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Comprehensive Evaluation of Digital Teaching Competencies of Vocational College Educators: A Comparative Study

Qingling Li, Roberto Guzman Jr.

Angeles University Foundation, Angeles City, 2009, Philippines

Abstract: This paper provides a comprehensive overview of the current status, key factors, and future trends in the evaluation of digital teaching competencies among vocational college educators, both domestically and internationally. In China, vocational colleges have markedly enhanced teachers' digital teaching capabilities through various evaluation methods, including self-evaluation, peer evaluation, and student feedback, integrated with diverse teaching activities such as classroom observations, lesson plan evaluations, and digital resource production. However, challenges remain in the evaluation system, particularly in balancing technical assessments with innovations in teaching and student interaction. Internationally, regions such as the United States, the European Union, and Russia have developed robust evaluation systems that emphasize the deep integration of technology with pedagogical practices, digital literacy, and interdisciplinary competencies. These systems offer clear evaluation criteria, scientific methodologies, and diverse approaches, providing valuable insights for China's educational framework. Moving forward, the evaluation of digital teaching competencies in vocational colleges is expected to become more detailed and multi-faceted, with a heightened focus on media resource design and the integration of school-industry partnerships to advance teaching practices and professional development.

Keywords: Digital Teaching Competencies; Vocational College; Teacher Evaluation; Educational Technology; Professional Development.

1. Introduction

Digital teaching competencies have become a critical aspect of modern vocational education. With rapid technological advancements, educators' ability to effectively integrate digital tools and resources into their teaching practices is essential for preparing students for contemporary workforce demands (Heine, Krepf, & König, 2022). Vocational education aims to equip students with practical skills applicable in various industries. Therefore, teachers' proficiency in utilizing digital technologies not only enhances the learning experience but also ensures students are prepared for technology-driven careers (Wang et al., 2023).

Despite the recognized importance of digital teaching competencies, there is a notable lack of comprehensive frameworks for evaluating these skills among vocational educators. Existing evaluation methods often focus on technical proficiency while overlooking the pedagogical and integrative aspects of digital competencies (Heine, Krepf, & König, 2022). A robust evaluation framework is necessary to provide a holistic assessment that includes technical skills, pedagogical strategies, and the ability to innovate in digital environments. Such a framework would help identify areas for improvement and professional development, ensuring that vocational educators are well-prepared to meet evolving educational demands (Lucas et al., 2021; Zhao et al., 2021).

This paper aims to provide an overview of the current evaluation practices of digital teaching competencies among vocational educators, both domestically and internationally. In China, vocational colleges have implemented various evaluation methods, including self-evaluation, peer evaluation, and student feedback, integrated with diverse teaching activities such as classroom observations and digital resource production (Domínguez, Antequera, González-Pérez, Pedrera-Rodríguez, & González-Fernández, 2022). Internationally, countries like the United States and regions such as the European Union have developed comprehensive evaluation systems that emphasize the integration of technology with pedagogy and interdisciplinary competencies (Liesa-Orús, Latorre-Cosculluela, Vázquez-Toledo, & Sierra-Sánchez, 2020). These international practices offer valuable insights and benchmarks that can inform the development of a more effective evaluation framework in China (Guillén-Gámez & Mayorga-Fernández, 2020).

2. Present Situation of Digital Teaching Ability Evaluation of Vocational College Teachers

2.1. Evaluation Methods and Practices in China

In recent years, China has made significant strides in evaluating the digital teaching competencies of vocational college teachers. Various evaluation methods have been adopted to enhance teachers' abilities in integrating digital tools into their teaching practices. These methods aim to provide a comprehensive assessment of teachers' digital competencies, ensuring they are well-equipped to meet the demands of modern educational environments (Zhao, Guo, & Zhu, 2021) (Table 1).

The characteristics of the domestic evaluation system are mainly reflected in the composition of evaluation indicators and the choice of evaluation methods. Evaluation indicators typically encompass the development of teaching resources, the use of online teaching platforms, and multimedia teaching skills, aiming to comprehensively reflect teachers' digital teaching abilities. The evaluation method emphasizes the

combination of process and result evaluation, examining both the teaching process and students' learning outcomes (Marín-Suelves, Vidal-Esteve, & Ramón-Llin, 2023). However, there are also some issues and deficiencies in the domestic evaluation system.

Table 1. Main practices and achievements

Main practice	achievements
Adopt diversified evaluation methods, including teacher self-evaluation, peer evaluation and student evaluation.	Comprehensive evaluation of teachers' digital teaching abilities
Combined with classroom teaching observation, teaching plan design evaluation, digital teaching resources production and other activities.	Encourage teachers to continuously improve their digital teaching skills in practice
Training and assessment of digital teaching ability	Enhance teachers' ability to apply information technology
Promote communication and learning among teachers.	Promote the popularization and application of digital teaching in vocational colleges

First, the evaluation indicators may overly focus on technical assessments, neglecting teachers' performance in teaching innovation and student interaction (Guillén-Gámez & Mayorga-Fernández, 2020). Second, although the evaluation methods are diverse, they may be influenced by subjective factors during implementation, which can affect the objectivity and accuracy of the evaluation results. Additionally, there are problems in the evaluation of digital teaching abilities in some vocational colleges, such as insufficient attention and resource investment, which hinder the improvement and development of the evaluation system (Hatlevik & Hatlevik, 2018).

2.2. Evaluation Methods and Practices in Other Countries

Many countries and regions worldwide have developed extensive experience and best practices in evaluating the digital teaching abilities of vocational college instructors. These practices not only demonstrate the global education community's strong commitment to enhancing teachers' digital competencies but also serve as valuable references for improving the evaluation systems in China (Table 2).

In the United States, the evaluation of digital teaching abilities for vocational college teachers is closely tied to professional development and educational technology integration. American educational institutions often utilize standardized evaluation tools, such as the ISTE Standards for Educators, to comprehensively assess teachers' capabilities in a digital environment (Lucas, Cabezas-González, & Fernández-Rodríguez, 2021). These standards focus not only on technical skills but also emphasize teachers' effectiveness in enhancing student learning, innovating teaching practices, and leading educational technology reforms.

In the European Union, the evaluation of digital teaching abilities places a stronger emphasis on information literacy and interdisciplinary integration. The European Digital Competence Framework (DigCompEdu) provides a clear set of guidelines for developing teachers' digital competencies, which is widely implemented in professional development and evaluation processes (European Commission, 2018). Additionally, EU countries encourage teachers to enhance and demonstrate their digital teaching skills through participation in collaborative educational projects across Europe.

Table 2. Evaluation of digital teaching ability of teachers in vocational colleges abroad

Country	Present situation description
United States of America	American teacher education system 3.0 emphasizes the cooperation between teacher training projects and communities and families, and the teacher training venues are carried out in the "third space" formed by universities and communities. At the same time, the theoretical basis, curriculum system and practice mode of American teacher training have undergone revolutionary changes.
EU	The framework of EU teachers' digital competence consists of six competence domains, including professional participation, digital resources, teaching and learning, evaluation, empowering students and promoting students' digital competence, and 22 competence indicators, with teachers' digital competence levels. In addition, the European Commission has also developed an online evaluation tool matching DigCompEdu to help teachers embed digital technology into teaching, learning and student evaluation through the use of innovative educational technologies.
Russia	The promotion of digital transformation of Russian vocational education is facing problems such as weak and unbalanced infrastructure, imperfect digital service and insufficient digital literacy of teachers. In order to speed up the transformation process, Russia has taken measures such as building a legal and policy framework system for the digital transformation of vocational education.

Russia has its own distinct approach to evaluating the digital teaching abilities of vocational college teachers, focusing on the integration of information technology with curriculum development and the use of e-education resources. Russia has established national educational technology competitions and projects to stimulate innovation and practical application in digital teaching (Gong, 2020).

Despite these differences, all countries prioritize the application of information technology, the integration of teaching resources, and teaching innovation. However, cultural backgrounds and educational systems lead to variations in emphasis, evaluation standards, and implementation methods. Generally, these evaluation systems feature clear criteria, scientific methodologies, and diverse approaches, which allow for a comprehensive and objective assessment of teachers' digital teaching abilities, providing valuable guidance for professional development (Marín-Suelves, Vidal-Esteve, & Ramón-Llin, 2023).

For China, the insights gained from foreign evaluation systems suggest the following: adopting advanced international practices and tailoring them to local contexts can help develop more scientific and reasonable evaluation standards; employing diverse evaluation methods can provide a more comprehensive assessment of teachers' digital teaching abilities; and enhancing collaboration with foreign educational institutions can jointly advance the digital teaching competencies of vocational college teachers (British

Council, 2023).

3. Key Factors of Evaluation of Digital Teaching Ability

When evaluating the digital teaching abilities of teachers in vocational colleges, it is essential first to define what digital teaching ability encompasses. This includes not only basic information technology application skills but also the development of teaching resources, online courses, and blended teaching methods. The ability to develop teaching resources implies that teachers can effectively create and utilize various digital teaching materials according to the teaching content and students' needs. Developing online courses requires teachers to design and produce content-rich, interactive courses suitable for an online learning environment. The ability to implement blended teaching means that teachers can effectively organize and manage teaching activities, ensuring students' learning outcomes in a mode that combines traditional classroom instruction with online learning (Ilomäki et al., 2011).

Several key factors influence teachers' digital teaching abilities, with general ability, professional ability, and the demand for characteristic development being particularly important. General ability refers to teachers' fundamental qualities in information technology, pedagogy, psychology, and other fields, forming the foundation for conducting digital teaching (Guillén-Gámez & Mayorga-Fernández, 2020). Professional ability pertains to teachers' knowledge and skills in their specific subject areas, directly impacting their effectiveness in integrating professional knowledge with digital teaching methods. The demand for characteristic development reflects teachers' innovative spirit and the formation of a personalized teaching style in the process of digital teaching (Chen, Lambert, & Guidry, 2010).

To achieve a holistic assessment of teachers' digital teaching skills, it is crucial to integrate the genuine requirements of industry enterprises into the evaluation framework. Since vocational colleges aim to produce highly skilled individuals who meet societal needs, evaluating educators' digital instruction capabilities must focus on this objective. Collaborating with industry enterprises allows us to understand their specific talent requirements and translate these needs into standards and indicators for evaluating digital teaching ability. For instance, assessments should consider whether teachers incorporate the latest industry developments and enterprise requirements into their course design and teaching processes, and whether they can guide students to address and solve practical industry problems (Chen, Lambert, & Guidry, 2010).

Clarifying the essence of digital pedagogical skills, examining the key factors that influence these abilities, and embedding the authentic requirements of industrial entities within the assessment framework are crucial steps in formulating a comprehensive and logical appraisal system for the digital instructional prowess of vocational college educators. This approach will not only enhance teachers' pedagogical proficiency but also better satisfy the societal demand for highly skilled professionals.

4. Development Trends in Digital Teaching Ability Evaluation

With the continuous advancement of digital technology and the deepening of educational informatization, the evaluation of digital teaching abilities for vocational college teachers is also evolving. Evaluation criteria will become more clarified and refined. Currently, although there are some standards and indicators for evaluating digital teaching ability, there is still a lack of clarity and uniformity. In the future, with further practice, these criteria will become more specific and comprehensive, reflecting teachers' digital teaching abilities in a multifaceted and multidimensional manner. This will include basic information technology application skills, development of teaching resources, design and implementation of online courses, student interaction, and feedback processing (Redecker, 2017).

The ability to design and develop media resources will become a crucial aspect of evaluation. In a digital teaching environment, the creation and use of media resources are vital for improving teaching quality. Therefore, future evaluation systems will place greater emphasis on teachers' capabilities in designing and constructing media resources, such as producing high-quality teaching videos and interactive courseware. This will encourage teachers to continually enhance their media literacy and technology application skills to better meet students' learning needs (Hatlevik & Hatlevik, 2018).

The collaborative role of schools and industry enterprises in improving teachers' digital teaching abilities will become more prominent. Schools, as the primary workplace for teachers, will provide abundant digital teaching resources and training opportunities to help teachers master the latest educational technologies. Industry enterprises can offer practical environments and case studies, allowing teachers to better understand industry needs and processes, thereby designing and implementing more targeted digital teaching. Through the integration and cooperation of resources between schools and industrial enterprises, teachers' digital teaching abilities will be comprehensively enhanced (Redecker, 2017).

Combining the improvement of teachers' digital teaching abilities with teaching practice innovation is a key direction for future development. Digital teaching not only requires teachers to have basic technical application skills but also demands continuous exploration and innovation in practice. Hence, the assessment protocols should encourage educators to experiment with innovative pedagogical approaches and techniques, such as blended online and offline learning scenarios, employing big data and AI technologies for educational analytics, among other methodologies. Such measures are instrumental in fostering a spirit of pedagogical innovation among teachers and advancing digital instruction in vocational institutions (Delgado-Benito & Lozano-Álvarez, 2023; Althubyani, 2024; Marín-Suelves, Vidal-Esteve, & Ramón-Llin, 2023).

The emerging trajectory for evaluating the digital teaching aptitude of vocational college educators will focus on establishing clear appraisal criteria, enhancing competencies in media resource development, strengthening collaborations between academia and industry, and championing innovative pedagogical practices.

5. Conclusion

Evaluating digital teaching abilities is crucial for improving teaching quality and meeting the demands of modern vocational education. Efforts to develop a scientific evaluation system are ongoing both domestically and internationally to enhance teachers' teaching levels. While China has made progress with diversified evaluation methods

and indicators, issues such as a predominant focus on technical skills and subjective influences remain. In contrast, countries like the United States, the European Union, and Russia have more mature and systematic evaluation systems, particularly regarding teachers' professional development and educational technology integration abilities.

Evaluating digital teaching abilities in vocational colleges should encompass general abilities, professional expertise, and specific development needs while aligning with industry requirements to ensure the cultivation of high-quality skilled talents. As technology advances and educational informatization progresses, evaluation criteria will become clearer and more detailed. The design and construction of media resources will become increasingly important, highlighting the collaborative role of schools and industry enterprises. Moreover, evaluation systems will encourage teachers to innovate. Research from both domestic and international sources provides valuable insights and lessons, aiding in the improvement of China's evaluation system for teachers' digital teaching abilities in vocational colleges. This, in turn, promotes teachers' professional development and aligns with the needs of modern vocational education.

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