

Research on the Training Model of Higher Vocational Teachers' Information-Based Teaching Ability Enhancement in the Background of Education Digital Transformation

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Abstract: Under the background of digital transformation and intelligent advancement of education, there is an urgent need to improve the information-based teaching ability of teachers effectively. This paper first defined and interpreted the TPACK (technological, pedagogical, and content knowledge) theory and the informatization teaching ability of higher vocational teachers. Using the TPACK theory as guidance, a model for enhancing teachers' information-based teaching ability within a "post-certificate class competition" was established. Post-training possesses the certificate to consolidate the foundation, classroom practice, and evaluation of effectiveness, which gradually cultivates the informatization teaching ability of vocational teachers.

Keywords: Higher vocational colleges; Information-based teaching ability; TPACK; Post certificate class competition; Training mode

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1. Introduction

In March 2021, the Fourth session of the 13th National People's Congress adopted the 14th Five-Year Plan for National Economic and Social Development and the Outline for 2035, which put forward the concept of "digital China" and called for the need to accelerate digital development and develop an all-rounded digital China^[1]. Education is the foundation of a country's growth and the source of social progress. Therefore, the digital transformation of education is an important strategy for building a digital China^[2]. In February 2022, the Ministry of Education proposed strategic actions to implement digital education, emphasizing the strengthening of demand-driven approaches, deeper integration, innovative empowerment, application-driven strategies, active development of "Internet+ education," and accelerating the digital transformation and intelligent upgrade of education. In April 2022, the newly revised Vocational Education Law of the People's Republic of China was accepted, proposing to support the use of information technology and other modern teaching methods, develop

learning resources such as vocational education online courses, innovate teaching and school management methods, and promote the construction and integrated application of vocational education informatization [3].

The above policies have pointed out that the digital transformation of education has become a new requirement to adapt to economic and social development, solve the contradiction between social development, talent supply, and demand, and improve social productivity. Among this, teachers are the supporting force of education development, where the cultivation of their informatization teaching ability is undoubtedly the core and key to education digital transformation [4]. Determining the ideal training mode to achieve the improvement of higher vocational teachers' informatization teaching ability has become an immediate priority in higher vocational colleges.

2. Definition of concept

2.1. TPACK

TPACK (technological, pedagogical, and content knowledge) refers to the subject of pedagogical knowledge that integrates technology. It is composed of three aspects, namely, technical knowledge (TK), pedagogical knowledge (PK), and subject content knowledge (CK). Between these three, a composite module is formed, PCK (subject pedagogical knowledge), TCK (subject content knowledge integrating technology), TPK (pedagogical knowledge integrating technology), and finally the formation of TPACK (subject pedagogical knowledge integrating technology). TPACK theory organically integrates TK, PK, and CK to provide the research foundation for information-based teaching ability [5].

There has been in-depth research on TPACK domestically and internationally, especially on the connotation and training mode of TPACK. Ding and Xu believed that TK could be subdivided into teaching platforms, teaching software, and teaching hardware, while PK could be subdivided into teaching strategy, learning strategy, and learning effect assessment. Additionally, CK could be subdivided into core courses and compulsory courses [6]. Jin and Shuguo insisted that CK, PK, and TK were mainly acquired through reading, self-practice, and expert lectures, while PCK, TCK, TPK, and TPACK are practical knowledge that should be acquired by teachers in teaching practice [7].

Based on the above research results, this paper combs the TPACK framework, as shown in **Figure 1**, and takes it as the theoretical guidance basis for teachers to improve their information-based teaching ability.

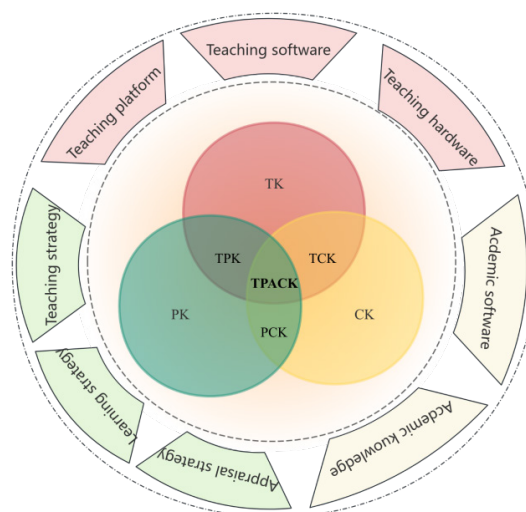


Figure 1. TPACK architecture diagram

3. Informatization teaching ability of higher vocational teachers

There are various research results on the connotation of information-based teaching ability domestically and internationally. The author concludes that although experts and scholars have explored the connotation of information-based teaching ability from multiple dimensions and different perspectives, there is a consensus on the core of information-based teaching ability, which refers to teachers' ability to complete teaching in an information-based environment. The foundation of information-based teaching ability lies in teaching ability, which is the embodiment of information-based education. The ability to use information-based enabling education and teaching is known as an information-based teaching ability ^[8].

Through sorting out the tasks and content of teachers' teaching work, the author expressed two insights. Firstly, the core of teachers' information-based teaching ability lies in their teaching ability. The application of information-based technology is like seasoning with saltwater and adding icing to a cake. It is impossible to improve a teacher's information-based teaching ability only by training their use of information technology tools ^[9]. The improvement of teachers' information-based teaching ability cannot be improved sustainably only through training. Only through curriculum development and real classroom teaching practice can it be effectively improved, which allows for information-based teaching to be internalized in the mind and externalized in practice. The improvement of teachers' information-based teaching ability is mainly through course development and classroom implementation. Courses serve as the vehicle for improving teacher's ability in information-based teaching.

4. Construction ideas for the improvement of vocational teachers' informatization teaching abilities

In the process of improving vocational teachers' information-based teaching ability, teachers play the role of students, and the education concept of the "post-class competition certificate" is implemented. Based on this, the author follows the context of a "post-class competition certificate" to explore the strategies to improve vocational teachers' information-based teaching ability ^[10].

A "research-learning-do-creation" community should be established among professional teachers. Through post-training, a community collective discussion can be carried out to sort out the teacher's teaching position, tasks, and work content, to determine the appropriate training content. To consolidate the foundation, a three-level training system can be implemented, extending down to the level of teaching and research offices. Teachers can learn about TK, PK, and CK knowledge by participating in online and offline training, attending expert lectures, and effectively consolidating their basic abilities. At the same time, learning standards should be based on teachers acquiring completion certificates, training certificates, and professional-grade certificates. Through the design of dual-line parallel tasks, community collective research, and the study of excellent courses, the simultaneous implementation of the professional curriculum can be carried out via practice, alongside improving the TPK, PCK, and TCK composite ability. Competitions regarding teaching abilities and discipline can be carried out, whereby the TPK, PCK, and TCK composite ability can be upgraded to the TPACK comprehensive ability. Ultimately, this achieves the ultimate goal of improving the teachers' informatization teaching ability.

5. The practical content for the enhancement of higher vocational teachers' information-based teaching abilities

The practice of "post-class competition certificate" in improving vocational teachers' informatization

teaching abilities is based on the curriculum. Therefore, it is more suitable to perform practical exploration by taking the teaching and research department as the unit. The author is the director of the Teaching and Research Department of Finance and Accounting specializing in big data and financial management. This model of practice has been implemented in the Teaching and Research Department of Big Data and Financial Management.

5.1. Training by post

The above article has sorted out the teaching position, task, and work content of teachers to obtain the real connotation of the teaching post. A teacher's teaching work is fully reflected in the three scenes of curriculum development, teaching implementation, and teaching research, and these scenes are gradually, interlocking, and repeating. The "Research-Learning-Do-Creation" community within the Big Data and Financial Management major community engages in collective brainstorming. Discussions include teaching platforms, teaching software, teaching hardware, teaching strategy, learning strategy, assessment strategy, subject knowledge, and subject software that is essential for professional learning.

5.2. Establishing the foundation

The relevant training organized at the school and college levels to solve the lack of knowledge and skills of TK and PK modules, and the lack of missing modules, especially the lack of CK modules, need to be targeted by the teaching and research offices to provide adequate training content. For example, Big Data and Financial Management majors need to master the frontier discipline knowledge by using software like Python and SQL^[11]. Frontier software like Powerbi, robotic process automation (RPA), and SPSS can also be used. The knowledge and skills of TK, PK, and CK modules can be consolidated through multi-dimensional training. After the training, the training certificate obtained will be used as the basis for training in online platforms. After the teacher completes the course learning and passes the online assessment, the platform will issue the completion certificate of the course assessment, and the training certificate and vocational skill level certificate after the online training. Through multi-dimensional training and a certificate-based approach, the ability of teachers' information-based teaching can be further strengthened^[12].

5.3. Cultivation of teacher's ability through classroom practices

Through the above analysis of teachers' teaching positions, it can be seen that the main line of teachers' work tasks is curriculum development, classroom implementation, and research teaching. The teachers' ability in information-based teaching is reflected in the completion of each task. In other words, it should also rely on the realization of each task included in curriculum development, classroom implementation, and research teaching^[12]. As the curriculum is the basis of the three major work scenarios, it was proposed that the teaching and research department should carry out curriculum research and practice to improve the teachers' information-based teaching ability^[13].

Teachers can undertake a well-known course and obtain the three links of improvement from the courses. The "Research-Learning-Doing-Creation" community of Big Data and Financial Management majors can gain a perception of the composite ability of TPK, PCK, and TCK by participating in the first national virtual teaching and research room and taking part in the accounting informatization course.

A professional course of teaching should be implemented. The "Research-Learning-Do-Creation" community of big data and financial management should select a professional course as the practice carrier for improving their teaching ability and acquiring the composite ability of TPK, PCK, and TCK through collective lesson preparation and teaching practices. With this, the curriculum and the teachers' information-based

teaching ability will complement each other.

5.4. Matching results

The “Research-Learning-Do-Creation” community of Big Data and Financial Management majors actively participates in teaching and discipline competitions, taking competitions as an important part of testing teachers’ informatization teaching ability, innovation, and enhancement ^[14]. Among them, “National Vocational College Teachers’ Teaching Ability Competition” and “Chongqing University Young Teachers’ Teaching Labor and Skills Competition” serve as training venues for improving teachers’ information-based teaching ability. The “National Vocational College Vocational Skills Competition” and “BRICS Vocational Skills Competition” are other advanced information technology tools for teachers. Through training and participating in competitions, the teachers’ information-based teaching ability is effectively improved and TPACK comprehensive ability is formed.

6. Conclusion

With the development of a new generation of information technology, innovative digital technologies represented by artificial intelligence and big data technology are increasingly integrated with the economy and key industries such as agriculture, industry, manufacturing, finance, medical care, transportation, and energy. The innovation and application of digital technologies are continuously accelerating and have embarked on the fast track of digital transformation. In the context of industrial digital transformation, higher vocational education, as the supply side of talents, needs to take the initiative to meet the new demands of the new economy, new business forms, and new vocational positions for talent quality, and realize the digital transformation of education simultaneously. Digital transformation of teachers in higher vocational colleges has become inevitable ^[15]. Ways to improve teachers’ digital teaching ability and realize their digital transformation should be the focus of future research.

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Disclosure statement

The authors declare no conflict of interest.

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