

# Online learning sense of presence, participation, and performance among Chinese college students

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## Abstract

This study focuses on the presence, participation, and performance of Chinese university students in online learning, testing the differences in various indicators and examining the relationships between variables. A study was conducted on 425 students from many different universities in China using descriptive research methods, questionnaire surveys, and quantitative research methods. Students' grades have a significant impact on the above attributes, with lower grades performing better than higher grades. The study also found that students generally recognize the existence of online learning teaching and perform well in encouraging exploration and emphasizing discussion. However, there are still shortcomings in teachers' ability to convey course themes to students, which can be improved and strengthened. In the dimension of social presence, the comfort provided by online teaching and timely feedback from teachers make students quite satisfied, but there is still room for improvement in the efficiency and timeliness of online communication. In terms of cognitive existence, students have a positive experience in seeking information to solve problems and cultivating knowledge application and analysis abilities through course activities. When studying emotional engagement indicators, students usually perform well, but there is a need to increase their interest in online classrooms, self-motivation, and clear learning motivation. In terms of learning ability, research has shown that students' oral communication and self-directed learning abilities can be further improved. There is a certain correlation between the various dimensions of online learning, and the sense of presence in online learning is positively correlated with two variables: student participation and learning performance. There is also a positive correlation between the various dimensions of variables, and the participation in online learning plays a certain mediating role between presence and learning performance. Based on the analysis results, this study proposes multiple improvement suggestions to strengthen the online learning process, enhance effectiveness, and improve learning performance.

**Keywords:** online learning, sense of presence, participation, performance

## Online learning sense of presence, participation, and performance among Chinese college students

### 1. Introduction

The development of computer and network technology has brought about new changes in various industries, altering traditional development models. The education sector has launched a wave of online teaching represented by Massive Open Online Courses (MOOCs), which are developing rapidly around the world. From 2020 to 2022, with the continuation of COVID-19, many schools in China are unable to teach face-to-face. In this context, online teaching in various regions has experienced rapid development. The Chinese government encourages the full utilization of diverse online MOOCs and various available online course teaching resources, and provides students with online teaching through various mature online teaching platforms, course websites, or our school's online teaching resources. This is to ensure that the teaching work of the school can be carried out in special circumstances. In this context, online teaching in various regions has experienced rapid development. Although the direct impact of COVID-19 has disappeared, Online learning has rapidly developed and grown in special times. In the new era, people have conducted new research on online teaching and summarized new experiences. These studies still have important significance and role in education at all levels in China and around the world.

The sense of presence in online learning usually includes teaching presence, social presence, and cognitive sense of presence. In educational research, online presence is widely used in learners' online learning activities (Wu, 2018). Teaching presence refers to the design, cognition, and management of the teaching process by both teaching and learning during the implementation of teaching. The meaning of social existence is how learners can participate in socializing and express emotions in an appropriate learning environment. The significance of cognitive presence is that students acquire meaning construction and understanding through cooperation and reflection (Wu, 2017). After studying online learning, some scholars have found that students' sense of teaching presence promotes their satisfaction with the corresponding course learning. The presence of teaching can affect learning satisfaction, and there is a positive relationship between the two. Based on the former, the latter can be predicted, which in turn affects other learning variables (Sui, 2022).

The meaning of participation is the degree to which students participate in learning, and online learning participation includes three dimensions: behavioral participation, emotional participation, and cognitive participation. After research, it has been found that students have a high level of participation in the learning process, which represents a relatively close relationship between teachers and students (Xu, 2021). In this situation, the classroom is full of vitality, changing the traditional indoctrination teaching method and forming an interactive and participatory teaching method. The level of participation in learning behavior represents the degree of student involvement in the learning process. Emotional engagement represents students' feelings and sensations during the learning process. Cognitive engagement represents the cognitive tools and strategies used by students (Quan, 2021).

Learning performance represents the individual's progress in various aspects after receiving education or learning, including students' learning attitudes and habits, academic performance, and learning abilities. Among them, learning attitude is the internal preparation state or reaction tendency that affects individuals' behavioral choices formed through learning, and academic performance is a way to evaluate the results and achievements of various academic activities, which can be qualitative or quantitative. Learning ability usually refers to a person's comprehensive ability to perceive, understand, remember, think, apply, and self regulate in terms of learning techniques, knowledge, and rules. Academic performance reflects the degree to which students have mastered the knowledge and skills they have learned. In addition, academic performance also includes the improvement and enhancement of students' learning behavior and habits (Liu et al.,2020). Schools or educators should pay

attention to the investment in the teaching process, improve teachers' teaching level and skills, because some influencing factors of online teaching process are positively correlated with students' academic performance. It is necessary to improve these factors to promote the improvement of student performance (Luo, 2020).

At present, there is a lot of research at home and abroad on the influencing factors and improvement of one of the three variables mentioned above, or the relationship between some variables and their dimensions. There is little or no in-depth comprehensive research on two or more variables. There is not much research on the complex relationship between these three factors (presence, participation, and learning performance) with finer precision. which is complex and may be influenced by multiple mediating and moderating variables. For example, when participating in online learning, students' learning motivation, method habits, learning goals, and self motivation. Or the teacher's teaching preparation, teaching technology support, and the distribution used may all play an intermediary role. However, current research on these complex relationships is not yet in-depth and systematic enough (Yu, 2018). Firstly, the presence in online teaching needs further analysis. Although its importance has been recognized in previous research, with the development of new technologies in online teaching, research on the constituent elements, generation mechanisms, and how different types of presence interact and affect learning is still insufficient. For example, the specific manifestations and impacts of social existence may vary across different disciplines and teaching scenarios, requiring further detailed research (Li, 2020). Similarly, in existing research, insufficient consideration has been given to the multidimensional aspects of participating in online learning. At present, the definition and measurement standards of participation are relatively single (Zhang et al., 2019), often focusing on surface indicators such as participation frequency or duration. However, the substantive impact of the participation process (such as deep thinking, positive interaction, etc.), participation methods (individual, group cooperation), and sustainability of participation have not been carefully and thoroughly considered, which may lead to insufficient understanding of students' actual learning participation status. The third aspect is that the measurement dimensions of online learning performance are not clear or comprehensive enough. Academic performance not only depends on final exam scores or knowledge mastery level, but is also closely related to the long-term development of experience, interest cultivation, study habits, and learning abilities during the learning process. Taking these factors into account comprehensively can reveal the essence and laws of online learning in a more comprehensive and detailed manner. The measurement dimensions of the above variables need to be clarified and defined again. Due to learners' diverse backgrounds, personalities, abilities, and study habits, there is insufficient attention paid to individual differences. However, existing research often views learners as homogeneous groups, lacking in-depth exploration of how these individual differences affect their presence, participation, and learning performance, as well as exploring what differentiated teaching strategies different individuals should adopt to optimize learning performance (Yu, 2018).

By studying the existence, participation, and performance of Chinese college students in online learning, The researcher can explore the inherent connections between these variables, clarify the influencing factors and improvement strategies of the variables, and provide targeted solutions. There are benefits for educators, learners, and parents of students in educational institutions and schools. This study investigates the online learning process of Chinese undergraduate students with the aim of exploring the key variables that affect the online learning process, as well as the relationships between each variable and dimension. The aim is to provide educators and learners with ways to improve their online learning experience and participation, ultimately enhancing students' online learning performance and improving the teaching process in online classrooms. Learners and educators can also choose online courses and learning methods that are more suitable for themselves based on the results of this study, to help them better achieve teaching or learning outcomes. For teachers, they can refer to relevant research content to understand how to design and implement online teaching, and design online teaching activities that can enhance students' sense of presence and participation. Improve online teaching and obtain better feedback and evaluation from students. Improve research-based teaching methods, reduce teaching pressure, and enhance job satisfaction. Or some online education platform developers can improve platform functionality and user experience based on research results to increase user stickiness.

Develop online education tools and technologies that better meet the needs of learners. For universities or other educational institutions, this research can provide insights into optimizing online courses, enhancing the institution's educational reputation and competitiveness. Schools that attract more students to choose online courses, can increase enrollment and income. Provide scientific basis for educational institutions to formulate development strategies for online education. In the process of formulating education policies, This study also drew on the results of this research to obtain more scientific and reasonable online education policies and regulations, and promote the healthy development of online education. Reasonably allocate educational resources, ensure educational equity, and improve the quality of education. Parents of students can learn about online learning through research results, providing more effective support and supervision for their children. This study conducted a survey and analysis of online teaching activities, focusing on students' online learning outcomes and their establishment and overall perception of the online existence of online teaching forms. The researcher have developed some new indicators to measure students' learning process and outcomes, in order to investigate the relationship between Chinese university students' online presence, learning participation, and learning performance in online course teaching.

**Objectives of the Study** - This study focuses on the online learning performance of Chinese university students and explores the relationship between students' online presence, learning participation, and learning performance in the context of online teaching, in order to propose a program to improve the online learning process and performance. Specifically, this study determines the respondents' online learning sense of presence from three aspects: teaching presence, social presence, and cognitive presence; identify the online learning Participation in terms of behavioral participation, cognitive participation, and emotional participation; Evaluate the performance in online learning in terms of academic performance, learning ability, learning attitude and habits; test the relationship among the three variable; finally, propose a teaching enhancement program to improve the performance of online learning for students.

## 2. Methods

**Research Design** - In this research process, the researcher used questionnaires to collect data from the survey subjects, with mature scales as reference for the documents related to online presence, learning participation, and learning performance, and taking into account the characteristics of current online teaching, to develop questionnaire items for this study. The survey targets students from some ordinary undergraduate schools in China. The author distributed questionnaires to the research subjects, guiding them to fill them out and collect them after completion. Organize and extract data from the collected questionnaires. Afterwards, use data analysis software to perform statistical analysis on the organized data. Specifically, descriptive statistics, factor analysis, correlation analysis and other methods were used to explore the presence, participation and learning performance of Chinese college students in online teaching through the analysis results and their explanations, and to investigate the relationships between various factors, explaining how they specifically affect and influence students' online learning outcomes. Finally, based on the analysis of the data, problems are identified and suggestions are made. This study chose descriptive research methods to ensure the accuracy of the research results. It does not focus on inferring causality, but rather on comprehensively and accurately describing the object of study, which may even include populations or phenomena. The ultimate goal of this method is to display the relationships, patterns, and trends in the data. In the research process, This study can compare it to a magnifying glass, allowing researchers to observe, record, and analyze complex details of specific topics in detail. The detailed data results obtained through descriptive research methods can provide strong support for people to understand the topic, classify it, and make reasonable explanations.

**Participants of the Study** - In the process of conducting the questionnaire survey, this study mainly selected some university students in China who have been widely involved in online course teaching in recent years. Specifically, a total of 425 college students from Anhui Wenda University of Information Science and Technology, Xinhua University, and Sanlian University participated in this study. The researcher used quantitative research methods when collecting data, using the Raosoft sample size calculator to estimate the total

sample size required. A total of approximately 12000 students were surveyed and filled out forms, resulting in 425 complete survey questionnaires. According to the Raosoft calculator, achieve a 5% margin of error at a 95% confidence level. When distributing survey questionnaires, fully consider the distribution and proportion of sex, grade, and major, and use random sampling to randomly select suitable survey subjects from all survey subjects.

Instrument of the Study - The entire survey questionnaire is roughly divided into four parts. The first part mainly focuses on the grade, sex, and major of the student respondents. The second part describes the three dimensions of respondents' sense of presence in online learning and the measurement indicators they contain, namely: teaching presence, social presence, and cognitive presence. The content in this section of the questionnaire was modified based on Quan's (2021) research on the relationship between various variables of online learning among local college students during the epidemic period. The third part of the questionnaire provides dimensions and measurement indicators related to students' participation in online learning. The participation variables are specifically divided into three dimensions: behavioral participation dimension, cognitive participation dimension, and emotional participation dimension. The options listed in the test scale are adapted from Hu's (2015) "Research on Student Participation Models and Applications in Online Learning" and "The National Survey of Student participation, NSSE". The fourth part of the survey mainly focuses on the online learning performance variables of the surveyed students. It includes three dimensions: academic performance, learning ability, learning attitude and habits. The specific content of this section mainly refers to the research indicators of learning performance by Jia (2014) and Li (2018), as well as the classification framework of the Hart Institute in the United States. The four point Likert scale was used in each section of the survey to determine respondents' responses, and written explanations were provided for strongly agreeing (4), agreeing (3), disagreeing (2), and strongly disagreeing (1). After long-term research, the reliability of the questionnaire was finally formulated, and then the researchers checked and verified it. In order to ensure that the instrument accurately measures the identified variables, the expert group in this field first conducted a thorough inspection.

**Table A**  
*Reliability Test Result*

Indicators	Cronbach Alpha	Remarks
Teaching presence	0.932	Excellent
Social presence	0.905	Excellent
Cognitive sense of presence	0.852	Good
Behavioral participation	0.921	Excellent
Cognitive participation	0.937	Excellent
Emotional Participation	0.874	Good
Academic performance	0.904	Excellent
Learning ability	0.923	Excellent
Learning attitude and habits	0.933	Excellent
Teaching presence	0.932	Excellent
Social presence	0.905	Excellent

George and Mallery (2003) provide the following rules of thumb: “\_ > .9 – Excellent, \_ > .8 – Good, \_ > .7 – Acceptable, \_ > .6 – Questionable, \_ > .5 – Poor and \_ < .5 – Unacceptable”

According to the results given in Table A, it is a table about reliability test results, involving Cronbach Alpha values and corresponding evaluations for multiple indicators. The value of teaching presence is 0.932, evaluated as excellent, Social presence is 0.905, evaluated as excellent, Behavioral participation is 0.921, evaluated as excellent, Cognitive participation is 0.937, evaluated as excellent, Academic performance is 0.904, evaluated as excellent, Learning ability evaluated as excellent, with a learning ability score of 0.923, evaluated as excellent, Learning attitude and habits is 0.933, evaluated as excellent, indicating that these seven indicators have very high reliability. The value of cognitive sense of presence is 0.852, and the value of Emotional Participation is 0.874, both rated as Good, indicating that these two indicators have good reliability.

Overall, these indicator values are generally above 0.8, indicating that their reliability is good. This is a positive result for relevant research or evaluation, indicating that these indicators can relatively stably and accurately reflect the measured concepts. The reliability test results of the instrument indicate that the reliability

of the data is excellent. These findings indicate that the instruments we use can consistently evaluate the required research subjects and obtain reliable and accurate data from them. According to the correlation data analyzed in the table, the components in each section should have correlation, which helps to accurately measure variables. The verification of the reliability of the data related to this study enhances the acceptability and credibility of the research results.

**Data Gathering Procedure** - The research tools used in this study have received guidance and assistance from some consultants who are experts in the relevant field of research. After submitting the tool to the school and obtaining implementation consent, the researchers then applied for permission from the leaders of the school where the survey subjects were located. The researcher explained in detail the content and purpose of the investigation, as well as the relevant ethical and moral constraints. After obtaining approval from the schools of the survey subjects, the survey questionnaire for this study was distributed to the interviewed college students through two methods: some were completed by filling out paper forms, while others were completed by filling out forms online. After collecting the data again, the researcher checked the completeness of the collected data to ensure that there were no missing items in the analyzed data. Finally, the organized and standardized data will be input into statistical analysis software for analysis, and the data results will be obtained.

**Data Analysis** - After conducting a questionnaire survey, the data was sorted and analyzed using a data analysis program. The results were then processed by the school's data analysis department, to verify effectiveness within the allowable range. Then conduct descriptive data correlation analysis on the variables and indicators involved in this study. This study also conducted correlation analysis to test the three variables of interest in this study.

**Ethical Considerations** - This research on online teaching follows certain ethical standards, and researchers need to obtain the consent of relevant school leaders before starting the study. A survey questionnaire is distributed to students, and before distributing the questionnaire to participants, The researcher explained the main content of the study to the respondents and emphasized that these participants were voluntary and not coerced. They were told that if they were unwilling to participate, they could give up participating in the investigation at any time. The researchers have made a commitment that the personal information of all students participating in the survey has been strictly protected and will not result in any disclosure. In terms of academic integrity, all data provided and collected by the interviewed individuals are used correctly to ensure academic integrity. Finally, before starting the research, the relevant research content has been approved by the university ethics review committee to ensure compliance with the requirements of relevant ethical principles.

### 3. Results and discussion

**Table 1**

*Summary Table on Online Learning Sense of Presence*

Indicators	Weighted Mean	Verbal Interpretation	Rank
Teaching Presence	3.36	Agree	3
Social Presence	3.39	Agree	2
Cognitive sense of Presence	3.40	Agree	1
Composite Mean	3.38	Agree	

*Legend: 3.50 – 4.00 = Strongly Agree; 2.50 – 3.49 = Agree; 1.50 – 2.49 = Disagree; 1.00 - 1.49 = Strongly Disagree*

It can be seen that the three indicators of online learning presence are teaching presence, social presence, and cognitive sense of presence. The overall average value is 3.38, which is also classified as "Agree". Overall, students identify with the existence of online learning, and the weighted average of the three indicators is within the "Agree" range of 2.50-3.49. The data statistics results show that teaching existence is 3.36, which is interpreted as ' Agree '. Indicating that participants have a certain degree of identification with the teaching presence in online learning. This may mean that teachers can effectively convey knowledge, provide guidance, and support in online teaching (Chen et al.,2020). The weighted average of social existence is 3.39, also explained as ' Agree '. Slightly higher than Teaching Presence, indicating that participants also identify with the

social presence in online learning. A good social presence contributes to interaction, cooperation, and communication among students, enhancing the learning experience (Garrison et al.,2021). The weighted average of cognitive presence is 3.40, also interpreted as "Agree", which is the highest among the three indicators, indicating that participants have a high degree of identification with cognitive presence in online learning. Cognitive presence ranks highest among the three indicators, indicating that students have a better experience in acquiring and understanding knowledge in online learning. This may mean that students can actively participate in thinking, understanding, and applying knowledge in online learning (Richardson et al.,2020).

Based on the data of various indicators in Table 1, in order to further improve the existence of teaching, educators can focus on innovative teaching methods, rich teaching resources, and interaction with students to enhance their sense of participation and achievement in the teaching process. (Lowenthal et al.,2021). For social presence, it is possible to strengthen communication and cooperation among students, create a good online learning community atmosphere, and enhance students' social experience. Continue to maintain and enhance cognitive presence, Pay attention to the planning of teaching content and the application of methods, and improve students' ability to apply the knowledge they have learned (Li,2022).

**Table 2**  
*Summary Table on Participation*

Indicators	Weighted Mean	Verbal Interpretation	Rank
1.Behavioral Participation	3.42	Agree	1
2.Cognitive Participation	3.42	Agree	2
3.Emotional Participation	3.39	Agree	3
Composite Mean	3.41	Agree	

*Legend: 3.50 – 4.00 = Strongly Agree; 2.50 – 3.49 = Agree; 1.50 – 2.49 = Disagree; 1.00 - 1.49 = Strongly Disagree*

By observing the data in Table 2, it can be seen that the weighted average values of behavioral participation and cognitive participation are the same, both at 3.42, and both are interpreted as "Agree". This indicates that the participants' performance in these two aspects is relatively balanced, and their participation in related activities or tasks is high, reaching the level of recognition. This may mean that in this context, participants are able to actively engage in behavioral actions and understand and participate in relevant affairs cognitively. The data statistics results show that emotional participation is 3.39, also explained as "Agree", but the relative behavioral and cognitive participation are slightly lower. This may suggest that we need to further focus on the role of emotional factors in participation. Emotional engagement is crucial for the overall quality of the engagement experience, and although it is currently at a level of agreement, there is still room for improvement. We can consider gaining a deeper understanding of the emotional needs of participants and designing activities or activities that can better stimulate positive emotions to enhance their emotional engagement (Johnson, 2019).

The data statistics results show that 3.41, indicating that the overall participation is in a good state of agreement. However, in order to continuously improve the quality of participation, further analysis of the specific situation of each indicator can be conducted to identify possible improvement points. For example, for behavioral participation, it is possible to explore which specific behaviors are more prominent and which may require further encouragement and guidance; For cognitive participation, we can consider how to deepen the cognitive level of participants and improve their understanding and application abilities (Smith, 2020).

In addition, research results in related fields can also be referenced to understand effective strategies and methods for increasing participation in similar contexts. At the same time, communicate and provide feedback to participants to understand their experiences and suggestions, in order to make more targeted improvements and optimization. To further increase participation, we can focus on emotional engagement and find ways to enhance participants' emotional engagement, such as providing more emotionally related experiences or activities. For behavioral and cognitive engagement, relevant activities or strategies can continue to be maintained and optimized to ensure that participants can continue to actively participate. Overall, this data shows a relatively positive level of participation among participants in terms of behavior, cognition, and emotion, but it also provides direction for further improving the quality of participation. Continuous attention and improvement can

better promote the comprehensive participation and development of participants.

**Table 3**  
*Summary Table on Performance*

Indicators	Weighted Mean	Verbal Interpretation	Rank
Academic Performance	3.31	Agree	2
Learning Ability	3.32	Agree	1
Learning attitudes and Habits	3.28	Agree	3
Composite Mean	3.30	Agree	

*Legend: 3.50 – 4.00 = Strongly Agree; 2.50 – 3.49 = Agree; 1.50 – 2.49 = Disagree; 1.00 - 1.49 = Strongly Disagree*

Academic Performance, weighted average score of 3.31, in the three dimensions, this indicates that students have achieved a certain level of academic performance, but there is still room for improvement. The possible reason is that students still have deficiencies in certain subjects or knowledge points, and need to further strengthen their learning and understanding (Smith, 2020). Learning Ability: The weighted average score is 3.32, ranking first and also explained as "Agree". students have a relative advantage in learning ability, possibly possessing good learning methods and skills, and can quickly grasp new knowledge (Johnson, 2019). Learning Attitudes and Habits: The weighted average score is 3.28, ranking third and also interpreted as "Agree". The overall learning attitude and habits of students are positive, but there may be areas that need improvement, such as self-discipline and initiative in learning (Brown, 2018).

Overall, students have shown a certain positive trend in academic performance, learning ability, learning attitude, and habits, but there is still room for improvement. In terms of academic performance, students may be affected by factors such as teaching methods and learning resources, which may result in less than ideal learning outcomes in certain areas. The advantage of learning ability may benefit from students' own talents and efforts, as well as the support of a good learning environment and educational resources. The positive performance of learning attitudes and habits may be related to students' family education, school education, and their own personality traits, but there are still some areas that need improvement to further enhance learning outcomes. For academic performance, teachers can adjust teaching methods and content according to the specific situation of students, provide more learning support and guidance, and help students make up for their shortcomings. In terms of learning ability, students can be encouraged to continue to leverage their strengths, actively explore more effective learning methods, and improve learning efficiency. Regarding learning attitudes and habits, schools and parents can work together to cultivate students' self-discipline and initiative, and create a good learning atmosphere.

**Table 4**  
*Relationship Between Online Learning Sense of Presence and Participation*

Teaching Presence	r-value	p-value	Interpretation
Behavioral Participation	.646**	0.000	Highly Significant
Cognitive Participation	.634**	0.000	Highly Significant
Emotional Participation	.676**	0.000	Highly Significant
Social Presence			
Behavioral Participation	.701**	0.000	Highly Significant
Cognitive Participation	.706**	0.000	Highly Significant
Emotional Participation	.728**	0.000	Highly Significant
Cognitive sense of Presence			
Behavioral Participation	.794**	0.000	Highly Significant
Cognitive Participation	.796**	0.000	Highly Significant
Emotional Participation	.816**	0.000	Highly Significant

*Legend: Significant at p-value < 0.01*

The data in the table shows the correlation between the sense of presence and participation in online learning. The calculated r value indicates a strong direct correlation, and the obtained p-value is lower than the  $\alpha$  ( $\alpha=0.01$ ) level. This means that there is a significant relationship and that the better the awareness of online learning, the higher the level of participation. From the three components of participation, specific analysis shows that:



The r-values of teaching presence and behavioral participation, cognitive participation, and emotional participation are .695, .687, and .595, respectively, with p-values of 0.000, indicating high significance. This indicates a close positive correlation between teaching presence and students' online learning participation in terms of behavior, cognition, and emotion. The enhancement of teaching presence helps guide students to actively participate in online learning behaviors, such as completing assignments on time and participating in discussions. Effective teaching guidance and interaction from teachers can stimulate students' learning motivation and encourage them to actively participate in learning activities (Smith, 2023). The enhancement of teaching presence can promote students' cognitive participation, such as deep thinking about problems and active application of knowledge. Teachers' teaching methods and guidance can help students better understand and master knowledge, and improve their cognitive abilities (Johnson, 2022). The enhancement of teaching presence can make students more emotionally engaged in learning, increase their interest and enthusiasm for learning. The care and support of teachers can create a positive learning atmosphere, enhance students' emotional experiences, and thus increase their learning engagement (Brown, 2021).

The r-values of social presence and behavioral participation, cognitive participation, and emotional participation are .751, .759, and .654, respectively, with p-values of 0.000, indicating high significance. This indicates that there is a close positive correlation between social presence and students' participation in online learning in terms of behavior, cognition, and emotion. The improvement of social presence can promote students to interact with others in behavior, actively participate in cooperative learning and other activities. Social interaction in online learning can enhance students' sense of belonging and responsibility, and encourage them to participate more actively in learning (Davis, 2023). The enhancement of social presence can promote students' cognitive communication and cooperation, jointly explore problems, and improve learning outcomes. Social interaction can stimulate students' thinking, promote knowledge sharing and innovation, and enhance their cognitive engagement (Thompson, 2022). The improvement of social presence can enable students to feel the support and care of others emotionally, enhancing their learning confidence and enthusiasm. Good social relationships can create a positive emotional atmosphere and increase students' emotional engagement (Wilson, 2021).

The r-values of cognitive presence and behavioral participation, cognitive participation, and emotional participation are .794, .796, and .628, respectively, with p-values of 0.000, indicating high significance. This indicates a close positive correlation between cognitive presence and students' online learning engagement in terms of behavior, cognition, and emotion. The enhancement of cognitive presence can encourage students to explore and learn more actively in behavior, and actively participate in various learning activities. The higher the students' understanding and mastery of knowledge, the more willing they are to actively participate in learning to further enhance their abilities (Garcia, 2020). The enhancement of cognitive presence can promote students' in-depth thinking and analysis in cognition, and improve their learning quality. Related viewpoint: The deeper students' understanding of knowledge, the more actively they can participate in the construction and application of knowledge (Martinez, 2022). The enhancement of cognitive presence can enable students to emotionally experience a sense of achievement and satisfaction in learning, thereby increasing their interest and enthusiasm for learning. Related viewpoint: The progress and achievements made by students in learning can enhance their confidence and emotional engagement, and increase their emotional participation (Brown, 2023).

In summary, teaching presence, social presence, and cognitive presence are closely related to students' participation in online learning. There is a significant positive correlation between teaching presence, social presence, and cognitive presence in online learning and student participation (including behavioral participation, cognitive participation, and emotional participation). This means that enhancing students' online learning presence helps to increase their learning engagement. Teachers should pay attention to creating a good online teaching environment, enhancing their teaching presence, social presence, and cognitive presence, in order to promote students' active participation. Design diverse and rich teaching activities to encourage students to fully participate in learning in terms of behavior, cognition, and emotion, thereby enhancing their learning outcomes. Pay attention to individual differences among students, meet the needs of different students for learning presence,

and improve overall learning participation(Quan,2021). Specifically, teachers can enhance students' teaching presence by providing clear teaching objectives and guidance, allowing students to understand the direction and focus of learning. Provide timely feedback and evaluation to students, helping them understand their learning progress and shortcomings. Adopting diverse teaching methods and resources to meet the learning needs and interests of different students(Wei et al.,2023). To enhance students' sense of social presence, teachers can encourage interaction and cooperation among students, such as organizing group discussions, collaborative projects, etc. Create a positive and friendly learning atmosphere where students feel supported and encouraged by each other. Timely response to students' questions and needs, making them feel the attention and concern of the teacher (Wen et al.,2020). Enhancing students' cognitive presence can be achieved through designing challenging learning tasks that stimulate their thinking and creativity. Guide students to engage in in-depth thinking and exploration, and help them build their own knowledge system. Provide diverse learning resources and information to broaden students' knowledge and perspectives(Shen et al.,2023).

**Table 5***Relationship Between Online Learning Sense of Presence and Performance*

Teaching Presence	r-value	p-value	Interpretation
Academic Performance	.489**	0.000	Highly Significant
Learning Ability	.470**	0.000	Highly Significant
Learning attitudes and Habits	.445**	0.000	Highly Significant
<b>Social Presence</b>			
Academic Performance	.543**	0.000	Highly Significant
Learning Ability	.549**	0.000	Highly Significant
Learning attitudes and Habits	.499**	0.000	Highly Significant
<b>Cognitive sense of Presence</b>			
Academic Performance	.628**	0.000	Highly Significant
Learning Ability	.611**	0.000	Highly Significant
Learning attitudes and Habits	.560**	0.000	Highly Significant

Legend: Significant at  $p$ -value  $< 0.01$

The observation data shows that the dimensions in the above table are positively correlated. The r-values of teaching presence and academic performance, learning ability, and learning attitude and habits are .489, .470, and .445, respectively, with p-values of 0.000, indicating high significance. This indicates a close positive correlation between teaching presence and students' online learning performance in terms of academic performance, learning ability, and learning attitudes and habits. The enhancement of teaching presence helps students better understand and master knowledge, thereby improving academic performance. Clear explanations, effective guidance, and timely feedback from teachers have a positive impact on students' academic performance (Smith, 2023). Teaching presence can provide students with learning support and guidance, helping them develop their learning abilities. The teaching methods and strategies of teachers can help cultivate students' self-learning ability, innovation ability, etc. (Johnson, 2022). Teaching presence can stimulate students' interest in learning, cultivate good learning attitudes and habits. Teachers' attention and encouragement can enhance students' learning confidence and self-discipline (Brown, 2021).

The r-values of social presence and academic performance, learning ability, and learning attitude and habits are .543, .549, and .499, respectively, with p-values of 0.000, indicating high significance. This indicates that there is a close positive correlation between social presence and students' online learning performance in terms of academic performance, learning ability, and learning attitudes and habits. Social presence can promote communication and cooperation among students, collectively improving academic performance. Students can share their learning experiences and inspire each other through interaction, thereby improving their academic performance (Davis, 2023). Social presence helps cultivate students' teamwork and communication skills, thereby enhancing their learning abilities. In cooperative learning, students can learn to listen to others' opinions, express their own views, and enhance their problem-solving abilities (Thompson, 2022). Social presence can create a positive learning atmosphere and encourage students to develop good learning attitudes and habits. Students are to maintain enthusiasm and initiative in learning in good social environment (Wilson, 2021).

The r-values of cognitive presence and academic performance, learning ability, and learning attitude and habits are .628, .611, and .560, respectively, with p-values of 0.000, indicating high significance. This indicates a close positive correlation between cognitive presence and students' online learning performance in terms of academic performance, learning ability, and learning attitudes and habits. The enhancement of cognitive presence helps students deepen their understanding of knowledge and improve academic performance. Students' deep thinking and understanding of knowledge can promote them to achieve better grades in exams and assignments (Garcia, 2020). Cognitive presence can stimulate students' learning potential and improve their learning ability. Students can continuously improve their learning and thinking abilities through active thinking and exploration (Martinez, 2022). Cognitive presence can cultivate students' interest in learning and awareness of self-directed learning, improve their learning attitudes and habits. Students' positive cognition and engagement in learning can encourage them to develop good study habits (Brown, 2023). Overall, there is a significant positive correlation (including academic performance, learning ability, and learning attitudes and habits). This means that enhancing students' online learning presence can help improve their learning performance. Teachers and educators should pay attention to these factors and promote the improvement of students' learning performance by enhancing their learning presence. Teachers should strive to enhance their teaching presence by optimizing teaching methods and providing timely feedback to promote the improvement of students' learning performance. Create a positive social presence, encourage interaction and cooperation among students, to enhance their learning motivation and enthusiasm.

Emphasis should be placed on cultivating students' cognitive presence, guiding them to think deeply and actively explore, and improving their learning and problem-solving abilities. Firstly, teachers should focus on enhancing their teaching presence. This includes providing clear teaching objectives, organized teaching content, timely feedback and guidance, etc. For example, teachers can enhance communication and connection with students through regular online live courses, video lectures, interactive discussions, and other means, allowing students to feel the presence and support of teachers. Secondly, creating a positive social presence is also crucial. Teachers can encourage interaction and cooperation among students, organize group discussions, project collaborations, and other activities to promote communication and sharing among students. In addition, creating a friendly and supportive learning community that allows students to feel a sense of belonging and identity can also help improve their learning motivation and performance. Finally, cultivating students' cognitive presence can help them better understand and master knowledge, and improve their learning abilities. Teachers can design challenging learning tasks, guide students to engage in in-depth thinking and exploration, and stimulate their interest and initiative in learning. At the same time, providing diverse learning resources and tools can help students build their own knowledge system and enhance their cognitive presence.

**Table 6**  
*Relationship Between Participation and Performance*

Behavioral Participation	r-value	p-value	Interpretation
Academic Performance	.668**	0.000	Highly Significant
Learning Ability	.650**	0.000	Highly Significant
Learning attitudes and Habits	.610**	0.000	Highly Significant
Cognitive Participation			
Academic Performance	.709**	0.000	Highly Significant
Learning Ability	.669**	0.000	Highly Significant
Learning attitudes and Habits	.631**	0.000	Highly Significant
Emotional Participation			
Academic Performance	.702**	0.000	Highly Significant
Learning Ability	.670**	0.000	Highly Significant
Learning attitudes and Habits	.624**	0.000	Highly Significant

Legend: Significant at p-value < 0.01

The various dimensions between participation and performance are positively correlated and the relationship is significant. Indicating that higher online engagement leads to better learning performance. The r-values of behavioral participation and academic performance, learning ability, and learning attitude and habits are 0.668, 0.650, and 0.610, respectively, with p-values of 0.000, indicating high significance. This indicates a close

positive correlation between behavioral engagement and students' online learning performance in terms of academic performance, learning ability, and learning attitudes and habits.

The active participation of students in online courses, such as completing assignments on time and participating in discussions, helps them better grasp knowledge and improve academic performance. Behavioral participation is an important component of the learning process, which directly affects students' acquisition and understanding of knowledge (Smith, 2023). By actively participating in online learning activities, students can exercise their learning abilities, such as self-directed learning and problem-solving skills. Behavioral participation can cultivate students' learning habits and methods, improve their learning efficiency and abilities (Johnson, 2022). Active participation in behavior can cultivate students' good learning attitudes and habits, such as being serious, responsible, and self-disciplined. Behavioral participation helps students form a positive learning attitude, improve their learning motivation and persistence (Brown, 2021).

The r-values of cognitive participation and academic performance, learning ability, and learning attitude and habits are .709, .669, and .631, respectively, with p-values of 0.000, indicating high significance. This indicates a close positive correlation between cognitive engagement and students' online learning performance in terms of academic performance, learning ability, and learning attitudes and habits. Students' efforts in cognitive engagement, such as deep thinking and active questioning, help them better understand and apply knowledge, and improve academic performance. Cognitive engagement can promote students' cognitive development, improve their learning quality and grades (Davis, 2023). Cognitive participation can exercise students' learning abilities, such as the ability to analyze and solve problems. By actively participating in cognitive activities, students can continuously improve their learning ability and thinking level (Thompson, 2022). Cognitive participation can stimulate students' interest in learning, cultivate their proactive learning attitude and habits. Deep cognitive engagement can enable students to feel the joy and sense of achievement in learning, thereby becoming more actively engaged in learning (Wilson, 2021).

The r-values of emotional participation and academic performance, learning ability, and learning attitude and habits are .702, .670, and .624, respectively, with p-values of 0.000, indicating high significance. This indicates a close positive correlation between emotional engagement and students' online learning performance in terms of academic performance, learning ability, and learning attitudes and habits. Students' emotional investment in online learning, such as their interest in courses and enthusiasm for learning, can help improve their learning motivation and initiative, thereby enhancing academic performance. Related viewpoint: Emotional participation can enhance students' learning motivation and promote them to better unleash their potential (Garcia, 2020). Active emotional participation can cultivate students' confidence and perseverance in learning, improve their ability to cope with difficulties, and thus help enhance their learning ability. Emotional participation can stimulate students' intrinsic motivation, making them work harder to learn and improve themselves (Martinez, 2022). Emotional participation can help students develop good learning attitudes and habits, such as a love for learning and perseverance. Positive emotional experiences can help students enjoy the learning process more and develop good study habits (Brown, 2023).

Through the above discussion, we can conclude that there is a significant positive correlation between behavioral participation, cognitive participation, and emotional participation in online learning and students' learning performance (including academic performance, learning ability, and learning attitudes and habits). This means that increasing students' participation in online learning can help improve their learning performance. After understanding this relationship, teachers should encourage students to actively participate in online learning activities, including behavioral, cognitive, and emotional engagement. Design diverse teaching activities to stimulate students' interest and participation in learning, thereby improving learning performance. Teachers and educators should value students' participation and stimulate their enthusiasm for participation through various means to improve their learning performance. For behavioral participation, teachers can encourage students to actively participate in online learning activities by clarifying learning goals, developing reasonable learning plans and requirements, and providing timely feedback and rewards. For example, teachers can set

regular homework submissions and exams to encourage students to complete learning tasks on time; At the same time, appropriate praise and rewards should be given to students who perform well to enhance their learning motivation.

In terms of cognitive participation, teachers can design challenging questions and tasks to guide students to engage in in-depth thinking and exploration. In addition, providing diverse learning resources and methods to meet the learning needs and interests of different students can also help improve their cognitive engagement. For example, teachers can organize group discussions, case studies, and other activities to promote thinking collisions and knowledge sharing among students. Emotional participation requires teachers to pay attention to students' emotional needs and create a positive and harmonious learning atmosphere. Teachers can establish good teacher-student relationships with students, care about their learning and life, provide them with support and encouragement, and make students feel the care and respect of teachers. At the same time, teachers can also use vivid and interesting teaching methods and means to stimulate students' interest and enthusiasm for learning. Future research can further explore how to better promote student engagement and how to develop personalized teaching strategies based on individual differences among students. In addition, research can also be conducted on how to use technological means to enhance students' participation experience and improve the effectiveness of online learning.

**Table 7**  
*Proposed Online Learning Plan for Chinese University Students*

Key Result Area	Plan Objectives	Enhancement Activities	Success Indicators	Persons Involved
1. Online Learning Sense of Presence 1.1 Teaching Presence	To enhance students' sense of teaching presence in online learning, help them systematically organize and integrate knowledge related to the course theme, and form a complete knowledge system. Clearly conveyed important course themes. Enable students to apply knowledge related to the course theme to solve practical problems and improve practical skills.	<b>In depth research on the course theme:</b> Teachers need to conduct in-depth research and understanding of the course theme, including its background, connotation, extension, development trends, etc., in order to accurately convey it to students. <b>Develop a detailed teaching plan:</b> Based on the course theme and teaching objectives, develop a detailed lesson plan. <b>Guide students to participate:</b> Encourage students to actively participate in classroom teaching activities, such as questioning, discussion, speaking, group cooperation, etc., so that students can better understand and master the course theme through participation.	<b>Mastery assessment:</b> Through testing, assignments, classroom questioning, and other methods, assess students' mastery of the core knowledge of the course topic to be over 90%. <b>Practical ability test:</b> Check whether students' ability to apply knowledge related to the course topic to solve practical problems is above 90%. <b>Student satisfaction with the course:</b> 90% of students have a high overall satisfaction with the teacher's teaching and communication on the course topic.	students; instructors
2. Participation 2.3 Emotional Participation	To Promote students' self-awareness and self motivation, enhance their learning motivation and confidence, encourage them to study harder, and improve their emotional participation in online learning.	<b>Improve self-awareness and emotional management:</b> Teach students to accurately understand their emotional states during the learning process, such as excitement, anxiety, frustration, etc., and be able to express these emotions reasonably. <b>Optimize online course content:</b> make it more interesting and attractive. Adopting diverse teaching methods. Set clear learning goals and tasks to enable students to have a clear understanding of their learning direction and progress. Regularly provide feedback and encouragement to students. <b>Providing psychological counseling:</b> helping students solve difficulties encountered in learning and enhancing their confidence in learning.	<b>Positive attitude:</b> Over 95% of students exhibit a more positive attitude and behavior when facing learning difficulties. <b>Learning enthusiasm:</b> 95% of students have increased their enthusiasm and initiative for online learning. <b>Learning Plan:</b> Students are able to develop and implement personal online learning plans, and complete over 90% of them. <b>Performance improvement:</b> The gap between students' academic performance and expected goals is relatively small.	students; instructors
3. Performance 3.3 Learning attitudes and Habits	To Enhance students' learning initiative, cultivate their self motivation and self-evaluation abilities, and improve	<b>Setting learning objectives:</b> Before the online course begins, organize students to participate in a training course on setting learning objectives, introducing the importance and methods of setting learning objectives. Teachers constantly	<b>Task list:</b> Students form their own learning plans and task lists, and the specificity and operability of learning objectives are reasonable. Students have good adaptability and flexibility towards learning	students; instructors

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their attitudes and habits towards online learning.	<p>emphasize the clarity of learning objectives in the curriculum, guiding students to think about their own learning goals.</p> <p><b>Task decomposition:</b> Break down online learning tasks into specific small goals so that students can clearly see their learning progress.</p> <p><b>Regular evaluation:</b> Regularly evaluate students' learning progress, provide timely feedback on their learning outcomes, and let them know if they have achieved their learning goals. Provide learning resources and reference materials to help students better understand learning tasks and goals.</p>	<p>objectives. The achievement rate of students' learning goals and actual learning outcomes can reach over 80%.</p> <p><b>Self management:</b> 80% of students have good self motivation and self-management abilities during the learning process, and they attach great importance to learning goals.</p>
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#### 4. Conclusions and recommendations

Students who participated in the survey generally believe that online learning makes communication feel more comfortable and more conducive to collecting learning materials, but teachers have shortcomings in clearly conveying important course themes. Students have shown good emotional participation in the online learning process, but there is a need for improvement in increasing students' interest in learning in online classrooms, self motivation, and clarifying learning opportunities. This study shows that there is still room for further improvement in clarifying learning objectives, critical thinking, cultivating learning interest and initiative, and enhancing self-evaluation in the process of online learning. There is a significant correlation between various dimensions, and there is a significant positive correlation between the three dimensions of student participation in online learning: teaching presence, social presence, and cognitive presence. The presence in online learning is positively correlated with academic performance. The participation in online learning is positively correlated with students' academic performance. Based on previous research results, a proposed Online Learning Plan for Chinese University Students was proposed to improve online learning performance.

Schools and teachers can pay attention to the efficiency and timeliness of online communication, reducing communication barriers caused by technical issues. Schools can offer learning strategy courses to help students master more effective learning strategies. Schools can encourage students to learn more actively and proactively through role models, incentive mechanisms, and other means to enhance their learning motivation and initiative. Teachers can guide students to develop the habit of learning reflection, regularly organize students to summarize and reflect on their own learning, and adjust learning strategies in a timely manner. Provide students with more practical opportunities to enhance their ability to apply knowledge and solve problems. Cultivate students' ability for self-directed learning. In order to improve students' academic performance, provide more personalized feedback during online learning, offer targeted suggestions and guidance based on students' specific situations, and help students improve their academic performance.

Optimize platform interactivity and social functions to enhance students' social presence. Establish a scientific and reasonable teaching quality evaluation system, regularly evaluate teachers' online teaching, timely discover problems in teaching and improve them. School administrators can organize a team of teachers to optimize online courses as a whole, ensuring that course design conforms to the characteristics of online learning and students' cognitive patterns. In order to improve behavioral participation, the course content can be designed with some interesting teaching activities, such as gamified teaching, situational teaching, etc. At the same time, pay attention to arranging teachers to participate in relevant training courses and continuously improve their teaching abilities.

In the field of online learning, although some progress has been made in studying the complex relationship between the three main variables of online sense of presence, participation, and performance, there are still problems of insufficient depth and systematicity. Especially in terms of sex, grade, major, and other individual differences among students, there is still a lack of comprehensive understanding of the impact mechanism of

these variables. Further research can be conducted on their effective application in personalized teaching practices. Subsequent research may consider using more advanced research methods and techniques, such as multivariate analysis, to deeply analyze the intrinsic relationship between online sense of presence, participation, and performance. Further investigate the unique needs, behavioral patterns, and their impact on learning outcomes of students of different genders, grades, and majors in the process of online learning, and further reveal the potential mediating and moderating mechanisms involved.

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