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Research on the Improvement of Information Teaching Ability of College Teachers

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Abstract: Based on the investigation of TRACK knowledge elements, this paper analyzes the current situation of college teachers' information-based teaching ability, summarizes the influencing factors of college teachers' information-based teaching ability, and puts forward the strategies to improve college teachers' information-based teaching ability, so as to provide reference for relevant colleges and universities to carry out teachers' information-based promotion work and help the development of national education information construction. The current situation of teachers' information-based teaching ability in colleges and universities is that they have the basic literacy of the discipline, and the discipline construction and cultural display need to be strengthened. Adhere to the principle of teaching method, build the situation needs to be strengthened; strong awareness of information technology literacy, ability to be improved the combination of subject teaching literacy is good, and the reform practice is not enough; there are many applications of information discipline literacy, and the production and construction are not enough; the literacy of information-based teaching method is easy to know and difficult to practice, and the needs across time and space are difficult to meet; the basic ability of information subject teaching literacy is possessed, and it is difficult to meet the all-round personalized needs. In view of the seven influencing factors of college teachers' information-based teaching ability, it is proposed to improve the construction of curriculum system to improve the subject quality. To realize the transformation and positioning of teachers' role to improve the quality of teaching methods; carry out the construction of information team to improve information technology literacy ; carry out the construction of curriculum teaching team to improve the quality of subject teaching ; build a subject resource library to improve the literacy of information-based teaching methods; build an information-based teaching platform to enhance the literacy of information-based teaching methods; strategies such as the deep integration of information technology and subject teaching to improve the teaching literacy of information-based disciplines.

Keywords: TPACK; Knowledge Elements; Information Teaching Ability.

1. Introduction

Information-based teaching ability is the ability of teachers to build a new teaching mode and promote the common development of teachers and students with the support of information technology and the guidance of modern education and teaching. Improving the ability of information-based teaching requires teachers to design and innovate based on information technology in a series of teaching elements such as teaching concept, teaching content, teaching organization, teaching mode and teaching evaluation.

At present, teaching informatization is a national strategy to promote the connotative development of higher education. Information-based teaching is the specific path to realize education informatization, and the construction of teachers' information-based teaching ability is the key factor to promote education informatization. The author investigates and analyzes the current situation of college teachers' information-based teaching ability, summarizes the influencing factors of college teachers' information-based teaching ability, and puts forward the strategies to improve college teachers' information-based teaching ability, in order to provide reference for relevant colleges and universities to carry out the work of improving teachers' information-based teaching ability, and help the construction of national education information and the development of education.

2. Related Theories and Technologies

(1) Brief introduction of TPACK theory

TPACK theory is a model that is highly recognized at home and abroad to describe the knowledge structure of teachers in the information age. This theory was proposed by American scholars Kohler and Mishra in 2005.After that, many scholars carried out a survey on the current situation of teachers' informatization ability based on TPACK and a study on training strategies.

TPACK (Technological Pedagogical Content Knowledge) is the subject teaching knowledge that integrates technology. Kohler and Mishra believe that TPACK is a new form of knowledge that teachers creatively integrate the three key knowledge of technology, pedagogy and subject content and transcend them. It is necessary for teachers to carry out effective teaching.

TPACK contains three core knowledge elements, namely subject content knowledge (CK), pedagogical knowledge (PK) and technical knowledge (TK). It contains four composite knowledge elements, namely, pedagogical content knowledge (PCK), technological content knowledge (TCK), technological pedagogical content knowledge (TPK), and technological pedagogical content knowledge (TPACK).

(2) The Basis of TPACK Research

The research hotspots of TPACK from 2007 to 2024 are summarized as follows: the improvement and expansion of TPACK ontology, the subjectification of TPACK, the

evaluation and measurement of TPACK, the teaching practice based on TPACK, and the teacher education based on TPACK. The research on TPACK will help to improve teachers' ability to master and use information technology. Teachers' TPACK ability is a necessary ability for future teachers. Information technology should be deeply integrated with education to find an effective way and method to achieve the goal of educational informatization.

3. Information-based Teaching Ability of College Teachers based on Ability Framework

(1) Analysis of teachers' information teaching ability standard

The analysis of TPACK knowledge elements of competency standards reveals that the competency standards are based on the education goal orientation to formulate the development direction of teachers' ability, emphasize teachers' technical ability and technical application consciousness, and design the design, development, implementation and evaluation of teaching process from the perspective of technical support teaching. 'ISTE Educator Standards' and 'Teacher Information and Communication Technology Competency Framework' focus on learner-centered learning methods and strategies, reflecting the understanding of teachers' teaching ability and the change of teachers' role orientation.

(2) The construction of university teachers' information teaching ability framework

The basis of constructing the framework of college teachers' information-based teaching ability. Firstly, the framework of college teachers' information-based teaching ability is developed from the perspective of teachers' role. This method starts from the role of university teachers to determine the relevant abilities that teachers should have in using information technology to carry out teaching. From the analysis of the standards and framework of teachers' information-based teaching ability, it can be seen that whether it is the standards of teachers' information technology ability in developed countries, international organizations or China, the basic context of its formulation includes the determination of teachers' information-based teaching ability standards from the perspective of teachers' roles. The role orientation of teachers is closely related to the cultivation of students' ability, and the standard of teachers' ability is the guarantee measure to realize the goal of talent cultivation.

(3) IPA Analysis of college teachers' information teaching ability

Based on the IPA analysis method (importance-performance analysis), the questionnaire' survey on the importance and satisfaction of college teachers' informatization teaching ability was designed and collected. The questionnaire questions include basic information such as teachers' profession, age, and gender. The main body is an IPA survey of 7 first-level ability indicators and 27 second-level ability indicators. It also includes open suggestions for improving the information-based teaching ability of college teachers.

(4) The current situation of university teachers' information teaching ability

The basic ability of informatization subject teaching literacy is possessed, and the all-round individualized demand is difficult to meet. College teachers give medium and above importance evaluation to the nine standards in informatization subject teaching literacy, but in many specific literacy aspects, the evaluation of their own ability satisfaction is not high. College teachers have the basic teaching literacy of information technology, and can formulate teaching objectives, organize teaching content, explore and apply teaching methods supported by information technology, and accurately convey them to students.

4. The Influencing Factors of University Teachers' Information Teaching Ability Construction of Teaching Materials Ontology

(1) subject literacy

Subject literacy usually includes basic knowledge, basic skills, basic experience, basic quality and so on. Under the concept of literacy orientation, the subject literacy of college teachers is not only reflected in professional skills, but also in the quality of subject thinking and subject psychological quality. Subject literacy is the basic literacy that teachers must possess.

(2) Pedagogical literacy

Teaching method literacy is the ability literacy of teachers to adopt appropriate methods to achieve teaching objectives in the teaching process. The teaching method should point to a specific teaching goal. The teaching method is restricted by the teaching content. The teaching method is the unity of teaching method and learning method. The reasonable selection of teaching methods is an important step to realize the optimization of teaching and the realization of teaching objectives. The selection of teaching methods according to teaching objectives is the basic principle.

(3) ICT literacy

Information literacy is a basic ability that teachers need to have in the information age. It mainly includes when to need information, how to obtain information, how to evaluate and use information effectively. Information technology supports information literacy, which is a general term for various technologies used to manage and process information.

(4) Subject teaching literacy

Subject teaching literacy is the ability of teachers to carry out effective teaching according to the specific subject content combined with teaching methods. Different subjects and different contents of the same subject generally need to adopt different teaching methods. Teachers need to design and plan in detail according to the teaching content, teaching objects, teaching objectives and tasks, so as to teach students in accordance with their aptitude.

(5) Information technology discipline literacy

Information discipline literacy is the ability of teachers to use technology to assist in presenting specific subject content. As network aborigines, the source of students' acceptance of knowledge is no longer limited to the classroom, and is no longer limited to real society and objects such as teaching tutorials. The characteristics of network resources, such as huge information, various forms, fast update and innovation, stimulate students' excitement and interest.

(6) Information teaching method literacy

Information-based teaching method literacy is the ability of teachers to reasonably choose teaching methods and use information technology to support the effective development of teaching. Information-based teaching method is an effective auxiliary for teachers to carry out teaching. Teachers

should make clear when, where and how to use information-based teaching methods to carry out teaching activities. Teachers should build an information-based learning environment to meet students' needs of cross-time and space-time learning.

(7) Information subject teaching literacy

The teaching literacy of information technology is the ability of teachers to integrate the knowledge of technology, teaching methods and subject content, use technology to effectively represent and present content, effectively select teaching methods, and efficiently carry out subject teaching. The teaching literacy of information subject includes teachers' ability in teaching content design, teaching process development, teaching evaluation and so on. It is the comprehensive ability of the deep integration of information technology and subject teaching.

5. Strategies for Improving the Information-based Teaching Ability of College Teachers

(1) Improve the construction of the curriculum system to enhance the quality of the subject

The curriculum system refers to the system that under the guidance of certain educational value concepts, the elements of the curriculum are arranged and combined, so that each curriculum element points to the curriculum objectives in the dynamic implementation process. The curriculum system includes three aspects: target elements, content elements and process elements. The curriculum system is the main carrier to achieve the teaching objectives and the key to ensure and improve the quality of education. Constructing an all-round and three-dimensional curriculum system is a specific way to improve the subject literacy of college teachers' information-based teaching ability.

(2) Realize the transformation and positioning of teachers' role to improve the quality of teaching methods

The role of teachers should be reshaped around the goal of talent training and the cultivation of students' innovative ability. It should be transformed from the inculcator of knowledge to the organizer, instructor, analyst and integrator. It should be transformed from the authority of knowledge to the explorer and co-learner. University teachers should cooperate with students to complete teaching and learning together.

(3) Carry out information team building to improve information technology literacy

College teachers shoulder the two tasks of teaching and scientific research. Teaching optimization and management, academic paper writing, scientific research project declaration and management are inseparable from information technology. This requires university teachers to master certain information technology capabilities to support teaching and support scientific research. This paper puts forward the influencing factors of information team construction. Through the team construction of college teachers' own learning, full-time and part-time technical team and outsourcing enterprise personnel, it helps to improve the information technology literacy of college teachers and comprehensively serve the information teaching needs.

(4) Carry out the construction of curriculum teaching team to improve the quality of subject teaching

The construction of the curriculum team should establish and innovate the team cooperation mechanism, formulate clear development goals, establish an effective operation mechanism, and adopt methods such as mutual help and mutual learning, mutual supervision, teaching and research discussion to improve the overall teaching quality of the team.

(5) Build a subject resource library to improve the quality of information technology disciplines

The construction of teaching resources is bound to be a complex and long-term process, so it is advocated to pay attention to the accumulation of data in the daily teaching process. Teachers need to have certain information sensitivity, be able to use and produce information materials and resources, and realize the continuous construction and development of disciplines. In the construction of teaching resources, school-school cooperation, teacher-teacher cooperation, teacher-student cooperation, and student-student cooperation are advocated. The subject resource library should include teaching plans, courseware, micro-courses, teaching videos and other materials.

(6) Constructing an information-based teaching platform to improve the quality of information-based teaching methods

At present, the commonly used information-based teaching platform can be used for check-in, online communication, online testing, etc. In the normal course teaching, teachers generally adopt offline teaching methods. College teachers need to make efforts to build a complete information-based teaching platform to meet the needs of students across time and space, and effectively improve their own information-based teaching literacy.

(7) The deep integration of information technology and subject teaching to improve the teaching quality of information subject

The deep integration of information technology and subject teaching includes creating an information-based teaching environment, realizing new teaching and learning methods, and changing the traditional classroom teaching structure. In recent years, many colleges and universities have explored the application of online high-quality resources such as MOOCs and micro-courses to carry out flipped teaching and blended teaching, which has achieved good results and promoted the deep integration of information technology and teaching. Teachers are the natural leaders in the teaching process. College teachers should make revolutionary changes in concepts, techniques and methods. College teachers should study the law of modern information technology education and teaching, study the deep integration point of information technology and subject teaching, and strive to build a new teaching mode of online and offline linkage, in-class and extracurricular connection, traditional and innovative integration, so as to realize the transformation from teacher-centered to student-centered, teaching-centered to learning-centered teaching paradigm.

6. Conclusion

Under the background of the development of national informatization and the era of educational informatization, it is an inevitable choice to carry out the work of improving the information-based teaching ability of college teachers to promote the connotative development of professional disciplines. School functional departments should establish rules and regulations, teachers should be willing to pay, and work together to solve the key problems in the practice of information-based teaching, so as to truly innovate the training mode of talents, serve the national education cause and serve the society.

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