant took approximately 35 to 50 min and continued until the saturation point. Upon completion, we implemented the recorded files and analyzed the data.

Data Analysis
The analytic procedure began after the very first meeting and also throughout transcription. In order to develop the reputation of the searching for, the individuals' shared definitions were confirmed, translated, and interacted throughout the meeting. We adhered to a five-step technique recommended by (Giorgi et al., 2003). These steps consist of (1) reading the text to get a sense of the whole and reducing data; (2) identifying and discovering themes without researcher bias; (3) dividing the text into meaning units and the reduction of meaning across cases; (4) transforming the meaning units into psychologically sensitive statements of their lived-meanings by rendering implicit factors explicit; and (5) synthesizing the extracted meaning units based on the psychological structure of the experience. The following phase entailed damaging the summaries right into components (meaning units) in the table for correct evaluation. In order "to change the definitions had in summary, emotionally delicate means ... the initial expressions of the individuals were altered to ensure that the emotional definition of what the individuals revealed can be extra straight collared" (Giorgi & Giorgi, 2003). Complying with these actions, the first styles were removed and also coded after repetitive analysis and also based upon the establishing motifs. The codes were changed as the brand-new codes were arisen by examining various other meetings to create the link factor. Abstract groups were then determined and classified based on the definition patterns in motifs, expressions, and words. We arranged these enter tables that were finished gradually, allowing us to contrast information continually. Two expert colleagues performed an external audit to review the procedure and establish dependability.

Results and Discussion
The results of this study were identified through the process of analyzing individual interviews by identifying the personal experiences and thoughts about the phenomenon. This study aimed to describe and understand the current state of TSI by remaining neutral toward students' perceptions. After the initial analysis by uploading the documents into Nvivo12, the generated codes were reviewed and revised to identify and reorganize the relevant and important codes, which resulted in connected meanings. This process helped the researcher capture and discover themes regarding the factors influencing TSI based on students' perceptions. In the end, the students reviewed their transcripts and generated themes as a member checking stage to check the credibility and accuracy of the findings (Creswell, 2013). They confirmed the congruency of the themes with their responses. After reducing and synthesizing structural descriptions, three general themes with different components were generated from this research (Fig. 1): Effective Classroom Techniques, Participants' Attributes and Behaviors, and a good classroom environment.
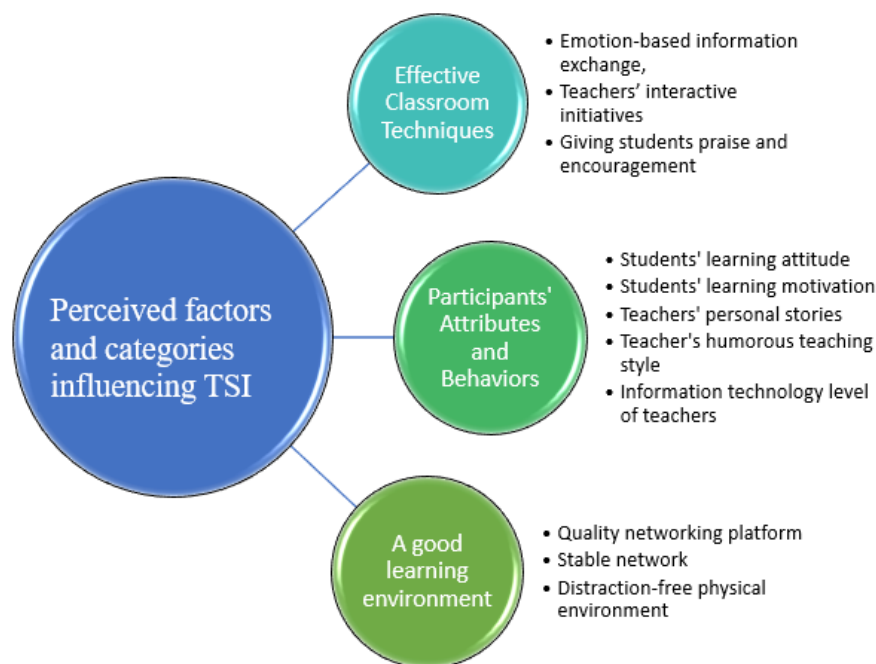
Fig. 1 Perceived factors and categories influencing TSI

Effective Classroom Techniques
This theme is associated with different classroom factors that students perceive to be important affecting TSI in online courses. Based on importance and prominence, these factors were: emotion-based information exchange, teachers' interactive initiatives, and giving students praise and encouragement. Regarding emotion-based information exchange, all participants believe that emotion-driven online teaching makes it easier to promote student engagement in the classroom. The participants believed that teachers should effectively and scientifically infuse emotional education to understand and explore students' deep-seated emotional needs fully. Especially during the Covid-19 epidemic, students' emotions are affected to a certain extent when faced with a sudden and major disaster. From the recondense of the participants, each class has a student-teacher WeChat group and their teachers often give encouragement to them in the group. Student (S) 8 emphasized his hope that teachers need to establish themselves as humane educators, not just movers of knowledge. At the same time, S11 said that teaching without emotions can lead to students' misunderstanding of online teaching as a process of moving offline classes online. Therefore, students believe that instructors should ensure that students have a good learning experience and feeling in online teaching so as to attract more students to participate in the classroom.

Teachers' interactive initiatives where students expect teachers to use humor to break the ice with online classes and provide opportunities for students to talk freely about their feelings and to engage in extracurricular activities. Students felt that the best strategies for TSI were those in which the teacher encouraged students to actively share questions and goals to assist them in achieving. For example, S12 emphasized the role of the teacher's interactive initiatives and commented, "I used to be shy, but my teacher always tried to communicate with me, and slowly I am going to be able to ask the teacher questions on my own initiative." Give praise and encouragement to students. S12 said that her English teacher often criticized them in class, which caused many students with poor English grades to develop a negative

feeling of hating English and disliked interacting with the teacher, and fell into a vicious cycle of "the more I don't want to learn, the worse my grades get; the worse my grades get, the less I want to learn. According to S11, "I don't like to ask serious teachers questions because I am afraid of being criticized for not understanding in time".

Participants' Attributes and Behaviors
This theme was associated with the specific personal characteristics. According to the student's responses, these factors were: Students' learning attitude, Students' learning motivation, Teachers' personal stories, Teacher's humorous teaching style, And information technology level of teachers. Learning attitudes and motivation influence students' learning behaviors, which in turn affect their learning outcomes. They intrinsically drive students' participation in class and promote the construction of good teacher-student relationships (Skinner & Belmont, 1993). This is because when a student has a positive attitude, he or she can ask the teacher for more advice, and the teacher will also develop the habit of interacting with the student positively. For example, S1 said, "During the Internet class, although the teacher could not see what I was doing, I always followed the teacher's pace and took notes, and when I encountered a problem I did not understand, I asked a question directly to the microphone or wrote it down in the chat box. As S12 commented, "In the lesson on the structure of the heart, I didn't understand the diagram because it was complicated, so I sent a message to the teacher in time. Later, when the biology teacher saw the message, he called me and explained it to me in time and asked me to draw the diagram at the same time to make sure that I really understood it, and because of this experience, I interacted with the teacher more and more".

Motivation to learn is an important factor influencing student-teacher interaction. This study divided the motivation of online classroom students to engage in interactive behaviors with the teacher into intrinsic and extrinsic motivation. Intrinsically motivated students tend to learn in order to gain knowledge and improve themselves, while extrinsically motivated students learn as a means to achieve one of their external ends (Deci et al., 1991). Half of the students reported that actively engaging in online classroom interactions deepens their mastery of knowledge. Regarding intrinsic motivation, some students believed that active online classroom interactions would result in more attention and praise from the teacher. For example, student 4 said that the class size would be larger (several classes taking one online class at the same time), but she would still want the teacher's attention and praise, so she would be more active in interacting with the teacher.

Personal Stories. Student 1 said that his physics teacher always shared his stories as a friend, which made them feel much less uneasy about the online class and more comfortable with the physics class, so we enjoyed interacting with the physics teacher more. For example, the physics teacher would introduce things she encountered in her life in the classroom. In the lesson "Electricity Hazards and Prevention", the teacher told us to disconnect the main power supply if the adults in the family had to repair an electrical appliance. She once forgot to turn off the power when repairing a switch and was electrocuted by the current. Fortunately, the current was very small and did not cause too much damage; otherwise the consequences would be unimaginable.
Humorous teaching style. Most of the students mentioned that they preferred a humorous teaching style, i.e., students were more willing to interact with the teacher when he or she

created a relaxed and humorous atmosphere in the online classroom, and Stuednt11 said that a humorous teacher was able to create a relaxed and enjoyable atmosphere for the students through humorous and lively words, which brought him or her closer to the students. Also, student8 said that during the Newcastle pneumonia epidemic, humorous online classes helped them to relax and have fun, thus motivating them to learn and interacting with the teacher. Similarly, student 5 said, "If the teacher is rigid and reduces the students' interest, it makes it difficult to interact with them."

Information technology level. Some students believed that the teacher's level of information technology affects student-teacher interaction. With the outbreak of the new crown epidemic, many secondary school teachers were exposed to online teaching for the first time. Some students believed that the teacher's unfamiliarity with the software used in the class affected interaction and even the overall classroom effectiveness. For example, according to student 8, her biology teacher didn't know how to close the microphone when she first taught her class, which led to a lot of talking and noise in the class. After a week or two of online classes, my teacher became familiar with these interactive tools and then took the initiative to interact with us more in class. In the online classes he would often ask us in a timely manner if we had understood, if we could keep up with the pace, etc."

Good Classroom Environment
Unlike offline teaching, online teaching requires a stable, high-quality network platform and equipment to provide teaching support. The huge number of students learning online and the number of online courses pose a severe test for online education software and equipment. The surge in access may make the online teaching platform unprepared in time, resulting in software crashes and many teachers having to move from one online education software to another. Nearly all students report that learning devices have a positive impact on student-teacher interaction satisfaction, meaning that good teaching devices tend to increase student satisfaction with online classroom interactions. Also, a stable network is a must, according to S11, so that offline classes do not have problems such as "disconnection, network delay, and network card", which have many negative effects. For example, in the political science class, the teacher's network was so bad that many times the class could not continue for a long time, and little content was taught during the class.

In addition, an undisturbed physical environment is essential. On the one hand, it is the student's learning environment, and some parents may monitor their children's performance in class from time to time. Some students report that their parents even sit next to them in class. On the other hand, it is the teacher's class environment. According to S11, "I could hear the teacher's child crying in one geography class". Therefore, building a good online course platform, creating a good network environment, and smooth operation of the network and learning software are necessary conditions for good TSI in an online course, as well as a prerequisite and foundation for improving the satisfaction of TSI and student teaching satisfaction.

Conclusion
This study explored the main factors affecting TSI among secondary school students in Nanning, Guangxi, China, during the Covid-19 epidemic by analyzing interview data and concluded that effective classroom technology, teacher and student traits, and

environmental factors had significant effects on online classroom TSI. Students' learning attitudes and both intrinsic and extrinsic learning motivation affect students' online classroom participation. Students with stronger learning drive have higher online classroom participation and are more satisfied with the interaction between teachers and students. A humorous teaching style motivates students' willingness to interact with the instructor, which in turn affects interaction satisfaction. There was a significant effect of learning devices on students' online learning and satisfaction with TSIs, and problems with learning devices and the network environment during the epidemic affected students' interactions with the instructor.

In response to the findings of this study, the researcher believes that the future online classroom needs to focus on the following three areas. First, schools need to strengthen the construction of online teaching platform to provide quality assurance for effective online teaching. With its characteristics and advantages of openness, sharing and readiness, online teaching has changed the shape of traditional education. Although online education has broken the physical walls of school education, schools are still a strong support and important guarantee for teachers' teaching. Especially in the face of this Covid-19 epidemic, China quickly organized 37 well-founded and strong online course platforms and technology platforms to help schools offer a total of 41,000 catechism courses and other types of online courses, with 1.18 billion online learners, strongly guaranteeing normal education and teaching activities in universities and schools nationwide. However, the huge scale and usage of online teaching has brought a great test for the operation of online teaching platform. The teaching platform lags and interruptions occur from time to time, and teachers have to switch between multiple teaching platforms to carry out teaching. After the new pneumonia epidemic, the construction of online courses should pay more attention to the universality of the courses. In addition, secondary schools should strengthen the training of teachers on online classroom teaching. Before this epidemic, most secondary school teachers had no experience in online teaching, which led to unskilled use and operation of their course equipment, making it easy to make mistakes and affecting teaching quality.

Second, teachers should strengthen the teaching design and organization of online classrooms to enhance the interactive charm of the course. A good online classroom cannot be achieved without careful teaching design, which is a major factor affecting students' learning effectiveness in the classroom. The improvement of teachers' classroom teaching design ability and organizational ability has an important impact on students' learning level and classroom teaching quality (Murray, 2008). Due to changes in communication media, teaching environment, and other factors, the way teachers communicate and interact with students in online and traditional classrooms may also change. This survey found that more than one-third of students believe that there is little difference in the content and manner of TSI in the online classroom compared to the traditional classroom. Asking and answering questions by name is still the primary method of student-teacher interaction in the online classroom. When the students were asked "What are your expectations and suggestions for TSI in online classrooms", students hope that teachers can design more interactive teaching sessions to stimulate the classroom atmosphere, and add online Q&A sessions to ask students about problems they encounter, understand students' dynamics, and encourage students to give feedback on their ideas and confusions. In addition, some students said that simply playing the courseware was not conducive to students' understanding of knowledge, and they hoped that teachers could combine courseware with board books. In terms of interactive

content, students hoped that the teacher would combine professional knowledge with current hot topics to increase students' interest in discussion. At the same time, some students also hope that teachers can be more enthusiastic in teaching and attract students to interact. It is clear from the feedback of students that the teacher's organization and design of classroom interaction content and methods, as well as the charm of the teacher's personal teaching style have an important influence on the interaction between teachers and students in the classroom.

Third, students should establish good learning attitudes and strengthen independent learning. Students' learning attitudes and motivation play an important role in their learning ability and level. Relevant studies also show that learning attitudes and motivation have a significant impact on learning performance. In this study, about one-third of the students were unable to stay focused in the online classroom, and more than half of the students would do other unrelated things during the course. This phenomenon confirms the importance of learning attitudes and motivation on students' learning and willingness to interact with teachers and students, and reveals that students in current online classrooms still lack strong independent learning and self-management skills. It is important to cultivate students' ability to learn independently, and students themselves should take the initiative to get rid of their lazy and casual learning habits and attitudes, fully mobilize their learning initiative, plan and motivate themselves to learn and participate in TSI in the online classroom, manage their own learning voluntarily and self-discipline, and continuously improve their independent learning ability.

Acknowledgements

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