Research on the Improvement of Teachers' Teaching Ability in Applied Universities Based on TPACK Framework

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Abstract: This paper focuses on the implementation of the strategy of rejuvenating the country through science and education and the development trend of strengthening the talent support of modernization construction. In view of the problems of Applied Universities in improving the level of running schools and the quality of talent training, using TPACK framework combined with the concept of Outcome Based Teaching and Learning (OBTL), this paper analyzes the constituent elements of teachers' teaching ability in applied universities, designs questionnaires and interview outlines, analyzes the current situation of teachers' teaching ability, the problems and challenges of the evaluation system with the help of SPSS software, and puts forward specific strategies to improve the teaching ability of teachers in Applied Universities.

Keywords: TPACK Framework; Applied University; Teachers' Teaching Ability; Promotion Strategy; Personnel Training

1. Introduction

China's applied universities are the most important base for cultivating applied talents, and undertake the important task of delivering high-quality applied talents to the society. The new era has brought new problems and challenges to Chinese universities, especially applied universities, in improving the level of running schools and the quality of personnel training. The education in applied universities in China is experiencing a stage from "quantity expansion" to "connotation development and quality improvement". The core of cultivating student quality in universities is the teaching ability of teachers, which is the most fundamental reflection of the school's educational level and which directly affects the efficiency and quality of student cultivation.

Improving teachers' teaching ability has become an important task for applied universities to improve the quality of student training and improve the ability of educational capabilities.

2. Concept Introduction

2.1 Theoretical Framework

This study aimed to improve the evaluation criteria of teachers' teaching ability based on the concept of Outcome Based Teaching and Learning (OBTL), which is based on the results-oriented teaching model. The Technology Pedagogical Content Knowledge (TPACK) framework used in this study was proposed by Dr. Matthew J. Koehler and Dr. Punya Mishra (2005) of Michigan State University. It is based on the perspective of integrated technological to propose the knowledge required by teachers' teaching, and is one of the frameworks for exploring teachers' development [1]. This study used TPACK mode to improve the evaluation index of teachers' teaching ability, which is a theoretical framework for the integration of educational technological, and emphasizes how teachers can reasonably combine technological knowledge (TK), pedagogical knowledge (PK) and teaching content knowledge (CK) in the teaching process to improve the teaching effect [2].

TK refers to the knowledge of information technology (including hardware and software), such as the use of teaching platforms, software and related training and experimental equipment for class or micro lecture production. PK refers to the relevant knowledge about students' learning, teaching theory, teaching strategies and teaching evaluation. For example, teachers' teaching methods, learning methods and teaching modes based on certain teaching theories and learning theories in the actual teaching process,

as well as the evaluation of teachers' teaching effect and students' learning effect. CK refers to knowledge about subject content, such as mastery of professional course knowledge and understanding of professional frontier knowledge.

2.2 Teachers' Teaching Ability

Teaching ability refers to a kind of behavior characteristic of teachers in order to achieve teaching objectives and smoothly engage in teaching activities [3]. From the perspective of pedagogy, researchers generally believe that teaching ability is the synthesis of various teaching abilities [4]. Teaching ability is the comprehensive ability of teachers to successfully complete teaching tasks, improve knowledge structure, form educational ideas, create teaching styles, improve teaching level, guide students' development, transform scientific research achievements into knowledge and methods, and successfully teach them to students. For the teaching ability of applied university teachers, there are often higher requirements, which not only need to have the commonness of classroom teaching ability of ordinary university teachers, but also need to have the characteristics of Applied University Teachers [5]. For teachers in applied universities, they should not only have a profound academic theoretical foundation, but also have the comprehensive ability and quality to transform basic theories into applications [6]. Practical teaching ability is a necessary ability for teachers in Applied Universities [7]. Zhou proposed that applied university teachers should have strong practical teaching ability, certain teaching innovation ability and good comprehensive ability [8].

In this study, teachers' teaching ability is defined as teaching technological ability (TA), teaching pedagogical ability (PA) and teaching content ability (CA) based on the conclusions of the above scholars and TPACK framework.

Teaching technological ability (TA) includes the ability to skillfully use multimedia, online tools and subject software in teaching, and to follow the development of educational technology to innovate teaching mode.

Teaching pedagogical ability (PA) includes the ability of teachers to focus on students, flexibly select and adjust teaching methods according to the characteristics of students, use diversified teaching methods to teach, and conduct teaching evaluation.

Teaching content ability (CA) includes the ability of teachers to have rich professional knowledge, combine theory with practice, design courses in line with the syllabus, understand the links between disciplines, and help students establish knowledge networks.

3. Analysis on the Current Situation of Teachers' Teaching Ability in Applied Universities

3.1 Survey Objects and Methods

Based on the elements of teachers' teaching ability, this paper designs a questionnaire and an interview outline about the current situation of teachers' teaching ability in applied universities. Teachers in Heilongjiang applied university were selected as the research object, and the questionnaire was distributed online. To investigate the current situation of teachers' teaching ability in applied universities, and find out the existing problems and challenges.

3.2 Survey and Interview Design

The questionnaire contains 22 questions, including the basic information of teaching, the current situation of teachers' teaching ability and teaching evaluation.

The outline of the interview mainly focuses on the current situation, existing problems and challenges of teachers' teaching ability in Applied Universities and several core issues of suggestions for teachers.

3.3 Investigation Conclusion

Through the analysis of the questionnaire survey and interview results, the researchers believe that the teaching technological ability (TA) of teachers in applied universities is generally good, and they can flexibly use multimedia teaching technology, online learning resources and teaching interactive platform. Teachers still need to constantly improve their teaching technology ability, master the use of various teaching software and subject practice teaching tools, use emerging information technology and data analysis tools, apply cutting-edge technology to innovate the classroom, and provide more personalized and diversified learning support. Teaching pedagogical ability (PA) can use diversified teaching methods, teach students in

accordance with their aptitude, and accurately evaluate students' mastery of knowledge. However, there are still some deficiencies in the innovation of teaching methods of some teachers. Teachers need to constantly improve teaching methods and strategies, innovate teaching methods of curriculum reform, pay attention to heuristic teaching, provide students with a more comprehensive learning experience, and cultivate students' learning interest and ability to think and solve problems independently. Teaching content ability (CA) applied university teachers have good professional background, solid subject knowledge, pay attention to practical teaching, and can integrate the latest theoretical and practical achievements into teaching. Teachers should pay real-time attention to the industry's cutting-edge technology and application practice, and integrate the latest achievements into teaching. At the same time, we should pay attention to the integration of interdisciplinary knowledge and cultivate students' comprehensive quality and innovation ability.

4. Challenges Faced by the Improvement of Teachers' Teaching Ability in Applied Universities

4.1 Rapid Socio-economic Development and Demand Changes

With the rapid development of social economy, the demand for talents in the industry is also changing. At the same time, applied university teachers are required not only to have profound professional knowledge, but also to keep up with the pace of the times, constantly improve their teaching technological ability and interdisciplinary knowledge integration ability, constantly innovate teaching pedagogical, and apply cutting-edge technologies to provide more personalized and diversified learning support combined with emerging information technology and data analysis tools. However, this often brings great pressure to teachers, requiring them to constantly learn new knowledge and technology to ensure the cutting-edge and practicability of teaching content.

4.2 Continuous Updating of Education Policies and Standards

In the 2024 government work report, the statement of "building strong Applied

Undergraduate Universities" was added, which indicates that higher requirements and new deployment have been put forward for the construction of applied undergraduate universities. The construction task is to promote the construction of first-class applied universities, create high-quality applied talents and build a high-quality teaching staff; Promote the in-depth integration of production and education and the in-depth cooperation between universities and enterprises, and strengthen the construction of teaching resources such as first-class courses and university enterprise cooperation textbooks; Improve the evaluation standards, strengthen the construction of "double qualified and double qualified" teaching staff, and improve teachers' practical teaching ability and scientific research application ability. All these put forward higher requirements for teachers' teaching ability. Teachers need to adapt to the new evaluation system, master the new teaching policy, and effectively integrate it into the teaching construction.

4.3 Technological Innovation and Teaching Resource Allocation

With the rapid development of artificial intelligence, big data, cloud computing and other technologies, technological innovation in the field of education is changing with each passing day. Teachers need to constantly learn and master new technology, and also need to effectively integrate technology and teaching content to improve teaching effect. Technological innovation has promoted the transformation of teaching mode, from the traditional teacher centered to student-centered. This requires teachers to pay more attention to students' subjectivity and personalized needs, and adopt more flexible and diverse teaching methods and means. However, due to the differences between regions and schools, the distribution of educational resources in different regions is uneven, some schools' technology and equipment update is lagging behind, and the resources including practice bases are insufficient, which cannot meet the teaching needs. It will directly affect the teaching effect of teachers and the learning experience of students, and then limit the improvement of teachers' ability to use new technology for teaching innovation. There are also some areas where the educational

resources are relatively scarce, which makes it difficult for teachers in these areas to obtain sufficient teaching resources and support. This also limits the improvement and development space of teachers' teaching ability.

4.4 Backward Management Concept and Imperfect System

Colleges and universities generally attach importance to scientific research rather than teaching. Some applied universities still follow the concept of traditional colleges and universities in management, paying too much attention to the output of scientific research results, while ignoring the improvement of teaching quality and teachers' teaching ability. This phenomenon of "attaching importance to scientific research and neglecting teaching" leads to teachers' insufficient investment in teaching, which affects the quality of teaching and the training effect of students. These universities need to change the management concept, put the improvement of teaching quality and teachers' teaching ability in a more important position, and realize the balanced development of scientific research and teaching. The backward management concept and imperfect system are one of the important factors restricting the improvement of teachers' teaching ability. At the same time, the teacher evaluation system relies too much on the quantity and quality of scientific research results, and ignores the evaluation of teaching performance, teachers' morality and style. This single evaluation system cannot fully reflect the comprehensive quality and contribution of teachers.

4.5 Insufficient Incentive Mechanism for Teachers

At present, most applied universities do not pay enough attention to the teacher incentive mechanism and lack long-term planning and investment, which makes it difficult for the incentive mechanism to play a role continuously and effectively. The design and implementation of teachers' incentive mechanism is lack of scientific and systematic, and effective incentive strategies and measures, which cannot fully stimulate teachers' enthusiasm and creativity. This makes it difficult for the incentive effect to achieve the expected goal, and also cannot provide strong support for the long-term development of

teachers. Teachers' efforts often exceed the traditional class workload, but it is difficult to get the corresponding return, which leads to the frustration of teachers' enthusiasm. The existing incentive mechanism is often unfair, such as the distribution of the award is not transparent enough, and the selection standard is not fair enough, which affects the work enthusiasm and the quality of education and teaching.

4.6 Teachers Lack Motivation for Self-improvement and Career Planning

applied university teachers not only need to undertake heavy teaching tasks, but also need to carry out a variety of responsibilities such as scientific research and social services. Due to the high pressure of work, daily work such as lesson preparation, homework correction and teaching preparation takes up a lot of time, which makes it difficult for teachers to have extra time for professional study and further study, and it is difficult for them to spare time and energy for self-improvement. Some applied universities do not provide more effective learning resources, which makes it difficult for teachers to acquire new knowledge and skills. At the same time, applied university teachers have not formulated effective career planning, and they often lack clear development paths and goals at different stages of their career. In terms of professional title evaluation and promotion, there is no clear planning and development direction, and there is a lack of career consultation and guidance, which makes teachers feel confused and confused in career planning.

5. Strategies for Improving Teachers' Teaching Ability in Applied Universities

5.1 Strengthen Continuous Learning and Professional Development

Establish a lifelong learning mechanism and provide professional training and development support. Encourage and support teachers to participate in various professional trainings and seminars, and constantly update their knowledge structure and teaching skills. This includes providing training courses and resources related to the application of teaching methods and teaching technologies, as well as providing on-the-job training opportunities in cooperation with enterprises [9].

Introduce interdisciplinary training and technical skills training. Organize interdisciplinary academic exchange activities, improve teachers' interdisciplinary knowledge integration ability, and promote interdisciplinary integration and innovation. Strengthen the training of emerging technologies such as information technology and data analysis, so that teachers can skillfully apply new technologies in teaching.

Promote industry university research cooperation. Strengthen the contact and cooperation between schools and enterprises. Enterprises provide teachers with on-the-job training opportunities, practice opportunities and scientific research platforms to help teachers improve their teaching ability, practice ability and innovation ability.

5.2 Keep up with the Update of Education Policies and Standards

Policy interpretation and communication. Actively pay attention to the changes of educational policies, and timely organize teachers to learn and interpret the new educational policies and standards to ensure that every teacher can understand and adapt to the new requirements.

Construction of teaching resources. According to the policy guidance, we should strengthen the construction of teaching resources such as first-class courses integrated with production and education, school enterprise cooperation textbooks and so on, so as to provide strong support for teaching.

Reform and optimize the evaluation system. Establish a teacher's teaching ability evaluation committee, adjust the teacher's evaluation system based on scientific and objective evaluation criteria, increase the proportion of evaluation in teaching performance, teacher's ethics and style, achieve the balance between scientific research and teaching, and comprehensively evaluate teachers' teaching ability from multiple dimensions, so as to promote the sustainable development and growth of teachers.

5.3 Promoting Technological Innovation and Resource Balance

Technology integration teaching. Put forward targeted teacher training programs, including professional knowledge update, teaching technology training, education concept guidance, etc. Promote teachers' deep integration of new technology and teaching content, innovate teaching mode and improve teaching effect [10].

Optimize the allocation of resources. We should increase investment in areas where educational resources are scarce, update teaching resources in time, improve teaching conditions, and ensure that every teacher and student can obtain the necessary teaching resources.

Construction of sharing platform. Establish a teaching resource sharing platform, encourage teachers to share high-quality teaching resources and experience, organize teacher seminars, teaching observation and other activities, exchange and share successful teaching cases and practical experience, and promote the improvement of the overall ability of the teaching team.

5.4 Change the Management Concept and Improve the System

Management concept innovation. Establish the concept of "teaching oriented", pay attention to the improvement of teaching quality and teachers' teaching ability, and realize the coordinated development of scientific research and teaching.

Improve the teacher management system. Clarify the responsibilities of teachers, including the specific contents of teaching, guiding students, carrying out scientific research and so on, so as to ensure teachers' due diligence in teaching work.

Build a diversified teacher evaluation system. Build a scientific, reasonable and diversified teacher evaluation system, and emphasize the importance of process evaluation, student feedback and peer evaluation. Regularly evaluate and feedback teachers' teaching ability, adjust and improve the evaluation system, and provide accurate evaluation results and improvement suggestions.

5.5 Scientifically Design the Incentive Mechanism

Establish a clear incentive mechanism, design a scientific and reasonable incentive mechanism according to the actual needs and development goals of teachers, and ensure that the incentive measures are targeted and effective. Link teachers' teaching ability with professional title promotion and performance

bonus, stimulate teachers' enthusiasm and creativity, and continuously improve their own quality.

Fair and transparent implementation. Ensure that the implementation process of the incentive mechanism is fair and transparent, eliminate the unfair phenomenon, and improve the satisfaction and enthusiasm of teachers.

Personalized incentives. For different types of teachers at different stages of development, provide personalized incentive programs to meet the needs of different teachers.

5.6 Improve Self-improvement Motivation and Career Planning Ability

Provide career planning guidance. Provide career planning guidance services for teachers, help teachers clarify the direction and objectives of career development, and formulate effective career planning. Establish teacher development centers.

Make teacher development plan. Provide teachers with rich learning resources and support, regularly carry out training and seminars, support teachers to participate in academic conferences, and promote teachers' professional development. Timely feedback the teaching evaluation results to teachers, provide specific suggestions for improvement, and provide personalized development plans and support for teachers.

Encourage teachers' self-reflection and self-development. Regularly organize teachers' self-reflection activities, evaluate their teaching ability and career development, timely adjust their learning plans and career plans, and encourage teachers to develop independently according to their own interests and specialties.

6. Summary

This paper discusses the important challenges and opportunities faced by China's applied universities in the process of transformation and development, with special emphasis on the core role of teachers' teaching ability in improving the quality of talent cultivation. Using TPACK framework and OBTL concept, this paper puts forward strategies to comprehensively promote the development of teachers' teaching ability. Improving the teaching ability of teachers in China's applied universities is a systematic project, which requires the joint efforts of universities,

teachers and all sectors of society. Through the implementation of the above comprehensive strategies, it can effectively promote the comprehensive development of teaching ability of teachers in applied universities, and then promote the high-quality development of applied universities, and cultivate more high-quality applied talents for the society.

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