



# The Influences of Embodied Experience on Social Presence of Chinese University Students' Online Learning

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**Abstract.** Online courses have brought about the separation of time and space. In previous study, social presence of online learning have been extracted, with the in-depth analysis of learners' participation neglected. This study explored the influences embodied experience on social presence in Chinese university students' online learning, considering how to use embodied experiences to affect communication efficiency. It is practical to connect embodied cognition with telepresence, focus on social presence, and improve learning efficiency with effective embodied experience. In-depth interviews are utilized to find out opinions of every participant, so as to investigate how embodied experience determines communication efficiency through a more focused approach. Finally, the conclusion that embodied experience amplifies social presence was drawn.

**Keywords:** Online learning · Embodied cognition · Social presence · Communication

## 1 Introduction

Online courses have brought about the separation of time and space. How to break the boundary of distance and interact at the same frequency have become an urgent problem to be solved in the process of online learning.

In the concept of embodied cognition, the central idea emphasizes that embodied experience is a way of body learning, an expression of body experience, a cognitive way of body participation, and an integration of body and environment [1]. The physical activities and environment constitute a part of learning, not just the intermediary and means commonly considered.

In previous study, social presence of virtual learning and the key influencing factors have been extracted, and researchers have found the higher the value of technology, interaction, emotion and team cohesion, the better the social presence experience will be. Huge importance is generally attached to the theoretical and applied research on telepresence, and the conclusion is the theory of telepresence has important guiding significance for the current online curriculum.

Furthermore, telepresence is mainly divided into teaching presence, social presence and cognitive presence. For the concept of social presence mentioned in this study, its development includes 3 stages. In the late 1970s, this theory was first proposed by researchers Short, Williams and Christie et al., who believed that social presence refers to the degree to which a person is regarded as a real person and the perceived degree of connection with others in the process of communication through media [2]. From 1980s to 1990s, some researchers explained the inherent dehumanized nature of CMC by using the theory of social presence, which is that CMC filters out non-verbal information and other relevant cues that are normally encountered face-to-face [3]. In the mid-1990s, since the Internet promoted the growth of online learning, Garrison, Anderson, Gunawardena et al. began to question whether the attributes of media determines social presence, arguing that users' perception of presence is more important than the attributes of the media itself [4]. The extent to which communications media filter out non-verbal and social cues was questioned [5]. After that, the fact that online learners bring their own personality to the discussion and build a sense of social presence was found [6, 7]. Since then, social presence has become a central concept in online learning research.

However, without the in-depth analysis of learners' participation, the process of interaction still stays in the abstract description and is difficult to implement. At the same time, various questionnaires and scales have been made, attempting to identify and verify social presence. So far, however, there is no agreement on how to measure social presence [8].

Under the situation of the online learning era caused by COVID-19, this study applied in-depth interview to explore the social presence of online learning from a specific perspective, so as to consider how to use the specific experience to affect the communication efficiency in online learning. It is practical to connect the embodied perspective with the sense of presence, focus on the sense of social presence, and improve learning efficiency with embodied experience.

## **2 Method**

### **2.1 Data Collection**

In-depth interview was adopted as the research method. In order to investigate how embodied experience determines communication efficiency of online courses through a more focused approach, participants were selected among university students. The interview questions were designed attempting to reveal feelings brought by specific embodied experience, the relationship between the communication efficiency of online courses and embodied experience, and the main factors affecting the communication efficiency of online courses. The purposive sampling criteria included (1) full-time university students (2) students currently using online courses instead of offline courses for various reasons (3) young people aged 18–23. The age range was selected because university students is more dependent and divergent on autonomous learning, which is less purposeful and utilitarian than that of middle school students, thus more likely dominated by embodied factors.

A total of 16 interviews were conducted in May 2022. Participants came from a mix of undergraduate universities ( $N = 13$ ) and junior colleges ( $N = 3$ ) and from different cities (First-tier cities = 12; Second-tier cities = 4). Their age average was 19.6.

Due to the lockdown situation because of the epidemic, in-depth interviews were conducted online by video call. All interview questions were open questions. During the one-To-one interviews, interviewees were asked to describe their experiences of online learning. On average each interview lasted about 30 min. All interviews were video-recorded and the audios were later transcribed. A pseudonym was assigned to each participant to ensure privacy. The consent of the participants was obtained.

## 2.2 Data Analysis

The interview transcripts were first coded via open coding with the extraction of key words, then associated codes was formed via axial coding. Finally, the important factors affecting the communication efficiency of online learning are analyzed via selective coding.

Open coding was used to carry out first-level coding for the original interview compilation manuscripts. Coding in vivo was adopted to find concept categories and categories from the collected data, extract keywords and name them, and conceptualize them. Finally, 20 open codes are extracted, which are as follows: interaction, immediacy, communication, simulation, distraction, self-control, supervision, practical effects, teaching level, recording, technology, practical operation, feeling, roll call and check in, atmosphere, stuck, participation, time saving, rituality, freedom.

Axial coding were used to find and establish the connection between each conceptual category, organically integrate and connect the open codes, so as to give a more comprehensive and clear explanation of the formation of the phenomenon. Finally, 20 open codes were combined into 12 associated codes, which are as follows: self-control, supervision, technology, practical effects, simulation, interaction, communication, immediacy, participation, teaching level, practical effect, rituality.

Selective coding was used to determine the core categories with strong correlation ability and key roles by analyzing many concept categories and their internal relationships. Through the analysis of 10 relational codes, it is found that the four core codes, namely, immediacy, interaction, communication and teaching level, are important factors affecting the communication efficiency of online learning. Every core code is associated with a number of other factors, interacting with each other.

## 3 Results

Figure 1 is the framework of the article obtained after logical arrangement of the coded keywords. Specifically, results of this paper can be divided into the following parts.

### 3.1 Choices Between Online and Offline Courses

69% participants asserted they preferred offline courses to online ones for various reasons, such as the inconvenience of practical operations.

*Online courses are indeed a helpless move under the epidemic situation. From my perspective, the experience of online courses is not as good as that of offline courses. Sometimes, there will be interference because of the network, and the immediate communication between teachers and students will be affected. In addition, the learning atmosphere will be dispelled.*

Online courses are never as convenient as offline courses and are really distracting... As a student majoring in science and engineering, online courses are very inconvenient for my practical operations and experiments.

Among the remaining 31%, freedom, time saving and recording are the main factors for university students to prefer online courses.

*I prefer to take online courses. The journey between my home and school takes so much time, and the fatigue and lack of sleep caused by distance will greatly consume energy, leading to the inability to concentrate.*

*Online courses lead to more freedom. To be honest, some of the courses I think are not meaningful can be suspended to finish other tasks.*

*For me, the advantage of online courses is to save my myopic eyes that can't see the blackboard clearly, and I can record or take screenshots when I can't keep up. In addition, it saves me the time of torturing on the road. I wasted at least one hour a day simply walking back and forth.*

### 3.2 Internal and External Factors

Due to the particularity of mixed teaching mode and university students, undergraduate mixed course learning engagement is not only influenced by their learning experience, but also greatly influenced by individual initiative and other individual factors [9]. During interviews, 15% participants mentioned self-control or supervision, which were included in the first-level codes. Internal self-control and external supervision are examined to be two opposites, which complements each other, affecting university students' online learning. Detailed elements are additions to both of these factors.

The characteristic of university students' independent learning is the basis for exploring the communication efficiency of online learning. Compared with middle school students, they possess much more freedom to make choices on their own, thus leading to self-control becoming one of the fatal factors.

*If you're lack of self-discipline, it's easy to get distracted, or it's easy to fail to focus. I don't think it matters whether the quality of teaching is good or not. If I don't want to focus I certainly won't, and if I do want to focus then I certainly will.*

*Perhaps only by promoting self-discipline of individuals can improve learning efficiency.*

Supervision is clarified into numerous aspects, including attendance, interaction.

*Frequency of roll call really improves online efficiency... Tanja, my major teacher, loves to ask questions, and I'm afraid to get distracted in her class.*

*Roll call frequency is definitely the top... The two courses that I took the most seriously were the ones where teachers randomly picked lucky students to share screens.*

*If you have a camera on, you can't just lie in bed. You can't eat while you're taking courses. You can't chat while you're taking courses. So as the roll call. if I know*

**Table 1.** Main Keywords and Frequency According to Selective Coding

Classification	Codes	Frequency
External elements	Interaction	31.08
	Immediacy	28.38
Internal elements	Communication	27.03
	Teaching level	13.51

*in advance the teacher often calls on students at class, there will certainly be more concentration, instead of engaging in my own business.*

### 3.3 Detailed Elements

Through further frequency statistics of 10 s-level codes, the results indicate that the frequency of attention is relatively high for 4 detailed elements, namely interaction, immediacy, communication and teaching level, which are 31%, 28%, 27% and 14% respectively (Table 1).

As for internal factors, 56% participants mentioned the key word teaching level. For university students, educators' teaching level greatly determines their level of self-discipline, thus affecting learning efficiency, finally reflected as the communication efficiency of online courses.

*If there is a rank, I think the teaching quality is the top.*

*Teaching level is most important. If the teaching content is good enough, both online and offline students are willing to listen carefully.*

*If the teaching content is interesting, I will focus even if the course doesn't require roll call.*

In terms of external factors, 88% participants mentioned the keywords interaction, immediacy and communication. For university students, interaction, immediacy and communication can constitute the simulation of offline learning. Participants generally commented that these factors boost learning efficiency to a huge extent.

*If there is more immediacy, students can interact with teachers at any time, which is closer to the situation of offline courses.*

*Because of the lack of interaction in recording courses, I simply can't focus. Live courses will make me have a more immersive experience and feel that I have learned something.*

*The improvement of hardware facilities can enhance interaction and improve immediacy. I think these factors are in direct proportion to the learning efficiency.*

### 3.4 Hardware Facilities

All participants agreed that hardware facilities such as image sharpness and network speed are essential factors affecting online efficiency. It was revealed that hardware facilities are the basis of the implementation of the 3 external detailed elements, namely interactive, immediacy, and communication.

**Table 2.** Main Keywords and Frequency According to Axial Coding

Classification	Codes	Frequency	Frequency
Research topic	Practical effects	6.818	6.82
External and internal factors	Supervision	9.091	14.77
	Self-control	5.682	
Internal factors	Teaching level	6.818	6.82
External factors	Communication	13.636	40.34
	Immediacy	13.636	
	Interaction	13.636	
Measurement	Simulation	11.932	24.43
	Participation	7.386	
	Rituality	5.114	
Hardware facilities	Technology	6.818	6.82

*If the picture is not clear, the video is stuck or the sound cannot be played, the integrity of this material will be spoiled. Therefore, online course requires perfect equipment and smooth network.*

*If the picture is not clear, I can't see the slides; if the network is stuck, I can't hear the teacher; if the hardware facilities are not perfect, I can't focus on the class and I will not focus on the class.*

### 3.5 Embodied Experience

According to the frequency statistics of secondary codes, it can be found that external elements are mentioned with the highest frequency. Compared with internal elements, external elements are more likely to be noticed and remembered by participants (Table 2).

During online learning constructed by external elements, simulation, participation and rituality are considered as important indicators to measure the communication efficiency. Participants generally asserted that these 3 elements were controlled by embodied experiences, such as wearing formal clothes or turning on a camera, mostly on visual level and tactile level. In other words, embodied experience enables participants to create imitation of offline learning, improving communication efficiency.

*If you dress formally, you will subconsciously feel that this is a more formal matter, and will attach more importance spiritually. However, if you're wearing pajamas, you will not take the course for a big deal.*

*I think it's mostly a matter of rituality. If I had a camera on, I would probably clean up my image and have a better attitude.*

Contrary to the hypothesis, learners pay less attention to whether they can see the educators than whether they are seen. A small number of participants said that having a camera on when the teacher having classes increases eye contact, among other things. However, 69% participants were more likely to assert there was no difference.

*Sometimes I don't even notice (whether the teacher has a camera on or not). There was no difference.*

*I don't think it's any different. I just stare at the courseware, okay*

*It doesn't seem to make much difference, but you can sense that the teacher pays more attention to the class (when he or she has a camera on). If the teacher has a camera on, the sense of communication is also amplified.*

## 4 Discussion

This study explores the communication efficiency of online learning among Chinese university students. The results indicate that embodied experience is an important factor affecting the communication efficiency of online learning. It is the physical experience in all aspects of online learning that forms the basis of mimicry, as the results show, mostly on visual level and tactile level.

According to the results of this study, it is affirmed that the embodied experience amplified social presence. The term telepresence is used to describe the experience of virtual environments, and social presence is one of its categories. Social presence is usually described as the ability to promote communication between learners and learners or between educators and learners through network information, digital media and other technologies based on the network environment. It is not only a measure of the sense of community experienced by learners in the network environment, but also an important perception formed by online learners during online learning [10]. In addition, in the concept of embodied experience, the learner's body is integrated into its surrounding environment, interacts with educators and other learners to generate a dynamic and symbiotic sense of individuality, relies on and is formed by such social relations, and reflects the social characteristics of the self [1]. Telepresence of online conferences cannot be separated from multiple spatial perception [11]. Embodied experience is the basis for constructing the mimicry during online learning. The more vivid and lifelike the situation, the more it can trigger the individual's embodied experience [12]. Like wearing formal clothes or turning on a camera, such embodied experience can force university students with a loose learning mode to engage in social mimicry, so as to strengthen interactions with educators and other learners. Embodied experiences in online learning can help learners reshape social environments and interpersonal relationships, thus strengthening the sense of social presence, collaborating with learners and other learners to overcome the loneliness of time and space separation.

In addition, effective embodied experience reflected by learners mainly focuses on the visual and tactile levels. These two levels are the biggest differences between offline and online embodied experience. This kind of embodied resources on the most traditional level is not only a powerful tool to facilitate problem solving and communication efficiency in mathematics (and other fields), but also, on a more fundamental level, a visible embodied experience of the sensory-motor simulation processes involved in the learners' understanding of concepts [13].

Firstly, on the visual level, there are two aspects: the sense of being watched and watching others. For the former, the sense of being watched can become a way of supervision. Under the gaze of potential slights, learners will have a sense of tension, thus increasing learning efficiency. However, the sense of being during online learning is not as strong as that during offline learning. Turning on a camera could to some extent increase communication efficiency, which in fact does not work for every situation. For the latter, there is not much difference between the situation of online and offline learning. Admittedly, when learning online, the behavior of watching others brings loneliness, because educators and other learners are confined in small blocks, and even do not show their real faces. Therefore, in this case, the sense of watching others face to face during offline learning cannot be duplicated. Secondly, there is no doubt that the sense of touch is one of the most important parts of the impression given by a certain environment. In the case of online learning, wearing formal clothes or not is mostly concentrated on, which is the only factor that can be duplicated in online learning. For educators and learners, various clothes have been associated with various occasions, such as pajamas are connected with private spaces, and formal wear with the outdoors, where the possibility of interacting with others is greatly increased. Although at first the binding process was dominated by environmental factors, gradually there was a two-way link between clothes and scenes. When educators or learners wear formal clothes, the embodied experience in the corresponding tactile level will inevitably trigger the solemn attitude of relevant scenes. Despite being in a virtual cyberspace, learners can still absorb information from detailed embodied experiences that influence communication efficiency. Wearing formal clothes and turning on a camera are just several forms of expression, but they provide a virtual sense of being watched and touch that is close to the offline experience.

Further, on the visual level of embodied experiences, the sense of being watched is paid more attention to than that of watching others, which is the only part that does not fit the hypothesis. It is this difference that characterizes embodied experience. For embodied experience comes from the body and depends on the body perception of the subject, its autonomy cannot be denied. Embodied experience is self-oriented, especially on the visual level. There is no doubt that people are more sensitive to their own physical changes than they are when observing the environment.

Compared with previous studies, this study combines embodied experience with telepresence, and then draws a conclusion on how to enhance the communication efficiency of online learning. According to results above-mentioned, embodied experience is valued to a larger extent at the visual and tactile level. At the same time, the results show that any embodied experience to improve communication efficiency is not suitable for everyone. Nevertheless, various embodied experiences are not specifically subdivided and further discussed in this research, which may have contributed to the generality of the results. Potential follow-up research can focus on the impact of some specific or detailed embodied experience and how it works on educators and learners. In addition, according to the results, embodied experience at the visual and tactile levels can also be focused on to achieve better communication efficiency.



## 5 Conclusion

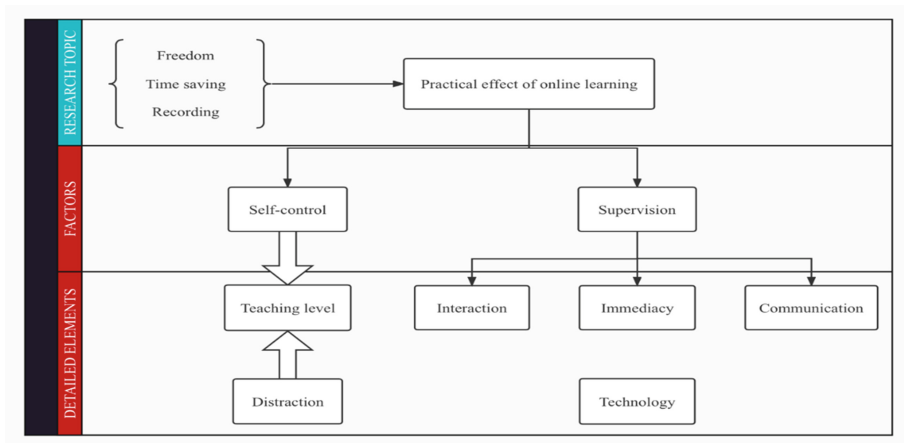
Through research, this study first detected that learners prefer offline courses rather than online courses, and then explored and discussed factors affecting the communication efficiency in online learning. Through encoding previous interviews, deep logic of multi-layer factors affecting the communication efficiency was sorted out. The reasons why learners choose online or offline courses and 2 major factors improving communication efficiency were subsequently concluded. This study discovered that learners tend to pay more attention to external factors instead of internal ones, including 3 detailed elements, which can be classified as timely, communication and teaching level. In addition, technology was asserted to belong to the essential hardware facilities boosting online learning efficiency. After further research, this study found out that simulation, participation and rituality are 3 important indicators to measure the communication efficiency, all dominated by embodied experience. Based on the embodied perspective, the visual and tactile aspects were considered to be the most important factors influencing communication efficiency. Surprisingly, contrary to the hypothesis, when the visual aspect was subdivided into the sense of being watched and watching others, the former was far more likely to be a concern than the latter.

After discussion, this paper drew the conclusion that embodied experience enhances the sense of social presence, increases the interaction between learners and learners or educators and learners, promotes communication, and finally achieves a simulation of offline scenes, thus improving communication efficiency in online learning. The difference in the sense of being watched and watching others reflects the peculiarity of embodied experience, that is, self-oriented characteristic.

Online learning has received increasing attention recently due to the COVID-19 pandemic. This study explores the specific factors that benefit communication efficiency in online learning, combines embodied experience with the concept of telepresence, and fills the research gap on specific measures promoting social presence. The conclusion of this paper can be practically used to consider how to improve communication efficiency in online learning with concrete embodied experience.

At the same time, it is undeniable that the current research is too general to some extent. There is no specific classification of embodied experience in this study, and each sub-item was not selected for specific discussion. Moreover, some of the conclusions drawn are not applicable to every participant. Attempts could be made in potential future studies including increasing the sample size, putting effort into classifying embodied experience from different levels and finally discussing how every category affects communication efficiency.

## Appendix



**Fig. 1.** Cognitive framework

## References

1. Jia, Z. Y., & Wang, J. Y. (2022). The influence of presence on online learning effectiveness from embodied perspective. *Continuing Education Research*, 5, 97–102.
2. Parker Edwin, B., et al. (1978). The social psychology of telecommunications. *Contemporary Sociology*, 7(1), 32–32. <https://doi.org/10.2307/2065899>
3. Walther, J. B., & Parks, M. R. (2002). *Handbook of interpersonal communication*. Sage.
4. Robinson, P. (2000). *Issues in web-based pedagogy: A critical primer*. Greenwood Press.
5. Gunawardena, C. N. (1995). Social presence theory and implications for interaction and collaborative learning in computer conferences. *International Journal of Educational Telecommunications*, 1(2–3), 147–166.
6. Swan, K. (2003). *Learning and teaching with technology: Principles and practices*. Kogan Page.
7. Swan, K., & Shih, L. F. (2005). On the nature and development of social presence in online course discussions. *Journal of Asynchronous Learning Networks*, 9(3), 115–136.
8. Teng, Y. Y. (2013). A literature review of research on social presence. *Modern Educational Technology*, 23(03), 64–70.
9. Huang, Y. T., & Wang, Y. (2022). Research on the influence mechanism of undergraduate learning engagement in mixed teaching under epidemic situation: Based on the perspective of inquiry-based community theory. *Higher Education Research in China*, 3, 52–59. <https://doi.org/10.16298/j.cnki.1004-3667.2022.03.08>
10. Song, J. M., & Chen, D. Z. (2021). Formation and research prospects of online learners' social presence. *Science Tribune*, 35, 152–154. <https://doi.org/10.16400/j.cnki.kjdk.2021.35.049>
11. Chen, Y. (2022). Telepresence: A case study of online conferencing. *Modern Communication*, 6, 54–57. <https://doi.org/10.16400/j.cnki.kjdk.2021.35.049>

12. Yin, M., & Liu, D. Z. (2015). Integration of mind and body learning: Embodied cognition and its educational implications. *Curriculum, Materials, Methods*, 35(07), 57–65. <https://doi.org/10.19877/j.cnki.kcjcjf.2015.07.010>
13. Hall, R., & Nemirovsky, R. (2012). Introduction to the special issue: Modalities of body engagement in mathematical activity and learning. *Journal of the Learning Sciences*, 21(2), 207–215.

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