

Online Teaching Research in China in the Context of Educational Digitization

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Abstract: Against the backdrop of digital transformation in education and the implementation of the “Three Links and Two Platforms Program,” teaching research among Chinese teachers has exhibited a growing tendency towards informatization. Information technology has been increasingly leveraged by teachers not only to organize teaching research activities and analyze research data but also to demonstrate their research outcomes. This article aims to give an overview of the history of online teaching research in China and pinpoint the promotional factors underlying its development. Inadequacies in current online teaching research are also discussed.

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Introduction

THE BASIC education curriculum reform in China calls for the teacher to become a developer and researcher of the new curriculum (Zhu, 2002). Teaching research by the teacher community, an important component of China's five-level education and teaching research system, has played a crucial role in advancing the quality of education (Yang, 2022). The accelerated development of information technology opened up novel paradigms for educational research, giving rise to online teaching research (OTR). OTR, also known as virtual or cyber teaching research, is an unconventional form of teaching research in which teachers employ information and communication technology (ICT) to conduct teaching research free from special constrictions, sharing teaching-related information and resources, and communicating research outcomes online (Li, 2007). OTR occurs in a virtual venue supported by computers and the Internet, thus having the advantages of being more flexible, cost-effective, and efficient compared with conventional teaching research. It is conducive to diversifying teaching research patterns and engaging the maximum number of teachers in instructional research (Xiao, 2007). This article gives an overview of the history of OTR in China, delves into the promotional factors underlying its development, and pinpoints issues with its current practices, with a view to eliciting an in-depth understanding of OTR and propelling its future improvement.

The History of OTR in the Teacher Community

OTR in China first surfaced at the end of the 20th century. In 1997, teachers at Country Garden School in Shunde City, Guangdong Province, began to use the bulletin board system (BBS) to discuss education and teaching issues, welcoming the participation of the public. Under the guidance of leading educational technology experts, chemistry teacher Pan established the "Xiande Chemistry Alliance" and "Xiande Virtual Teaching Research Center" in 1999 in collaboration with a group of like-minded peers. In 2000, he created the first online professional forum on chemistry teaching in China (Huang & Pan, 2002). In July 2003, the Ministry of Education (MoE) of China's Teacher Education Department launched the program "Cyber Alliance of National Teacher Education" (Zhang & Cao, 2003), marking the nationwide rise of online teaching research. Amid the rapid development of network devices such as QQ, blogs, BBS forums, WeChat, Tencent Document, and Tencent Meeting, teachers have continuously explored and practiced new forms of OTR. Generally, OTR among Chinese teachers has gone through three stages: teaching research based on digital-text interaction, online teacher community-based teaching research, and intelligent technology-supported teaching research under the initiative of "Internet plus education."

Teaching Research Based on Digital-Text Interaction

In the early 21st century, teaching research based on digital-text interaction arose because of the popularization of Internet use, relying on widespread, spontaneous teacher blogs and forums (Chen et al., 2003). Blogs, distinguished by their easy use and instant information sharing, have made inter-teacher, teacher-professional researcher and teacher-student parent communication more convenient and smoother. In the meantime, blogging brought about changes to the “centralized” teaching research pattern by motivating teachers to participate in regional teaching research activities on an equal and democratic footing (Wang, 2009).

Blog-based teaching research significantly boosted inter-teacher collaboration and communication, as well as facilitated distance in-service training among them, which generated a profound effect on promoting teacher professional development by using the Internet. According to Hu et al. (2009), teacher blog platforms for teaching research have effectively advanced the building of disciplinary resources and the professional development of teachers by fostering online learning communities for them. On the other hand, it was also noted that the outcomes and quality of blog-based teaching research vary among individuals and various regions. Yan and Li (2010) argued that blog-based teaching research mostly remained superficial interaction between teachers, with issues such as shallow reading of blog texts, unilateral comments without adequate interaction, focusing on the form of platforms but disregarding genuine communication, and a lack of deep concern about actual teaching challenges. They pointed out that blog-based teaching research should transition from personalized demonstrations towards more community-based teaching research (Yan & Li, 2010).

Online Teacher Community-Based Teaching Research

In 2010, OTR, based on teacher online practice communities and online training workshops, among other forms, underwent rapid growth. Online community platforms and computer terminal-based video technology served as important interaction media in teaching research, resulting in new features of the objectives, processes, and interactions of OTR (Wei, 2010).

Regarding research objectives, online teacher community-based teaching research placed more emphasis on improving teachers’ IT application abilities, fostering their practical knowledge, and enhancing their instructional competence (Chen et al., 2013). Xu et al. (2014), for instance, discovered that regional online collaborative lesson preparation was favorable for heightening teachers’ knowledge repertoire and that research and training activities organized by the grassroots community of digital education were effective in improving teachers’ ability to apply IT in instruction.

Furthermore, online teacher community-based teaching research emphasized systematic design and management of the research process. Li (2012) proposed that OTR should include six elements: research platforms, information search tools, educational and teaching issues that promote teacher knowledge development, thematic discussions and resource investigation, online activities based on personal reflection and collaborative communication, and research outcome demonstration and evaluation; and that performance-based evaluation devices should be adopted to assess the specific output of the teaching research community. Regarding interaction media in teaching research, however, domestic video technology at that time was insufficiently advanced to support the quantitative analysis of classroom teaching; there were still practical complications in exporting data for teaching research evaluation and providing tailored teaching research support, such as intelligent video push services, due to the limitations of the earlier Internet technologies (Huang et al., 2014).

Intelligent Technology-Supported Teaching Research under the Initiative of “Internet plus Education”

Amid the rapid popularization of mobile terminals, such as smart phones and tablets, as well as the improvement of network bandwidth, intelligent technology gave new impetus to OTR development in the mid-2010s under the strategy of “Internet plus education.” The technological convergence of the cloud, Internet, and terminals gave rise to innovative teaching research methods, significantly boosting the circulation efficiency of intellectual resources generated by experts, educational research staff, and leading teachers and thus increasing the sharing of teaching research space, resources, and outcomes. For example, intelligent video recording and broadcast technology has extraordinary capabilities for reproduction and cross-spatial sharing of scenarios and the capacity to capture multiple facets of classroom teaching, enabling teachers to research more diverse classroom practices (Hu & Xu, 2020). Also, intelligent technology-powered teaching research places a high value on the participants’ experience, emphasizing individualized research services. The big data analytics-supported OTR library, for instance, can intelligently recommend research themes, reports, and other research-supportive services, facilitating data-driven teaching research (Li et al., 2018).

Factors Driving OTR Development in China

The digital transformation of education poses more demanding requirements for the teacher’s competence in digital instruction, teaching research, and curriculum reform. In this context, teaching research is accorded with more

explicit purposes: to serve education and teaching by guiding curriculum reform and improving the quality of teaching; to serve teacher professional development by aiding them in upgrading teaching methods and enhancing instructional competence; to serve student holistic development by delving into issues relevant to their learning and growth; and to serve educational decision-making by strengthening studies of basic education theories, policies, and practices (Zheng & He, 2022). In the digital era, there is a growing trend towards increasing OTR duties or online-offline blended research duties while decreasing purely face-to-face teaching research activities (Lyu, 2023). China's OTR development has been strongly driven by national policies, technical support, and application-focused research programs.

Ongoing Policy Direction

The Chinese government has released a series of papers to support the development of OTR. 2010's "The Outline of the National Medium- and Long-range Educational Reform and Development Plan (2010–2020)" emphasizes the necessity of strengthening the construction of an online teaching resource framework and promoting the sharing of high-quality educational resources (Ministry of Education of China, 2010). 2017's "The 13th Five-Year Plan for National Education Development" underlines the exploration and popularization of innovative teaching research by teachers under the strategy of "Internet plus Education" (State Council of China, 2017). In "The Action Plan for Digital Education 2.0," the MoE proposed the service model of "Digital Platform plus Education" to integrate all types of public education resources, platforms, and systems at all levels (Ministry of Education of China, 2018a). Subsequently, more relevant papers were issued, including "The Notice on Trial Actions for AI-supported Teacher Professional Development" (Ministry of Education of China, 2018b), "Opinions on Implementing the High-quality Teacher Cultivation Plan 2.0" (Ministry of Education of China, 2018c), "Opinions on Implementing the Program 2.0 for Enhancing the IT Application Capacities of National Primary and Secondary Teachers" (Ministry of Education of China, 2019), and "Guiding Opinions on Advancing the Strategy of 'Internet plus Education'" (Ministry of Education of China, 2021a), all of which advocate leveraging the new-generation Internet and AI technologies to advance digital and intelligent educational and teaching research.

Additionally, local governments in China have launched specific policies to support regional OTR development in response to the central government's "Guiding Opinions on Implementing the 'Internet Plus' Initiative" (State Council of China, 2015). The Education Department of Ningxia Hui Autonomous Region, for example, initiated its collaboration with Central China Normal University in 2020 to conduct online evaluations and ratings

of IT literacy among primary and secondary teachers within the provincial region in an effort to boost their digital literacy and IT application abilities through evaluation and incentives. “The Report on the Development of IT Literacy among Primary and Secondary Teachers in Ningxia” was produced as an outcome of the partnership. In the meantime, Ningxia’s Artificial Intelligence Education Research Institute, with 10 county-level AI education research and training centers for teachers from five municipal regions, was established. A framework of multi-level research and training programs under the online-offline blended pattern was developed to enhance teachers’ digital competence and promote the digital transformation of education in Ningxia (Li & Rao, 2023).

Robust Technical Backing

As a result of the persistent national construction of “Three Links and Two Platforms” (namely, the school link to a broadband-based network, the class link to excellent teaching content, the individual link to the online learning space, the national public educational resource, and the educational administration platforms), online platforms, such as the national smart education platforms, can provide increasingly advanced education and teaching research avenues and resources for teachers throughout the country (Wang, 2015). The “Smart Primary and Secondary Education of China” platform, for instance, devises channels for thematic education, curricular instruction, after-school services, teacher research and training, home education, and practical experiences in educational reform. Among them, the teacher research and training channel includes columns of teacher learning resources, teacher ethical education, exemplary courses, thematic research and training, academic lectures, and mentoring of anchor teachers. The Service Center for Vocational Specialties and Courses on the “Smart Vocational Education of China” platform launched a wealth of high-quality specialty resource banks, online excellent courses, and open video courses; columns such as the “teaching resource center,” “virtual simulation training center,” and “teacher service center” were in development (Wang, 2022).

In the meantime, under the state’s policies like “The Developmental Strategy for National Informatization” (State Council of China, 2016) and “IT Development in the 14th Five-Year National Plan (Central Cyberspace Affairs Commission, 2021), new-generation information technologies, such as big data, cloud computing, AI, virtual reality, and 5G communications, have undergone robust development, popularization, and application in China. Such dynamics continue to provide powerful support for OTR development.

Application-Driven Research Programs

As digital technologies advance, diverse OTR practices have emerged, such as live streaming-based teaching research, collaborative distance teaching research, learning analytics-based teaching research, etc. (Zheng & He). For example, in 2010, an educational technology association was formed in Guangzhou City for primary and secondary teachers, which later sponsored plural educational technology application research and training programs. Also, member schools of the association carry out collaborative OTR activities like “lesson honing through different approaches,” giving teachers the opportunity to discuss their differential teaching methods, techniques, and ideas, as well as sharing experiences and learning from each other's strengths, in order to continuously improve their teaching research abilities and promote common growth in them (Zhao et al., 2010).

In addition to the proliferation of local OTR practices, the central education authorities have been actively promoting the creation of OTR agencies. In July 2021, the MoE's Higher Education Department issued the “Notice on Conducting Pilot Projects for Building Virtual Teaching Research Offices,” proposing to launch trial projects for exploring the standards, construction paths, and operation patterns of new-generation teaching research organizations in the intelligent era (Ministry of Education of China, 2021b). In February 2022, the MoE announced the first list of 439 trial projects of virtual teaching research offices in universities, setting forth objectives, duties, quality monitoring, facilities, and technical criteria for these online offices. It also provided the “virtual teaching research office platform” and “virtual teaching research information platform” for institutions involved in the program (Ministry of Education of China, 2022a). In the same year, the MoE released the second list of virtual teaching research offices in trial, suggesting that the virtual teaching research office's WeChat official account and “College Smart Teaching Research Platform” be used to communicate the practical experiences and research outcomes of online teaching research actors (Ministry of Education of China, 2022b).

Issues with OTR among Chinese Teachers

Inadequate Recognition of OTR among Teachers

The majority of schools have not developed a proper understanding of the value of OTR, placing insufficient weight on OTR activities. That results in the low efficacy of OTR in many schools. Teachers tend to view OTR as a minor supplement to conventional teaching research, an opportunity to upload and download digital materials, rather than a practice in which they should harness the advantages of educational technology to innovate teaching paradigms and increase instructional outcomes (Chen, 2021). They seldom infuse the perspective of professional development into OTR activities.

Most OTR organizers have limited experience in OTR management and are incapable of formulating scientific OTR plans and corresponding implementation procedures, which compromises OTR's effectiveness as well as restricting OTR participation among ordinary teachers (Cheng, 2022).

More Focus on “Quantity” than “Quality” in OTR

Issues of superficial exploitation of OTR platforms are pervasive. First, the communication between OTR participants is mostly a simple transmission of information, lacking substantive interaction, which results in a lack of complete research processes or in-depth research findings. Second, many schools save the effort to develop their own OTR platform; instead, they choose to copy those of others. This simplistic emulation may lead to their inability to conduct statistical processing of data. Third, most OTR follows a rigid form, which is insufficiently relevant to questions encountered in actual teaching situations. Issues like these bring about the low effectiveness of OTR practice, hindering the achievement of its expected outcomes (Li, 2022).

Unbalanced Equipment in OTR Facilities

With the national “Three Links and Two Platforms” and other basic educational technology in place, the majority of schools in China have developed rudimentary conditions for digital education. Nevertheless, the disparities in educational infrastructure between urban and rural schools have hindered OTR's popularization. In some rural schools, teachers have difficulty accessing basic facilities necessitated by OTR activities, such as high-performance computers and Internet connectivity. For schools in remote rural and ethnic minority areas, factors such as less developed infrastructure, outdated facilities, and frequent network disconnection discourage their teachers from engaging in OTR, who would choose to stay with face-to-face teaching research instead (Zhai, 2023). Regarding the soft environment, a portion of schools have not developed stable OTR platforms, leaving a gap between their nominal functions and teachers' actual needs. Furthermore, most of them do not have specialized staff for network maintenance and platform management, which negatively affects the implementation of OTR (Wei, 2023).

A Lack of Mature Evaluation Mechanisms for OTR

Teachers' engagement in and devotion to OTR, to a certain extent, is contingent on relevant evaluation and incentive mechanisms. A proper evaluation framework can assess the effects of OTR work while also providing evidence for necessary adjustments to OTR implementation (Li, 2022). None-

theless, the majority of schools focus on immediate teaching outcomes rather than the process of teaching research in their teacher evaluation. Fewer schools have OTR-specific evaluation mechanisms for measuring teachers' participation and achievements in OTR. In this situation, teachers cannot obtain feedback on and recognition of their OTR work. Over time, they may lose motivation for enhancing their OTR engagement (He & Zheng, 2023).

Conclusion

In the context of the digital transformation of education, OTR plays a significant role in advancing teaching research and teacher professional development. The popularization of OTR brings new opportunities as well as challenges to instructors' teaching research work. Schools must leverage all reachable digital resources to create an autonomy-supportive, highly efficient research environment to facilitate teachers' engagement in OTR practice. Teachers at all education levels should use their initiative to integrate cutting-edge technologies into teaching research to continuously heighten their professional competence and upgrade the quality of education.

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