Research on the Improvement of Information Teaching Ability of College Teachers in era of Intelligent Education

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Abstract: As an endogenous variable of the systematic reform of higher education, education information promotes the innovation of higher education concept, the reform of teaching mode and the system reconstruction. Traditional teaching and learning has been transformed to online learning and real-time interactive multi-user collaboration in the network environment. Teacher professional development is an important factor to achieve educational reform, and the development of education information is inseparable from the improvement of teachers' information teaching ability. This paper introduces the difficulties faced by the improvement of college teachers' information literacy, analyzes the connotation analysis of teachers' information teaching ability, and puts forward the strategies for the improvement of college teachers' information teaching ability, providing reference for the improvement of college teachers' information teaching ability in the era of intelligent education.

Keywords: Information; Teaching ability; Teachers; Higher education; Wisdom

1. Introduction

In order to meet the requirements of intelligent development of higher education, college teachers should change their ideas and improve their awareness of information-based teaching. Schools should dig deep and develop information-based teaching resources, perfect the hierarchical information technology training system, establish teachers' information-based learning community, stimulate teachers' self-efficacy in information-based teaching, attach importance to the evaluation of teaching application results, promote innovation by competition, and promote teachers' innovation ability in information-based teaching. Optimize the environment and strengthen the foundation of information-based teaching ability to enhance teachers' information-based teaching ability. With the rapid development of information technology, information-based teaching ability has become the most important professional quality and core competitiveness of college teachers.

2. Difficulties faced by university teachers in improving information literacy

2.1. The awareness of information-based teaching is weak, and the information-based teaching ability is unbalanced

Smart education is the deep integration of modern information technology and education and teaching, with the characteristics of intelligence, multimedia, digitalization and networking, some teachers in colleges and universities have weak awareness of actively improving their own information literacy, insufficient innovation power, and insufficient ability and motivation to use information technology to promote the reform of teaching methods; Teachers with science and engineering backgrounds are more likely to accept information and are more willing to participate in information teaching reform, while teachers with liberal arts backgrounds need to pay more energy in improving information literacy. Young teachers use information technology more, and the speed of information teaching ability is faster. The different atmospheres of information teaching in colleges and universities lead to differences in the level of information teaching of teachers [1-2].

2.2. The innovation ability of information teaching is weak, and the information teaching and training system is not perfect

Some teachers believe that proficiency in multimedia can be done once and for all, while neglecting the mastery of difficult information technology. More teachers have used the same teaching resources and the same set of courseware for many years, and have never taken the initiative to update teaching content or innovate teaching methods[3]; The information teaching and training system for college teachers is not perfect, the training goals are not clear, the training process ignores the actual needs and personalized differences of teachers, the degree of integration with actual course teaching is not high, and the training effect inspection and evaluation cannot be organized in time after the training[4].

2.3. Construction of information based teaching environment is insufficient

Colleges and universities generally lack the software and hardware environment for teaching [5]. The classroom is equipped with multimedia to support the development of information teaching, but ignores the indispensable hardware such as electronic whiteboard, recording classroom, and multimedia production, which restricts the full development of information teaching. The network resource service platform has not formed a resource co-construction and sharing. The lack of school-based high-quality resources in schools restricts the in-depth application of information technology.

3. Analysis of connotation of teachers' information based teaching ability

The implementation path of university teachers' information-based teaching ability is shown in Figure 1.Information-based teaching ability means that teachers actively and flexibly adopt intelligent teaching methods to carry out teaching activities in teaching design, resource

construction, teaching implementation, teaching evaluation and other links under the intelligent education environment, guided by advanced teaching theories and supported by various intelligent information technologies, and constantly promote the deep integration of information technology and education and teaching through reflection and innovation. Cultivate students' wisdom and ability. To construct the framework of college teachers' information teaching ability in the age of wisdom, we should give consideration to both prospective and realistic, adhere to competency-based, and emphasize practicality and practicability. Focus on mixed teaching, highlighting situational and hierarchical. In the era of smart education, teachers' information-based teaching ability mainly covers five aspects: awareness and attitude, knowledge and skills, design and construction, implementation and evaluation, reflection and innovation, see Table 1[6].
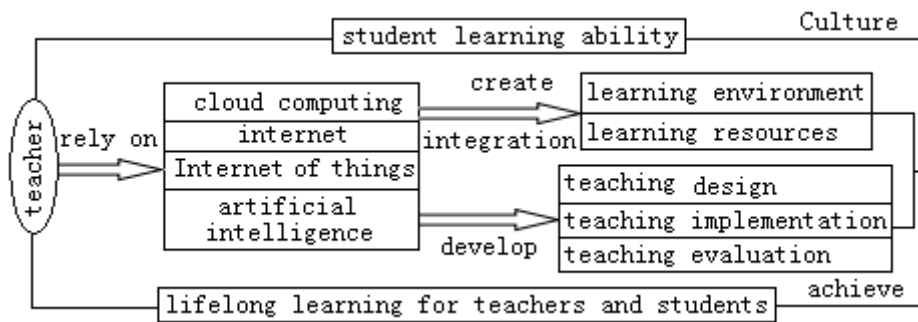

Figure 1. The implementation path of university teachers' information-based teaching ability

Table 1. Framework of college teachers' information teaching ability in the intelligent era

Ability element	Basic competence (mixed instruction led offline)	Ability development (online-led and integrated hybrid teaching)	Function
Consciousness and responsibility	1. Understand the important role of intelligent technology in personnel training and teaching reform 2. Actively learn and understand the awareness of intelligent technology 3. Understand the responsibility of cultivating students' information literacy	1. Take the initiative to think about the new requirements for talent training in vocational colleges in the intelligent age 2. take the initiative to explore and use intelligent technology to promote students' awareness of learning 3.establish the awareness of personal information protection in the era of intelligence, the correct concept of network security and data security	The source of strength to promote the development of intelligent education

Knowledge and skills	1. Master the theory and teaching method of information-based instructional design 2. Familiar with intelligent teaching equipment, master mixed teaching software platform and technical tools 3. Master the production technology of teaching resources such as lecture style courseware, interactive courseware and micro course	1. Master the theories and methods of online teaching 2. Familiar with intelligent technology, master the software platform and technical tools of online-oriented and integrated teaching 3. Familiar with the design and development principles of online courses and virtual simulation training resources	The necessary foundation of information teaching
Design and development	1. Offline oriented mixed teaching design 2. Selection and development of mixed teaching resources 3. Choice of action-oriented mixed teaching methods 4. Project-type, task-based and inquiry-based learning activity design 5. Learning evaluation and feedback design based on process evaluation	1. Design of online learning objectives based on professional ability development 2. Systematic online course development based on working process 3. Design of online learning experience based on real working situations 4. Online learning design that promotes independent learning 5. Online learning evaluation design to promote the development of students' ability	The important premise of information teaching application
Implementation and evaluation	1. Organization and implementation of mixed teaching 2. Analysis and utilization of learning process data 3. Personalized teaching of technical support 4. Process evaluation of technical support 5. Innovative construction of teaching model integrating science with reality and virtual with reality	1. Implementation of human-machine collaborative mixed teaching supported by intelligent technology 2. Teaching evaluation and improvement supported by intelligent technology 3. Personalized learning supported by intelligent technology 4. Data-driven accurate learning evaluation 5. Create a hybrid teaching model that integrates production and education	The important embodiment of information-based teaching ability
Reflection and innovation	1. Research on information-based teaching 2. The application of information technology to change the learning style 3. Use information technology to form a learning community with peers and enterprise experts	1. Optimization of intelligent technology teaching research 2. Carry out intelligent remote training and other activities 3. through analysis and feedback, realize the continuous improvement of the application of intelligent technology	Advanced ability of information teaching

4. Strategies for improving college teachers' information-based teaching ability

4.1. Implement precise training to strengthen the transformation of teachers' information knowledge

We will improve the hierarchical information technology training system, provide targeted and diversified training methods, provide online learning courses and online discussion platforms for teachers, and build a three-dimensional training system that combines online and offline activities and integrates both inside and outside the school.

Teachers should actively participate in the special training of information teaching ability improvement. Through offline training, teachers exchange and discuss with teachers from different schools to acquire knowledge and skills; Through online training, teachers can experience information-based teaching and deepen their cognition of information-based teaching while acquiring knowledge and skills. Teachers participate in the excellent teachers' teaching observation activities, enhance their understanding of information-based teaching, summarize excellent experience and skills, and lay a good foundation for their own information-based teaching practice.

4.2. Carry out evaluation and orientation evaluation of teachers' information-based teaching ability

Construct teachers' information-based teaching ability system based on the ability framework, integrate consciousness and responsibility, knowledge and skills into teaching design and implementation, highlight the ability assessment of design and development, implementation and innovation, research and development dimensions, and formulate practical tasks for each ability to specify the need to provide results evidence and evaluation criteria,see Table 2. To ensure that teachers ability assessment fine and standard. For example, the "knowledge and skills" dimension of "mastering the theory of information-based instructional design" can be integrated into the "design and development" of "offline leading mixed teaching process design" for micro-ability assessment. Teachers take the mixed teaching design of one class or one thematic module as the practical task. Submit "Offline leading Mixed teaching process design Scheme" and "Interpretation video of mixed Teaching Process Design"[7].

Table 2. Evaluation index system for teachers' information teaching ability

Primary indicators	Secondary indicators	Third level indicators
Basic literacy	Teaching style	Guide students to establish correct ideals and beliefs, and learn to use information technology teaching software
	Professional Skills	Proficient in obtaining information technology teaching resources, using relevant software to create teaching resources, using teaching platforms to create online courses and carry out teaching, adopting a mixed online and offline teaching approach
Teaching design and development	Teaching integration	Integrate information technology with professional knowledge, teaching methods and means, and ensure that the information design of teaching content meets the

ability		requirements of project-based curriculum reform
	Resource application and development	Effectively use information technology software to create and develop teaching resources such as micro videos, animations, and PPTD
Teaching implementation ability	Implementation of Information Classroom Teaching	Create rich and colorful information-based learning scenarios before class, organize and implement teaching according to information-based teaching design during class, and use information technology, digital resources, and information-based teaching equipment reasonably after class to improve teaching effectiveness
	Information based teaching management	Effectively organize and dynamically manage information technology classroom teaching, timely identify and solve problems in information technology teaching activities
Teaching reflection ability	Self teaching reflection	Can reflect on the pain points and difficulties in the reform process through the organization and implementation of information technology teaching
	Reflection on Student Learning	Can combine students' learning outcomes, scientifically and reasonably improve the pertinence of teaching activities, and effectively improve teacher-student interaction

After the evaluation of competence certification, the expert group of competence certification will give feedback on the status of teachers' competence, so as to facilitate teachers' reflection and improvement, and help teachers realize the improvement of information-based practical teaching ability in the continuous cycle of "practice-reflection-practice".

4.3. Data-driven development to promote the precision and individuation of teacher development

Intelligent teaching environment is the soil on which teachers' information teaching ability depends. Colleges and universities should take the intelligent updating and iteration of information-based teaching environment as an opportunity to create an intelligent teaching practice platform for teachers to improve their information-based teaching ability by using intelligent classrooms and intelligent training rooms with interactive feedback, high-definition recording and broadcasting, remote supervision, online teaching and research and intelligent analysis. It is necessary to vigorously promote the data integration of teacher-oriented information systems and platforms, and dynamically collect the teaching process and teaching behavior data from the virtual-real fusion space such as teacher development platform, smart classroom and smart learning platform, so as to provide data support for auxiliary teachers' precision teaching and professional development.

4.4. Stimulate teachers' self-efficacy in information-based teaching and guide teachers' innovation in information-based teaching

Combined with the ability certification, the basic ability requirements should be incorporated into the teacher evaluation and recruitment assessment system, the results of the developmental ability certification should be incorporated into the teacher teaching performance reward, and teachers should be encouraged to conduct teaching research and innovation in an intelligent environment.

Take teachers' teaching ability competition as an important way to improve teachers' information-based teaching ability, form a two-way mutual recognition mechanism of "certification" and "participation", and constantly stimulate the internal power of teachers' independent development.

Encourage teachers to take the initiative to carry out independent learning. Make full use of learning resources for learning, and conduct independent learning through sharing open platforms such as MOOC platform and Wisdom Tree of Chinese universities.

Aiming at the realization of intelligent teaching, teachers constantly improve the application of information technology in specific teaching, realize the deep integration of technology and teaching, and build typical cases of information-based teaching with their own characteristics.

4.5.   Integrated development mode of guidance, training and research competition

The improvement of teachers' information-based teaching ability runs through the reform of teaching mode and the professional development of teachers. By referring to the three ability dimensions of teaching thinking cognition, teaching implementation and sustainable development, teachers' information-based teaching ability is divided into four levels: consciousness and concept, skill and accomplishment, research and development, application and practice, and the integrated development mode of guidance, training and research competition is constructed, see Figure 2.
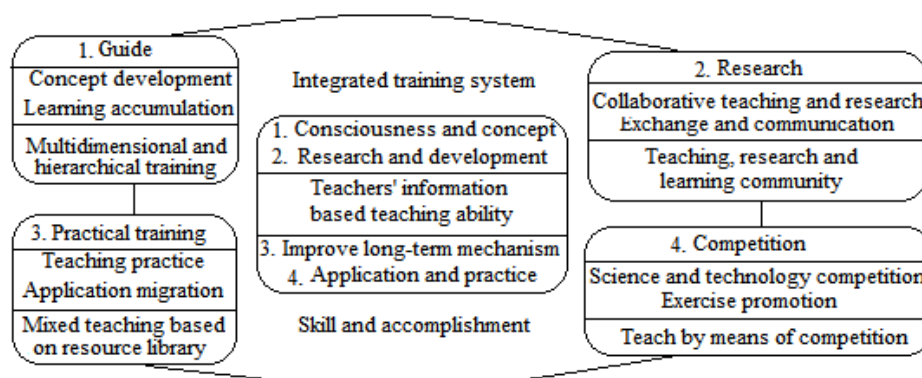

Figure 2. Integration model of information teaching ability of college teachers

It focuses on learning accumulation based on concept development, application transfer based on teaching practice, dialogue and communication based on collaborative teaching and research, and exercise and improvement based on teaching competition. Through the guidance of systematic multi-dimensional and hierarchical training, enhance consciousness and concept; Through the construction of curriculum resource base, carry out mixed teaching and other practical training, improve the skills and quality; Through the establishment of a composite teaching and research learning community, to enhance research and development, by building a competition platform, promote teaching and reform and development, sublimate application and practice. The four links of guidance, training and research competition integrate and penetrate each other to promote the spiraling improvement of teachers' information-based teaching ability[8].

5. Conclusion

Under the background of "Internet + education", the development of information technologies such as big data, cloud platform and smart terminal has injected new impetus into the reform and development of higher education teaching. The deep integration of emerging technologies and education and teaching has promoted the continuous updating and upgrading of education information. We will continue to enhance teachers' information-based teaching ability, promote the teaching reform of higher education, improve the quality of vocational education and personnel training level, and train applied talents for social and economic development. Information-based teaching ability is not only the core connotation of teacher development under the background of information age and intelligent society, but also an unavoidable important trend of school reform and development. It is a personal development problem of teachers to improve their information-based teaching ability. College teachers should constantly update their teaching concepts, reshape their roles in the new era, and improve their information-based education and teaching ability in the construction of curriculum resources, reform of teaching mode, and innovation of evaluation methods.

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