Journal of Contemporary Educational Research, 2025, Volume 9, Issue 2
http://ojs.bbwpublisher.com/index.php/JCER
ISSN Online: 2208-8474
ISSN Print: 2208-8466

Information Management in University Online Education: A Triadic Analysis

Dan Zhang*

Sichuan International Studies University, Chongqing 400031, China

***Corresponding author:** Dan Zhang, palzdzhang@163.com

Abstract: Online education has become a critical mode of instruction in Chinese universities, particularly during and after the COVID-19 pandemic. This study examines information management in online education through a triadic framework encompassing classroom information management, teaching effectiveness management, and teaching information management. Drawing on in-depth interviews with administrators, teachers, and students, the findings reveal three primary challenges in online education: the absence of embodied information, the uncontrollable nature of online platforms, and nonverbal overload caused by Zoom fatigue. Teachers face difficulties maintaining presence and interaction due to limited feedback from students and risks associated with class recordings. Students experience increased psychological and physical fatigue due to the overlap of learning and living spaces. Recommendations to address these issues include enhancing teacher-student interaction to foster a sense of presence, improving the transparency of course information to align expectations, and adopting user-friendly teaching platforms with privacy safeguards. These insights aim to improve the security, effectiveness, and experience of online education in higher education institutions.

Keywords: Online education; Information management; Class interaction

Online publication: March 4, 2025

1. Introduction

The China Internet Network Information Center (CNNIC) released its *51st Statistical Report on Internet Development in China*, stating that as of December 2022, the number of Internet users in China had reached 1.067 billion, an increase of 35.49 million compared to December 2021 [1]. During the pandemic, online teaching became the primary mode of education, and online education has garnered significant attention from both academia and industry, domestically and internationally, in recent years. Key policy documents, such as the *Guiding Opinions on Promoting the Healthy Development of Online Education* [2] jointly issued by the Ministry of Education and ten other departments in 2019, and the *Several Opinions on Strengthening the Management of Online Open Course Teaching in General Higher Education Institutions* [3] issued by five departments at the beginning of 2022, have underscored

the importance and potential of online teaching within the higher education system. The COVID-19 pandemic has further elevated the role of online education, with the Ministry of Education issuing multiple notices to guide the orderly transition between online and offline teaching. These directives aim to ensure the quality of online education and minimize the pandemic's disruption to the normal order of teaching and learning. Online teaching presents both opportunities and challenges. Recent incidents, such as the disruption of online classes through Zoombombing, highlight the need to examine the mechanisms of information management and the factors influencing online education. Strengthening effective interaction among teachers-students-institution is essential to enhance the security and quality of online teaching.

Research on online teaching primarily focuses on the following areas: (1) the design of teaching platforms based on information technology [4]; (2) analysis of current practices with proposed optimization strategies, alongside an exploration of alternative educational methods such as flipped classroom models (FCM) [5] and small private online courses (SPOC) [6]. These efforts aim to enhance teaching effectiveness through new approaches. However, there is a lack of research on information flow and the management of unexpected information within online classrooms. In contrast, international studies tend to adopt a systemic perspective, exploring topics such as the impact of information flow in online education on learning outcomes. Consequently, examining information management in online education from a communication studies perspective and addressing related information risks presents significant potential for further exploration. Drawing on the online teaching framework proposed by Martin *et al.* [7], this study adopts a communication perspective, conceptualizing online teaching as the flow and feedback of information between teachers, students, and supervisory institutions. This interaction shapes the dynamics and development of these three entities. Based on this framework, the study identifies three types of information within online teaching: classroom information management (i.e., the interaction between teachers and students), teaching effectiveness management (i.e., the interaction between supervisory institutions and students), and teaching information management (i.e., the interaction between teachers and supervisory institutions).

1.1. Classroom information management

Based on the framework and a review of the existing literature, online interaction between teachers and students can be categorized into two types: instructional information and emotional information. Instructional information includes teaching communication, online guidance [8], Q&A support [9], and responses and feedback [10], which primarily represent teacher-to-student information output. It also encompasses student-centered interaction activities such as questioning [11] and participation [12]. Emotional information refers to the learning states conveyed by students [13] as well as the care and support provided by teachers [14]. Most studies assess the relationship between teacher-student interaction and learning outcomes through quantitative analyses, employing measures such as satisfaction and learning engagement [15] to propose strategies for enhancing classroom interaction and improving learning outcomes. A large body of literature indicates a positive correlation between teacher-student interactions and learning outcomes [16]. Furthermore, compared to traditional learning, the effectiveness of online learning places greater emphasis on the quality of instructional information, including course resources and design [17].

1.2. Teaching effectiveness management

Research on the interaction between supervisory institutions and students can also be divided into two categories: teaching evaluation and learning monitoring. Teaching evaluation refers to students providing feedback on their learning outcomes to supervisory institutions. This indirectly supervises teacher behavior through teaching assessments. Common strategies include conducting teaching evaluations [18], establishing comprehensive evaluation

models [19], and monitoring teaching effectiveness and classroom practices [20]. Learning monitoring involves supervisory institutions overseeing students' information, such as tracking their online learning behaviors and emotional fluctuations [21]. This allows for the timely identification of issues and prompts appropriate interventions, such as sending emails or issuing pop-up alerts [22]. Thus, research on teaching effectiveness management can be regarded as a complement and extension of classroom information management. It builds on the information exchange and transfer between teachers and students in the classroom. Supervisory institutions, through direct interaction with students, measure learning outcomes and, in turn, indirectly monitor and manage teacher behavior via learning outcomes and teaching evaluations.

1.3. Teaching information management

There is a limited number of studies on the information flow between supervisory institutions and teachers. Most focus on the technical aspects, discussing how information science can assist teachers in teaching management through platform establishment. These include functions like course scheduling, grade management, online training, and technical support [23]. The interaction primarily occurs indirectly via platforms, lacking feedback mechanisms. This creates a one-sided flow of information from supervisory institutions to teachers, with limited research highlighting reverse supervision, such as teachers evaluating the service quality or document management capabilities of supervisory institutions.

In summary, classroom information management, teaching effectiveness management, and teaching information management represent the information generated through the interaction of teachers, students, and supervisory institutions. However, the interactions among these three entities are not equal, and the boundaries between certain types of information are ambiguous. This ambiguity leads to gaps in information management. Therefore, the research questions addressed in this paper are: What issues currently exist in online teaching in higher education? How can these issues be resolved?

2. Research design

In-depth interviews were conducted as the main research method for this study. Six teachers and students from a large institution in west China were recruited (**Table 1**). Questions explore key aspects of online teaching information management and interaction from the perspectives of administrators, teachers, and students. Administrators are asked about the structure and systems in place for managing online teaching information, including challenges in monitoring student engagement, maintaining classroom order, and ensuring transparency. They also address difficulties in obtaining certain data and strategies for managing crises like sudden incidents or public opinion issues. Teachers are asked about the information they manage, their interaction with students, and how they monitor classroom dynamics. Questions include the ideal teacher-student interaction model, unmet needs for student-related data (e.g., learning expectations), and difficulties in making teaching materials public. Crisis management measures and response strategies are also explored. Students focus on their access to teaching information, the impact of teacher behavior and platform design on engagement, and ideal interaction models. They are also asked about the transparency of academic records and their preferences for sharing personal information. Each interview lasted between 45 and 120 minutes. Approval from the institution was obtained before the study.

Table 1. General information of the research subjects

Name	Occupation	Gender	Age	Role	Online education experience (hours)
S1	Staff	M	50	Administer	101-150
S2	Staff	M	31	Teacher	101-150
S3	Student	F	24	Student	31-50
S4	Staff	F	40	Administer	151-200
S5	Student	F	23	Student	51-100
S6	Student	M	24	Student	51-100

3. Results and discussion

Interview results revealed that online teaching offers students greater convenience but presents more significant challenges for teachers. These challenges are specifically reflected in the following three aspects.

3.1. Absence of embodied information: Separated physical environments

Interviews with both teachers and students highlighted that the lack of a shared physical environment is widely acknowledged as a critical factor affecting classroom information transmission. From the teachers' perspective, teaching is a ritualistic activity that relies on embodied interactions within a shared space to create a communicative and interactive environment. However, in online settings, teachers face digital representations rather than real individuals, as one participant described, "It's basically just a black screen" (S2).

Without the ability to observe students' facial expressions, body language, or engagement levels during class, teachers experience a lack of feedback, weakening their sense of presence and engagement in teaching. Consequently, online instruction struggles to foster the community awareness inherent in campus life or cultivate close teacher-student relationships. As one teacher noted, "After a whole semester, many students barely know their instructors, and teachers are even less likely to recognize all their students. Forget about cultivating shared values—it's basically just reading the PPT and wrapping up" (S1).

3.2. Uncontrollable online information: Risks of platform recordability

For teachers, a primary challenge of online teaching lies in the ambiguity and broadening of the audience. As one teacher stated, "You don't know who is listening on the other side. It could be their parents, friends, or siblings. The sense of teaching to a specific audience becomes very weak" (S1). This expansion of the audience introduces uncontrollable risks to the classroom, as sensitive or controversial topics intended solely for students may be misunderstood by others. "Some content is meant only for students. University classrooms should discuss controversial topics, but for some people, they just can't understand it" (S1).

Additionally, the recordability of online classes is a significant concern for teachers. Many online teaching platforms, often designated by institutions, come with full recording capabilities. While this feature benefits students, it creates challenges for teachers, as one noted, "Recordings can be watched repeatedly to review content that was missed during the live session" (S1). Recordings remove the ephemeral nature of teaching and may compromise the "right to be forgotten." As one teacher expressed, "Teaching is an all-encompassing process. If someone takes a segment out of context and posts it online, it might be impossible to restore the original meaning of the lesson" (S1).

3.3. Nonverbal overload: The unconscious exhaustion of Zoom fatigue

Zoom fatigue, or the pervasive physical and mental exhaustion caused by video interactions, arises from the blending of work, life, and study spaces, leading to nonverbal overload [24]. Zoom fatigue could be attributed to psychological and technical factors. Unlike the flexible transitions between physical spaces in offline environments, most students are confined to learning at home, where study, dining, and living spaces overlap. This lack of spatial separation exacerbates the fatigue brought by online courses, often surpassing that of in-person classes. However, this exhaustion is subtle and varies depending on the type of course. As one participant noted, "Some courses are well-suited for online settings, like those that are more technical and easier to focus on" (S4).

The design of online communication platforms often excludes a significant amount of nonverbal cues, limiting interaction to the confines of a small video frame. "When I'm online, it feels like everyone else is in the dark, and I'm the only one in the spotlight" (S1). While enabling video can enhance the sense of presence, it introduces another challenge: seeing one's own image on-screen can lead to objectification, triggering constant self-evaluation and adjustment. This can even escalate into "mirror anxiety," further contributing to the psychological burden of online learning.

4. Recommendations

Through the established framework, online teaching information management can be categorized into three interrelated and intertwined types: classroom information management, teaching outcome management, and teaching information management. Analyzing these three aspects alongside the in-depth interviews reveals that online education in Chinese universities currently faces challenges such as a lack of embodied information, strong uncontrollability of information, and nonverbal overload. These findings provide valuable insights for improving online teaching information management in the future. Based on the interview analysis, the following recommendations are proposed.

4.1. Classroom information management: Enhancing interaction directness and creating a sense of presence

Classroom information management is a crucial part of information management, as it directly impacts how teachers and students perceive teaching information. "The way a teacher asks questions affects my learning state" (S5). The analysis suggests that improving interactivity and fostering a sense of presence can create a better atmosphere for teacher-student communication, thereby reducing communication barriers. For example, "When the teacher jokes with students, it boosts my focus during class" (S6).

Teachers are encouraged to use dynamic and engaging teaching methods to increase interaction. Incorporating live polls, student Q&A sessions, and playful elements could help simulate in-person classroom engagement and improve the learning experience.

4.2. Teaching effectiveness management: Improving course selection processes and increasing information transparency

Students typically select courses based on information provided by supervisory institutions. The transparency and clarity of this information significantly influence both student and teacher expectations of the course. "I need to know who the instructor is and whether they'll be replaced midway" (S3). Vague course descriptions may lead to mismatched expectations, which can negatively impact teaching outcomes.

Detailed course information should be provided, such as the instructor's research focus, course content, syllabus,

and teaching methods. This transparency will help students make more informed choices, reducing mismatched expectations and improving overall satisfaction.

4.3. Teaching information management: Opting for user-friendly platforms and protecting teaching privacy

The exchange of information between supervisory institutions and teachers also impacts teaching effectiveness. Notably, the design of the teaching platform interface can significantly influence the teaching and learning experience. "Many lectures now use [a particular platform] because its interface is clean and free from distracting ads" (S4). Additionally, privacy concerns about recorded lectures must be addressed.

Teaching platforms with intuitive and minimalistic interfaces that enhance usability and avoid unnecessary distractions are chosen. Robust privacy protection measures are implemented, such as allowing administrators to remove unauthorized participants from online classrooms. Additionally, it is necessary to limit the accessibility and use of recorded lectures to safeguard teachers' intellectual property and prevent misuse.

5. Conclusion

This study has preliminarily established a framework of three interrelated and intertwined types of online teaching information management: classroom information management, teaching effectiveness management, and teaching information management. Through an examination of these three aspects and in-depth interviews, it was found that online education in Chinese universities still faces significant challenges, including a lack of embodied information, strong uncontrollability of information, and nonverbal overload. These findings offer valuable insights for improving online teaching information management in the future.

Disclosure statement

The author declares no conflict of interest.

References

[1] CNNIC, 2023, 51st Statistical Report on Internet Development in China, viewed December 20, 2024, https://www.cnnic.net.cn/n4/2023/0303/c88-10757.html

[2] Ministry of Education, 2019, Guiding Opinions on Promoting the Healthy Development of Online Education, viewed December 20, 2024, https://www.gov.cn/gongbao/content/2019/content_5462518.htm

[3] Ministry of Education, 2022, Several Opinions on Strengthening the Management of Online Open Course Teaching in General Higher Education Institutions, viewed December 20, 2024, https://www.gov.cn/zhengce/zhengceku/2022-04/01/content_5682923.htm

[4] Hu Y, 2012, Research on the Construction of an Online Teaching Platform for Literature Retrieval Based on Web 2.0, dissertation, Anhui University.

[5] Ma X, Zhao G, Wu T, 2013, An Empirical Study on the Flipped Classroom Teaching of University Information Technology Public Courses. Journal of Distance Education, 31(01): 79–85.

[6] Han L, Shi C, 2021, Research on Japanese Teaching Evaluation and Learning Outcomes Based on the SPOC Model. Foreign Language Research, 2021(05): 104–109.

[7] Martin F, Sun T, Westine CD, 2020, A Systematic Review of Research on Online Teaching and Learning from

2009 to 2018. Computers & Education, 159: 104009.

[8] Cai B, Lin Q, Liang G, et al., 2020, Research on the Transformation of College Students' Learning Methods in an Online Teaching Environment: Problems, Trends, and Development Paths. Heilongjiang Researches on Higher Education, 320(12): 140–144.

[9] Xiang C, Chen X, Lu K, 2021, An Empirical Study on the Effectiveness of Online Teaching in Higher Education and its Influencing Factors. China University Teaching, 2021(Z1): 93–99.

[10] Li S, Wang Z, Yu C, et al., 2016, A Framework and Measurement Indicators for Analyzing Engagement in Online Learning Behavior: A Study Based on LMS Data. Open Education Research, 22(02): 77–88.

[11] Wu D, Li W, 2020, The Phased Characteristics of Large-Scale Online Teaching in Chinese Universities: An Empirical Study Based on Surveys of Students, Teachers, and Academic Staff. Journal of East China Normal University (Educational Sciences Edition), 38(07): 1–30.

[12] Wang W, Yan H, Huang X, 2021, How Far is OMO Teaching? Overcoming Challenges in Online Teaching Through Teachers' Self-Efficacy. Modern Distance Education, 193(01): 48–55.

[13] Chen W, Cao H, 2020, Implementation Status and Reflections on Online Teaching in "Double First-Class" Universities. Education Science, 36(02): 24–30.

[14] Guo L, Hu H, 2022, The Relationship Between Teacher Care and College Students' Learning Satisfaction in Online Teaching: The Mediating Role of Learning Engagement. Contemporary Education Forum, 308(02): 42–50.

[15] Li S, Yu C, 2015, Development and Application of an Evaluation Scale for Distance Students' Learning Engagement. Open Education Research, 21(06): 62–70 + 103.

[16] Song J, Feng J, Qu K, 2020, The Impact of Teacher-Student Interaction on Deep Learning in Online Teaching. China Educational Technology, 406(11): 60–66.

[17] Shen Z, Wu D, 2020, Exploring Factors Influencing the Effectiveness and Satisfaction of College Students' Online Learning: An Empirical Analysis Based on Structural Equation Modeling. Research on Educational Development, 40(11): 25–36 + 59.

[18] Zhang Q, Wang A, 2014, Research on a New Hybrid Teaching Model Based on the "Flipped Classroom." Modern Educational Technology, 24(04): 27–32.

[19] Chen Y, Zheng Q, Sun H, et al., 2016, Modeling and Application of Online Learning Evaluation Based on Learning Analytics: A Study on the Teacher Comprehensive Evaluation Reference Model. E-education Research, 37(10): 35–41.

[20] Liang S, Yang J, Zhang G, et al., 2018, Process Quality Monitoring of Teaching and Learning in Online Classrooms. Modern Educational Technology, 28(S1): 140–144.

[21] Shu Y, Jiang Q, Zhao W, 2019, Precise Early Warning and Intervention in Online Learning Crises: Models and Empirical Research. China Distance Education, 535(08): 27–34 + 58 + 93.

[22] Yang X, Jiang Q, Zhao W, et al., 2017, Diagnosis and Intervention of Online Learning Procrastination Based on Learning Analytics in the Era of Big Data. E-education Research, 38(07): 51–57.

[23] Xiao Y, Wang J, 2020, Online Teaching Quality Evaluation System in Higher Education: Value Orientation and Construction Strategies. Heilongjiang Researches on Higher Education, 38(10): 141–144.

[24] Thomas S, Sherry J, Chierichetti R, et al., 2022, Beyond Zoom Fatigue: Ritual and Resilience in Remote Meetings. Ethnographic Praxis in Industry Conference Proceedings, 2022(1): 56–73.