

ICT Integration in China's Higher Vocational Education: A Review

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Abstract: As part of the country's education digitization and informatization agenda, schools in China are encouraged to use micro-courses or micro-courses as part of their instruction. Despite the influx of open educational resources, aligning ready-made micro-courses to curricular offerings remains challenging. Furthermore, readily available online micro-courses are often disorganized, making it difficult for students to select the most appropriate ones. Thus, teachers opt to develop their own micro-courses to ensure suitability to the content and the students. This study aims to describe the cognitions and practices of ICT teachers towards micro-course development. Using a multi-case study research design, this study will employ semi-structured interviews and classroom observations to gather qualitative data from select participants from three identified higher vocational schools. The results of this paper may contribute to further enhancing the capacity of ICT teachers in developing micro-courses, which contributes to enhancing students' learning experience in their ICT subject.

Keywords: Micro-course, ICT Micro-courses, Professional Development Program, Higher Vocational School.

1. Introduction

With the continuous advancement of modern times, computer technology improved at an unprecedented pace. This progress had a far-reaching impact, especially in the field of education, driving the continuous innovation of teaching and learning methods. Learners were surrounded by a wide range of new technologies that brought many positive changes to the learning process, making it significantly more personalized. Learners could customize their learning paths and content according to their individual characteristics and needs. At the same time, new technologies made learning more engaging by stimulating interest and motivation through vivid images, captivating animations, and interactive learning tools. Furthermore, technology greatly enhanced the accessibility of education. With internet access, learners were able to connect to vast educational resources anytime, anywhere.

To stay relevant to the needs of 21st-century learners, educational institutions pursued innovations in both teaching formats and methods, including the introduction of micro-courses (Yang, 2022)[22]. As the term implied, micro-courses were characterized by their short duration, blended teaching methods, and ease of distribution (Lv et al., 2020)[11]. Rather than presenting lengthy lectures, teachers used micro-courses to break down broad topics into smaller, focused segments delivered through short instructional videos. Hug (2005)[7] referred to this approach as "bite-sized" learning due to its modular and digestible format. The primary aim of micro-courses was to convey essential concepts while avoiding information overload (Kumar & Nanda, 2024)[10]. This aligned with Sweller's (1988)[14] Cognitive Load Theory, which posited that human working memory could process only a limited amount of information at one time. Therefore, microlearning helped maintain student focus and supported better comprehension and retention.

In the Chinese context, the government actively promoted micro-course development as part of its broader agenda for education digitization and informatization. According to the

Ministry of Education (2024)[13], the Smart Education of China platform-integrated into the learning management systems of over 519,000 educational institutions-offered 10,000 online vocational courses. Additionally, the Open University of China developed 20,000 micro-courses across various disciplines, including science, social science, medicine, agriculture, health, the arts, and recreation (The Open University of China, 2024)[16]. These two platforms were national in scope, but local governments, cities, and schools also developed their own smart education platforms. The establishment of these platforms was guided by key government policies, including the Education Informatization 2.0 Action Plan and the Modernization of China Education 2035.

Despite the availability of large-scale smart education platforms, teachers were still expected to develop their own micro-courses. This responsibility was not only part of instructional innovation but also necessary due to the limitations of existing resources. Zhou and Dai (2014)[23] noted that many available online micro-courses were poorly organized, making it difficult for students to identify the most suitable ones. This problem was compounded by inconsistent content quality. Micro-course development required more than simply recording traditional lessons-it involved additional pedagogical and technological skills. The development process involved careful planning, production, and implementation. As Chakaveh and Bogen (2007)[2] observed, the effectiveness of technology depended more on how it was used than on the technology itself.

To develop effective micro-courses, it was essential for teachers to be knowledgeable about the technologies available for planning, production, and implementation. Although research showed that Chinese in-service teachers were highly aware of ICT tools in lesson planning and development, they often lacked the practical skills to integrate ICT effectively into actual classroom instruction (He et al., 2022[5]; Kong & Zhao, 2017[8]; Ma et al., 2019[12]; Tang et al., 2019[15]). A systematic review by Yang, García-Holgado, and Martínez-Abad (2023)[20] found that 34 out of 50 studies

conducted from 2010 to 2023 recommended additional teacher training to enhance ICT competence.

The purpose of this review was to describe the current status of ICT integration among teachers in higher vocational schools. The focus was to provide a detailed overview of their competencies in integrating ICT into teaching. This aligned with the assertions of Yang and Hu (2019)[21] who stressed that planning and implementing digital instruction—particularly in higher education—required a high level of ICT proficiency. Therefore, the objective of this review paper was to consolidate existing research on ICT integration in higher vocational institutions and to examine government policies that supported ICT in education. Lastly, future research perspectives were also determined.

2. Methods

This study carried out a systematic literature review to fully understand the current level of ICT integration in Chinese higher vocational schools. The study gathered relevant academic works from public databases such as Google Scholar and the China National Knowledge Infrastructure (CNKI).

3. Results

3.1. Policy on Education Informatization of China

3.1.1. Educational Modernization Policy

In 2019, the Central Committee of the Communist Party of China and The State Council of China issued the document "China's Education Modernization 2035". In "China's Education Modernization 2035", the Chinese government put forward the overall thinking and strategic tasks for promoting the modernization of education. The informatization and information technology strategy in China's Education Modernization 2035 builds a comprehensive framework with intelligence as the core, covering campus construction, personnel training, education services, education governance, and other fields. The framework aims to promote the innovation and reform of the education model through the deep application and integration of information technology and realize the comprehensive improvement of education quality and the wide coverage of education equity.

The strategic framework of informatization and information technology includes four aspects. The first is intelligent campus construction: the document emphasizes the use of modern information technology such as the Internet of Things, big data, and cloud computing to build an integrated intelligent teaching, management, and service platform to improve the intelligence level of the campus environment. This includes the construction of intelligent classrooms, intelligent laboratories, and other teaching facilities, as well as applying intelligent management systems aimed at improving the efficiency and quality of teaching, management, and service. The second is the reform of talent training mode: the in-depth application of informatization and information technology provides strong support for the reform of talent training mode. The document proposed that big data technology should be used to conduct personalized analyses of students and develop personalized training programs that meet the development needs of students. At the same time, it promotes the deep integration of information technology and education and teaching and realizes the

organic combination of large-scale education and personalized training. The third is the innovation of education service formats: the document advocates the establishment of a mechanism for the co-construction and sharing of digital education resources, breaking the "wall" of school education resource supply through the Internet, and building a high-quality digital resource-sharing mechanism and public service system with universal participation and internal and external integration. This will help optimize the allocation of educational resources and promote the improvement of educational equity and quality. Finally, the reform of educational governance mode. Informatization and information technology also promote the reform of educational governance mode. The document pointed out that it is necessary to pursue the precision of education management and scientific decision-making based on big data and establish an intelligent education management and monitoring system. This will help improve the efficiency and level of educational governance and provide a solid institutional guarantee for the modernization of education.

The informatization and information technology strategy in China's Education Modernization 2035 aims to build an efficient, open, and personalized education system through a multi-dimensional layout such as intelligent campus construction, personnel training model reform, education service format innovation, and education governance mode reform. Its implementation will significantly improve the overall effectiveness of education in China, provide students with a better quality, fair, and personalized learning experience, and help them achieve all-round development and growth.

3.1.2. Educational Informatization Policy

With the rapid development of information technology, educational informatization has become an indispensable force to promote the modernization of education. The Ministry of Education of the People's Republic of China officially issued an important "Education Informationization 2.0 Action Plan" on April 13, 2018. The document number is Jiaoji [2018] 6. It aims to promote the development of education informatization further and speed up the process of education modernization. At the same time, it emphasized the core concept of the deep integration of information technology and education and teaching. It put forward major tasks such as improving the development and serviceability of digital education resources, improving teachers' information technology application ability, and promoting the deep integration of information technology and education and teaching.

The "Education Informationization 2.0 Action Plan" clearly defines the overall requirements of educating people, integrating and innovating, systematically promoting and leading development, and puts forward the development goal of "three full, two high and one big". In order to achieve the above goals, the "Education Informationization 2.0 Action Plan" puts forward eight implementation actions, including the popularization of digital resource services, the coverage of online learning space, and the development of online intellectual assistance projects, which are of great significance for improving the quality of education, promoting education equity and enhancing international competitiveness. Through an in-depth analysis of the background, requirements, objectives, and action strategies of the program, this paper reveals its strategic position and far-reaching influence in the field of education informatization in

China.

3.1.3. Education Digitization Policy

In terms of digitization of education, the Chinese government, through national strategic action on digitization of education, has promoted the efficiency and precision of education governance and the reform of educational decision-making and management methods. China has built the world's largest library of education and teaching resources, published standards and norms for the digitization of education, and become the world's first in the construction and application of MOOCs. At the same time, the quality resource supply capacity and functional service capacity of the national primary and secondary school smart education platform have been significantly improved, and the total amount of resources has increased significantly, serving students' independent learning, teachers' teaching, and "double reduction" to improve quality and efficiency. In addition, the digital transformation and upgrading of vocational education transform the vocational education section of the national smart education public service platform to strengthen the development and supply of digital resources.

3.1.4. Educational Tasks in China's Informatization Planning

In December 2021, China's Cyberspace Affairs Commission of the CPC Central Committee issued the 14th Five-Year Plan for National Informatization[3]. The National Informatization Plan to make arrangements for the development of informatization in China's "14th Five-Year Plan" period is an important part of the "14th Five-Year Plan" national planning system and is an action guide to guide the informatization work of all regions and departments. Among them, information-based education has been highly valued as an important part of information-based development.

In the "14th Five-Year Plan for National Informatization", the Chinese government put forward the task of carrying out lifelong digital education, accelerating the construction of China's education network and the "Internet + education" platform. The plan emphasizes improving education information infrastructure construction, expanding the coverage of high-quality resources, and deepening education and teaching reform. At the same time, we will promote the regular application of all types of innovative teaching, achieve fairer and better quality education, and enhance the digital literacy and skills of all people.

The 14th Five-Year Plan for National Informatization puts forward the overall goals for informatization development by 2025, including decisive progress in the construction of digital China, a substantial improvement in the level of informatization development, comprehensive consolidation of digital infrastructure, and significant enhancement of digital technology innovation capabilities. Setting these goals has laid a solid foundation for the rapid development of information-based education. The main tasks and key engineering attention of information-based education include (1) lifelong digital education. We will raise the level of education informatization infrastructure and build a high-quality education support system. We will improve the national public service system for digital education resources and expand the coverage of high-quality resources. Promote the deep integration of information technology and intelligent technology with education and teaching, and promote the reform of education and teaching. Give full play to the advantages of online education and virtual simulation training, and deepen the application of big data analysis in the field of

education. Explore the expansion of credit bank pilot projects and the accumulation, certification, and transformation of achievements, as well as build a public service system for a lifelong learning experience. (2) "Internet + Education" cloud network integration construction. We will accelerate the construction of China's education network and "Internet + Education" platform and build a ubiquitous online learning space. Support the normal application of all types of innovative teaching, and promote the open sharing of high-quality educational resources. Narrow the gap between regions, urban and rural areas, and inter-school, and achieve fairer and better quality education.

Information education priority action. National digital literacy and skills promotion action: By 2023, a national digital skills education and teaching resource system will be initially formed, and the digital literacy and skills of information vulnerable groups will be significantly improved. By 2025, digital skills education and training will be widely available to all so that people can share the fruits of informatization development. Build a national digital skills education resource system, strengthen the construction of financial media platforms, and meet the learning needs of various social groups. We will conduct diversified digital skills training programs and set up regular and scenario-based digital skills courses in universities and primary and secondary schools. Accurately help information vulnerable groups to improve their literacy level in the use of digital equipment, access to online services, and digital consumption.

Support for educational informatization in information infrastructure and technological innovation. The "14th Five-Year Plan for National Informatization" emphasizes the application of information technologies such as 5G, big data, and artificial intelligence in education informatization. Among them, the 5G Innovation Application project specifically proposes to accelerate the construction of audio and video transmission capacity based on 5G networks and enrich new multimedia content sources such as 4K/8K and VR/AR in the field of education. The application of these technologies will further promote the development of education informatization to a higher level.

The "14th Five-Year Plan for National Informatization" provides a clear direction and path for the development of informatization education. Through the implementation of key tasks and priority actions, such as lifelong digital education and the integration of the "Internet + Education" cloud network, China will accelerate the construction of a high-quality, fair, and sustainable education information system. In the future, with the continuous progress of information technology and the continuous expansion of application scenarios, educational informatization will usher in broader development prospects and infinite possibilities.

3.2. Status of Micro-courses in China

3.2.1. Micro-courses in China

In his book MOOCs: Massive Open Online Courses Sweeping Global Education (2014), Wang Tinghuai mentioned that MOOCs are a new teaching mode, and the origin of MOOCs can be traced back to the Open Educational Resources movement in the early 21st century. The book also mentions two models of MOOCs: c MOOC and xMOOC. Among them, although the c MOOC is relatively perfect, it is not easy to popularize because it is not suitable for diverse courses; x MOOC was born in colleges and universities, retains the characteristics of traditional courses, is more

systematic, develops relatively quickly, and is more popular among learners.

Zhang Ce et al. mentioned three typical characteristics of MOOCs in their article "Reshaping Teaching with the Advantages of MOOC to Achieve a New Model of Blended Online and Offline Teaching" (2018): First, large-scale, online and open, which is reflected in the particularity of the network platform for course operation; Second, in addition to providing video learning resources, MOOCs also provide test questions, discussions, examinations, and other teaching processes. MOC courses are similar to traditional courses and have the integrity of teaching activities. Third, teachers not only provide teaching video materials but also organize teacher-student interaction and student-student interaction and provide students with opportunities for online tutoring and interactive discussion.

It can be seen that China already had relevant research results on online teaching 10 years ago. Moreover, it discusses the characteristics, advantages, and disadvantages of online teaching from various angles and objectively evaluates the changes in the traditional education mode caused by the birth of online teaching and the various problems gradually reflected in the development process of online teaching.

Compared with the physical classroom, blended foreign language teaching can integrate the massive real corpus provided by the Internet, provide meaningful opportunities for foreign language learning and use, and realize the teacher-student remote interactive experience. Compared with pure online teaching, blended foreign language teaching also has a physical classroom that students are familiar with to obtain a certain sense of security, and it is not easy to get lost in massive resources or feel alienated by only remote interaction. In addition, blended learning can bridge the boundaries between online and offline environments, formal and informal learning, and make it easier to realize personalized learning (Dai Zhaohui 2015: 77)[4].

3.2.2. Research on Technology-Supported Education in China

According to the current research of Chinese scholars on MOOCs, flipped classrooms, and blended learning in colleges and universities, there are three important influencing factors in blended learning: (1) the deep integration of information technology and education, (2) Teacher identity and role, (3) Combine online and offline

Xia Dongsheng et al. discussed the characteristics and interrelationships of micro-class, MOOCs, and Flipped Classrooms (2019)[18]. Micro-class, MOOCs, and flipped classrooms, as three new and mature teaching resource forms and teaching modes, have attracted more and more attention from college teachers and have become one of the hot spots in today's education and teaching reform. There is a very important partnership between MOOCs and flipped classrooms. Before class, students learn through micro-lessons and MOOCs; Flipped classroom is a very important part of the curriculum. At the same time, the paper also mentions that in the era of "Internet +", with blended learning as the guiding ideology, it actively promotes the deep integration of information technology and education and teaching and combines traditional teaching with micro-class teaching.

In his article Research on the Role of College Teachers under the Hybrid Teaching Mode Integrating MOOCs and Flipped Classrooms (2019), Wang Qianjiao stressed that under the hybrid teaching mode, college teachers must reflect

on the drawbacks of traditional teaching methods and change the role of traditional teachers to meet the teaching needs of the new era. Chen Liping and Duan Jinxin mentioned in the article "SPOC Flipped Classroom Related Research Review" (2018) that flipped classrooms first appeared in the 1990s, and Eric Mazur, a physics professor at Harvard University, elaborated on the concept. In 2007, Aaron Sams and Jonathan Bergmann fully applied the flipped classroom. At the same time, the paper also introduces the three characteristics of SPOC-flipped classrooms: diversification, innovation of teaching concepts, and diversification of teaching modes.

Yan Bei proposed in Practice of Online and Offline Blended Learning Mode Based on Flipped Classroom (2022) that hybrid teaching combines the advantages of online and offline teaching, which is one of the hot issues in China's higher education[19]. A flipped classroom subverts the traditional teaching model and rearranges the order of knowledge transfer and understanding. In this innovative pedagogy, students study the course content independently through online resources before class and focus their class time on in-depth exploration and application of knowledge, significantly increasing their enthusiasm for active learning. In the practice of mixed online and offline teaching, students use online materials to preview. In contrast, teachers use the flipped classroom strategy in face-to-face teaching to guide students to discuss and research course content, which not only supplements and extends online learning, but also further deepens students' understanding and application ability. This model combines online and offline teaching elements, and offline interactive teaching is the core and key of the blended learning model.

The above literature mainly introduces the differences and connections between MOOCs and flipped classrooms and the origin and advantages of blended learning.

3.2.3. Teacher's Cognition on ICT Integration in Classroom

Teacher cognition is a complex network composed of what teachers know, think, and believe, which guides teachers' practice and is characterized by individuality, practicality, situation, systematization, and dynamics (Borg 2006)[1]. Borg defined teacher cognition as teachers' thinking, understanding, and belief in teaching. Under this definition, teacher cognition is considered to be the main factor that will greatly affect the teaching practice of information technology teachers, the various decisions they make in the classroom, and how they act in teaching. Therefore, the study of teacher cognition is helpful in understanding the different processes involved in classroom teaching and the effective development of teachers. It also has important significance in deeply understanding the current situation of teacher development.

According to the existing research, there are few cognitive studies on teachers' blended learning in the ICT curriculum. Researchers can use hybrid methods to design a more detailed and in-depth understanding of research problems. However, because different methods have different quality standards, researchers may encounter various difficulties due to improper design of mixed methods. Through the reading of many pieces of literature, the field of teacher cognition research can be roughly divided into three basic directions: teacher decision-making, teacher knowledge, and teacher belief.

Teacher cognition refers to the unobservable cognitive content of teachers in teaching, that is, "what teachers know, believe and think", which generally includes the process of

teachers constructing beliefs, forming knowledge systems, and making teaching decisions in teaching. Before the 1970s, "behaviorism" held a pivotal position in educational research, ignoring the dominant position of teachers and failing to have a holistic understanding of the essence and complexity of teaching. With the gradual improvement of cognitive psychology, the academic research focus on this problem has shifted from "what teachers do" to "why teachers do it". Studying teacher cognition helps to understand the different processes involved in classroom teaching and the effective development of teachers.

Kou Jun et al proposed in the Path to Improving Teaching Decision-making Ability from the Perspective of Student-Professional Teachers' Double Cycle (2024) that teaching decision-making is a process of professional teachers' independent choice in the teaching process, and teaching decision-making ability is related to the teaching methods and contents adopted by professional teachers, and teaching decision-making is a kind of goal-oriented active activity[9]. It is the trend of modern education reform to give professional teachers the right to independent decision-making in teaching, and the main position of middle school students is constantly highlighted in the teaching process.

In Teacher Knowledge: Research Trends and Construction Framework (2013)[6], Hu Chunguang et al emphasized that teacher knowledge is the life of education quality, the basis of teacher professional development, and has a decisive impact on teaching results. Yang Xinrong et al. proposed in the Hot Spots and Frontier Advances of International Teacher Knowledge Research in the 21st Century-Bibliometric Analysis Based on International Core Journals from 2000 to 2019 (2021) that since 2000, The hot spots of international teacher knowledge research mainly focus on the development of teacher knowledge (such as the relationship between teacher professional learning and the improvement of teacher knowledge and the effect of teacher training) and the influence of teacher knowledge (such as the teaching practice of teachers and the academic achievement of students). In addition, by drawing the keyword emergence map, it is found that current international teacher education researchers are paying increasing attention to the empirical exploration of the relationship between teacher knowledge, teaching quality, and student achievement changes, the development of teacher knowledge testing tools, the quantitative exploration of the structural relationship between various kinds of teacher knowledge and teacher literacy

In An Analysis of the Belief Structure and Its Ecosystem of University Teachers (2017)[17], Wu Wei proposed that teacher belief is the subjective cognition and viewpoint held by teachers on knowledge, teaching, student learning, and teacher-student relationships in the teaching context and teaching process. The formation and change of teachers' beliefs are the result of multi-dimensional factors, which are mainly influenced by personal background factors and external environmental factors. Teacher belief is the inner motivation for the development of university teachers. Improving teachers' teaching quality first depends on the change in their inner beliefs. Promoting the development and renewal of university teachers' beliefs is a systematic project related to teachers, schools, and the whole educational environment. It is mainly influenced by personal background factors and external environmental factors.

3.3. Vocational Teachers' Technology-Related Skills

The integration of information technology (IT) in vocational education has become a crucial factor in enhancing teaching effectiveness and student learning outcomes. Several studies highlight the significance of improving teachers' IT application abilities and propose strategies for their development.

Liu (2021) found that while most vocational teachers recognize the benefits of IT in teaching, their application abilities still require enhancement. Similarly, Wang (2023) emphasized that teachers' IT literacy significantly impacts teaching quality and student learning, calling for targeted interventions to improve their technological competencies. Ma, Liu, and Xia (2022) further examined the current state of IT-based teaching abilities, identifying key challenges and proposing effective strategies for improvement.

The role of IT in vocational education is underscored by Huiping and Lijia (2020), who pointed out that teachers' ability to organize and implement IT-driven instruction directly influences the quality of education. Sun (2020) advocated for a shift from passive to active IT training, recommending structured support systems and an optimized teaching environment. Jiang and Si (2020) reinforced this idea by demonstrating how IT integration in professional courses enhances student engagement and independent learning.

Ma and Huang (2021) framed IT-based teaching ability as a core competency, stressing the need for systemic reforms, including training programs, innovative teaching methods, and environmental enhancements. Collectively, these studies suggest that improving vocational teachers' IT skills requires a multifaceted approach involving policy support, continuous training, and institutional commitment to fostering digital transformation in education.

3.4. ICT Courses in China

3.4.1. Policy Support

In 2021, the Ministry of Education's website published the Notice of the General Office of the Ministry of Education on printing and distributing the English and Information Technology Curriculum Standards for Higher Vocational Education (2021 version). The notice pointed out that in order to implement the "Implementation Plan for the Reform of National Vocational Education", further improve the national teaching standard system of vocational education, guide the reform and curriculum construction of public basic courses of higher vocational education, and improve the quality of personnel training, The Ministry of Education has organized the development of the English Curriculum Standards for Higher Vocational Education (2021 edition) and the Information Technology Curriculum Standards for Higher Vocational Education (2021 edition). The "Information Technology Curriculum Standards for Higher Vocational Education (2021 edition)" clearly states that information technology courses for higher vocational education are compulsory or limited elective public basic courses for students of all majors. The core literacy of the discipline mainly includes four aspects: information consciousness, computational thinking, digital innovation and development, and information society responsibility. The goal is to improve the information literacy and the application ability of information technology of college students through

theoretical knowledge learning, skill training, and comprehensive application practice.

3.4.2. Technical Support and Development

ICT courses have been widely used in colleges and universities. Many colleges and universities have set up majors and courses related to information technology to cultivate students' information literacy and skills. At the same time, some universities are also applying ICT to teaching other courses, providing course resources and communication through online platforms to improve students' learning effectiveness and participation.

At the primary and secondary level, the ICT curriculum has also been actively explored and applied. Some schools have incorporated ICT courses into their teaching plans to enrich the teaching content and increase students' interest and engagement through the use of online resources and tools.

With the continuous improvement of education information infrastructure, such as the construction of China's education private network and the "Internet + Education" platform, it provides solid technical support for the implementation of ICT courses. At the same time, the construction of smart education platform also provides rich teaching resources and tools for ICT courses, and promotes the innovation and development of teaching models.

3.4.3. Challenges and Problems

Despite the positive application of the ICT curriculum in China, there are still some challenges and problems. On the one hand, teacher training and adaptation have become the key to ICT curriculum development. Teachers need to have certain information technology and instructional design abilities to adapt to the needs of the ICT curriculum. On the other hand, the issue of student participation and management also needs attention. In ICT courses, students' autonomous learning ability and self-management abilities are crucial, and how to effectively promote students' participation and management is a critical factor for the successful implementation of ICT courses.

To sum up, the current situation of ICT courses in China is driven by policies, technologies, and practices and has achieved remarkable development, but it also faces some challenges and problems. In the future, with the further advancement of education informatization and the continuous innovation of education models, ICT courses are expected to be applied and developed in more fields. In order to further promote the high-quality development of ICT courses, it is necessary to strengthen teacher training, enhance students' self-learning ability, and continuously optimize technical support and resource platforms.

3.4.4. Teachers' ICT Training

In the process of professional construction, the construction of ICT teachers is undoubtedly one of the core elements. High-quality ICT teachers are the key to improving professional standards. However, at present, many professional teachers tend to devote their energy to scientific research, and the evaluation of educational teaching is relatively complex. Teachers' participation in research projects and vertical topics often leads to technical and professional advancement, which has led to a gradual decline in the number of teachers who are actually engaged in ICT teaching and research.

In view of this phenomenon, schools should formulate a set of comprehensive education and teaching assessment policies. The policy should clearly require teachers with high academic

qualifications and professional titles to teach at least one ICT basic course every semester and encourage them to integrate scientific research results into teaching to achieve mutual promotion between teaching and research. Such measures help to build a high level of teachers who are good at both research and teaching.

In addition, schools should also encourage those teachers who are relatively not prominent in the field of scientific research to devote themselves to education and teaching research, and improve their teaching ability and academic value by applying for various teaching and research projects. Schools should equip new teachers with experienced instructors to help them quickly grow into the backbone of the educational and professional fields.

At the same time, schools should also strengthen the employment of off-campus tutors and attract excellent information technology teachers in cooperative units to serve as part-time teachers and students' off-campus instructors. Therefore, it is necessary to establish a set of perfect external teacher selection, responsibility, management, and evaluation systems to ensure the quantity and quality of the external teacher team.

4. Conclusion

China's higher vocational education system has seen substantial advancement in incorporating Information and Communication Technology (ICT) according to this review. The Education Modernization 2035 program along with the Education Informatization 2.0 Action Plan and the 14th Five-Year Plan for National Informatization have established a broad base to drive digital education forward. These strategies support the evolution of smart campuses while enabling customized learning experiences through big data analytics and expanding access to quality educational materials.

The swift development of micro-courses combined with blended learning models has transformed how higher vocational schools deliver instruction. The growing popularity of MOOCs along with SPOCs and flipped classrooms stems from their adaptable design and focus on student-centered teaching. Despite existing infrastructure and available resources, difficulties continue to exist especially in teacher training, technological competence, instructional design, and classroom integration. Research demonstrates that Chinese vocational teachers possess knowledge about ICT tools but many of them do not have the required pedagogical skills to implement these tools effectively. The efficacy of ICT integration depends significantly on teacher cognition which includes their beliefs and decision-making skills along with their knowledge.

Technical development alongside institutional practices and policy support jointly shape how ICT courses function in vocational education settings. Despite significant advancements, teachers still encounter challenges in integrating ICT such as teaching preparation, student engagement, and assessment methods. A sustainable framework must be established to facilitate continuous teacher development and ICT curriculum improvement.

5. Recommendations

Future research should concentrate on specific areas to further improve ICT integration in China's vocational education system. Research should focus on understanding the methods vocational teachers use to design, implement,

and evaluate micro-courses and evaluate both pedagogical effectiveness and student participation. The analysis of instructional methods and their success rates will lead to important insights about the best educational practices. Researchers must evaluate the enduring effects of professional development initiatives that focus on enhancing teachers' ICT skills. Future research should examine the way teacher training programs affect classroom methods and student learning results.

Moreover, learner experience deserves greater attention. The next wave of educational research needs to investigate students' perspectives on ICT-supported learning while monitoring their engagement and academic achievements in blended and technology-enhanced settings. The impact of teacher cognition forms a critical area of interest for ICT integration. Research through longitudinal studies could reveal useful data about the evolution of teacher beliefs and their effect on technology adoption in educational environments.

Research needs to investigate the local-level interpretation and implementation of national ICT-related policies, particularly in under-resourced rural areas. Systemic gaps and context-specific challenges can be identified through comparative studies conducted between different schools or provinces. The creation of ICT integration frameworks that suit vocational institutions and their subsequent validation would offer significant benefits. These models would provide schools with guidance to develop successful digital instruction strategies.

The development of assessment standards for ICT-based teaching practices proves to be essential. Research efforts should concentrate on developing assessment instruments that measure qualitative and quantitative results, including student learning improvements, teacher effectiveness, and technology use. The outlined directions function together to establish an ICT environment in vocational education that promotes innovation while ensuring effectiveness and equity.

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