

Research on the Evaluation System of Practical Teaching Quality of Engineering Specialty in Higher Vocational Colleges in China under the Background of Informatization

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Abstract: In the latest "Opinions of the Ministry of Education on Comprehensively Improving the Quality of Higher Education" (Jiao Gao [2012] No. 4), the Ministry of Education points out the need to further improve the quality standards system for talent cultivation and formulate and implement national standards for the teaching quality of undergraduate and higher vocational specialties. The goal of talent cultivation in Chinese higher vocational colleges is to cultivate technical personnel who are capable of meeting the needs of frontline production, construction, management, and service. Therefore, in order to improve the teaching quality of higher vocational colleges, it is necessary to establish a teaching quality evaluation system that is in line with the laws and characteristics of higher vocational education. This paper aims to study the construction and innovation of teaching evaluation system under the background of information age based on the development status and existing problems of practical teaching quality of engineering major in higher vocational colleges, and put forward targeted and original suggestions to provide strategic reference for the further development of curriculum teaching quality in higher vocational colleges.

Keywords: Vocational Colleges; Engineering Major; Practical Teaching; Quality Evaluation; Informationization.

1. The Necessity of Establishing the Quality Evaluation System of Engineering Practice Teaching under the Background of Information Technology

With the rapid development of information technology, the education model and teaching method of higher vocational colleges are undergoing earth-shaking changes. Under this background, the establishment of the teaching quality evaluation system is not only to meet the needs of the development of The Times, but also to meet the inherent requirements of higher vocational education to adapt to the characteristics of the information age and improve the quality of education. Teaching quality evaluation is a key component of the education quality assurance system in higher vocational colleges, which plays an important role in clarifying the teaching purpose, improving the teaching process and optimizing the teaching results [1]. Under the traditional evaluation system, the evaluation methods are usually based on written examination and theoretical course scores, and lack of systematic evaluation of students' practical skills and application ability. How to evaluate the practical teaching effect of engineering majors scientifically and reasonably is directly related to the educational effect of schools and the comprehensive quality level of graduates. Therefore, aiming at the reform of evaluation means under the current information condition, this paper proposes to take the evaluation of practical teaching quality of engineering major as the research entry point, which not only has practical pertinence, but also has far-reaching research value in theory.

2. Current Situation and Existing Problems of Quality Evaluation System of Practical Teaching of Engineering Specialty under the Background of Information Technology

With the rapid development of information technology, especially the wide application of new technologies such as big data and cloud computing in the field of education, higher vocational education is facing the historical opportunity and challenge of transforming from traditional teaching evaluation to modern information-based teaching evaluation. In the teaching practice of engineering specialty, the establishment of evaluation system plays an irreplaceable role in ensuring the quality of personnel training [2]. However, at present, the practical teaching quality evaluation system of engineering major in higher vocational colleges still has the following problems:

The current evaluation system pays too much attention to the examination of theoretical knowledge and neglects the cultivation of students' practical skills, which leads to the insufficiency of students' innovative ability and practical ability to a certain extent.

The traditional evaluation method relies too much on paper assessment and lacks the integration and utilization of information teaching means, which obviously does not adapt to the current teaching development trend.

The lack of interactive feedback in the evaluation system makes it difficult for students and teachers to get timely and effective feedback and improvement suggestions, which is not conducive to the continuous improvement of teaching

quality.

Under this background, it is urgent for higher vocational colleges to build a set of practical teaching quality evaluation system that conforms to the characteristics of engineering specialty.

3. Suggestions on Constructing Quality Evaluation System of Engineering Practice Teaching under the Background of Information Technology

3.1. Student Satisfaction

In today's educational environment under the background of information technology, the evaluation of student satisfaction has a great impact on the quality of practical teaching of engineering major in higher vocational colleges. This index can objectively reflect the actual demand and satisfaction degree of students in the aspects of curriculum theory, practical operation and teaching service, and is an important part of the evaluation of the effectiveness of the current teaching system. Relying on information technology means, it can achieve quantitative and real-time monitoring of student satisfaction, accurately capture the feedback and experience of students in the learning process, so as to provide a basis for the optimization and adjustment of the teaching process.

3.2. Teachers Teaching Content and Teaching Ability

The research shows that teachers, as the leader of teaching activities, their teaching content and teaching ability directly determine the quality of teaching [3]. Especially in the teaching of engineering specialty which emphasizes practical teaching, teachers' theoretical knowledge and practical ability play a decisive role in the cultivation of students' practical operation skills. Relying on the Internet platform and information technology means, the construction of an efficient and scientific monitoring system for teachers' teaching content and teaching ability is not only operable, but also can reflect all aspects of the teaching process in real time, which is conducive to the in-depth analysis of teaching quality and timely optimization and improvement of college management and teachers themselves.

3.3. Teaching Evaluation Feedback

The evaluation of practical teaching quality should not only rely on the perfect evaluation system, but also pay attention to the role of evaluation feedback in teaching improvement and quality enhancement. Teaching evaluation feedback is an important link to test the effectiveness of the evaluation system, which is related to whether the teaching quality improvement measures are implemented, whether the improvement of students' ability has quantifiable indicators, and whether the teaching management is scientific and efficient. Relying on information technology, a multi-dimensional feedback mechanism can be constructed to realize the dynamic closed-loop management of teaching quality assessment and feedback.

3.4. Monitoring Mechanism

In the modernization of higher vocational education, the evaluation of teaching quality has changed from a single

achievement measurement to a multi-component evaluation of comprehensive skills. For the practical teaching of engineering majors, the construction of evaluation mechanism needs to rely on information tools to realize the teaching process of real-time monitoring and dynamic adjustment, so as to ensure the comprehensiveness and transparency of evaluation. Monitoring mechanism not only ensures the standardized operation of teaching activities, but also provides objective data support for teaching management, which has decisive significance for improving teaching effectiveness.

4. Construction of Practical Teaching Evaluation System of Engineering Specialty under the Background of Information Technology

4.1. The Constitution of Evaluation System

Aiming at the practical teaching of engineering majors under the background of informatization, this study seeks to build a comprehensive, multi-level and dynamic evaluation system, and support its accuracy and real-time performance with data-driven, so as to comprehensively improve the teaching quality and the cultivation of students' practical skills. The core of the teaching evaluation system consists of four parts: teaching input evaluation, teaching process evaluation, teaching achievement evaluation and teaching feedback evaluation [4].

In the aspect of teaching input evaluation, the evaluation is made through the quantitative analysis of teachers' qualifications, teaching resources and students' learning basis. The evaluation of teaching process is evaluated from three perspectives: teaching effect, practice teaching arrangement and curriculum content innovation. Teaching achievement evaluation includes students' knowledge mastery, competition results and job market feedback; Teaching feedback evaluation focuses on the continuous monitoring and timely feedback of the teaching process and teaching results, so as to facilitate the discovery of problems and timely adjustment and optimization of teaching methods.

On the other hand, the data platform based on the campus information system provides the technical guarantee for the comprehensiveness and dynamics of teaching evaluation. Big data analysis and artificial intelligence algorithm are applied to process the large amount of data generated in the teaching process, and the model analysis and evaluation of teachers' teaching behavior and students' learning behavior are carried out by using predictive models and intelligent diagnosis and other technical means, so as to evaluate the teaching quality more accurately and generate targeted improvement strategies. Using this method, not only can realize the real-time monitoring of students' learning progress, but also can feed back to the teaching management department from a macro perspective, and promote the optimal allocation of teaching resources and continuous innovation of teaching methods.

For example, in the evaluation of teaching input, information such as teachers' teaching plans, teaching case base and students' background knowledge investigation for each semester will be collected in detail to ensure the comprehensiveness and accuracy of the evaluation. In the evaluation of the teaching process, the quality elements in the teaching process will be accurately captured through the sampling investigation of key teaching activities and the real-

time record analysis of students' classroom interaction. In the evaluation of teaching achievements, in addition to the conventional examination and homework score analysis, more attention is paid to the evaluation of students' project works, internship reports and inventions, etc., and the gold content of the evaluation is further improved through the inspection of comprehensive results.

4.2. Evaluation of Subject and Object Identification

For engineering majors in higher vocational colleges, the evaluation subject mainly includes teachers, students, enterprise tutors and educational managers, while the evaluation object mainly refers to the whole process and results of practical teaching activities. As the executor and guide in the teaching process, the teaching idea, method and practical teaching ability of the teacher directly affect the teaching quality; As the direct beneficiaries of teaching behavior, students' learning attitude, practical skills and knowledge application ability are the important basis for evaluation. Corporate tutors have a direct impact on students' practical skills and professional qualities, and their participation and guidance quality have become an indispensable part of the evaluation system. Educational managers need to grasp the quality of teaching from a macro perspective to ensure the smooth progress of teaching activities and the realization of teaching objectives.

In addition, the planning, organization, implementation and results of practical teaching activities are the objects of evaluation. The content of evaluation should cover the rationality of the curriculum, the modernity of the training facilities, the scientificity of the training process and the practicability of the training effect [5].

Therefore, it is necessary to make full use of modern information technology means, establish dynamic database and processing system, so that the collection, storage, processing and feedback of evaluation data are more scientific, refined and automated. Through in-depth mining and analysis of teaching evaluation data over the years, deficiencies in the teaching process can be found, teaching strategies and methods can be adjusted in time, and continuous optimization and improvement of teaching behavior can be realized.

4.3. Design of Evaluation Index

By analyzing the core elements of practical teaching of engineering specialty, this paper puts forward a set of evaluation index system including five main categories. Specifically, it includes five categories: students' practical ability, course content and structure, teaching methods and technologies, teacher professional development and teaching resources. Each category contains several specific sub-indicators, which are detailed to every link of the teaching process. Each indicator is composed of quantitative score and qualitative description, aiming to achieve comprehensive and in-depth evaluation.

The category of students' practical ability focuses on evaluating students' professional skills and innovative consciousness acquired through practical teaching, and emphasizes the role of practical teaching in improving students' ability to solve practical engineering problems.

The course content and structure category evaluates the scientific and forward-looking nature of the course design and examines the degree of match between the course and practical engineering needs to ensure that the teaching content

is closely aligned with the professional development trend.

The teaching method and technology category focuses on the teaching model and the application of information technology tools to evaluate whether it can match the characteristics of engineering practice teaching and maximize the interaction and participation of students.

The teacher Professional Development category focuses on the updating of teachers' professional knowledge and the continuous improvement of their teaching skills to ensure that teachers can lead students to adapt to the changing technical needs of the engineering community.

The teaching resources category evaluates whether the school provides appropriate hardware and software resources, including but not limited to modern laboratories, training equipment, and online learning platforms.

Through this set of comprehensive evaluation index system, teachers, students and administrators can accurately evaluate and continuously optimize the practical teaching of engineering majors. Combined with big data analysis technology, dynamic monitoring and real-time feedback of evaluation results are realized.

In addition, the evaluation system is piloted in Chongqing City Vocational College, and the application and verification of project research results are constantly carried out in practice.

The evaluation results confirm that this evaluation system can better guide practical teaching activities, optimize curriculum design, stimulate students' learning interest, improve teaching quality, help coordinate teaching resource allocation, provide data support for teachers' professional growth, and promote school-enterprise cooperation.

Therefore, the evaluation index system proposed in this study shows a good application prospect and popularization value in both theory and practice.

4.4. Evaluation Process Implementation

The evaluation process of engineering practice teaching in higher vocational colleges mainly includes four stages: evaluation preparation, evaluation implementation, data collection and analysis, and result feedback.

In the evaluation preparation stage, it is necessary to clarify the evaluation objectives, contents and evaluators, establish evaluation teams, unify evaluation standards, formulate evaluation plans, and conduct effective training for teachers and students involved in evaluation to ensure the smooth progress of evaluation.

In the evaluation implementation stage, the evaluator will systematically observe and record the teaching activities according to the pre-set evaluation plan and standards. The evaluation process should adopt multiple evaluation methods, such as self-evaluation, mutual evaluation, supervisory evaluation, etc., and adopt field investigation, questionnaire survey, interview, test and other data collection methods, so as to fully understand the various situations in the teaching process.

The data collection and analysis stage are the core of the evaluation process. Through in-depth analysis of the collected data, researchers can get the details of each teaching link, and determine the advantages and disadvantages of teaching through comparative analysis of teaching objectives and actual results. The selection of analysis tools should be reasonable to ensure the accuracy and scientificity of data processing, and statistical analysis software such as SPSS and Eviews can be used for effective processing.

The result feedback stage is the end of the evaluation process, and the evaluation results are timely fed back to teachers and students through online platforms, conferences and other forms, so that the evaluation results can guide the next teaching activities. In the evaluation results feedback, special consideration should be given to the timeliness and transparency of information feedback to ensure that every teacher and student can grow and progress from the evaluation.

In the whole evaluation process, all links should maintain close contact and a high degree of consistency, and effectively achieve the effective improvement of teaching quality under the background of information technology.

4.5. Feedback on Evaluation Results

Combined with the practice and system development experience of Chongqing City Vocational College, the feedback mechanism of evaluation results has been built into an efficient multidimensional information processing platform. The platform integrates three modules: standardized data collection, intelligent analysis and processing, and interactive results display.

The data acquisition module uses campus network technology to realize real-time monitoring and log recording of teachers' teaching behavior and students' learning effect.

The intelligent analysis and processing module is implanted with advanced data mining algorithm and teaching effectiveness scoring model, which not only ensures the accuracy of the evaluation results, but also provides personalized teaching optimization suggestions in the feedback output.

The result display module focuses on graphical and dynamic feedback. Through dynamic teaching quality graph and real-time data dashboard, teachers and students can intuitively and quickly grasp the timely changes of teaching quality.

At the operational level, the pilot colleges have provided teachers with comprehensive feedback from three dimensions: self-evaluation, peer evaluation and student evaluation through the teaching information system.

For example, teachers can watch their own teaching videos, view the evaluation scores of teaching links and feedback from students through the system to understand their own teaching effects.

Students can participate in anonymous evaluation of teachers through mobile terminals after class, which not only enhances the authenticity and objectivity of evaluation, but also deepens students' input and reflection on the teaching process.

At the same time, the teaching administration department has also set up a special teaching quality monitoring team, which is responsible for tracking the data generated by the evaluation system, timely detecting abnormal fluctuations in teaching quality, and feedbacks the analysis results and improvement suggestions to the relevant teaching teams.

The feedback mechanism of the evaluation results has shown positive effect in practice. Through systematic analysis

and feedback, teachers have made positive adjustments in teaching strategies, teaching methods and course content, significantly improving the pertinence and effectiveness of teaching, and thus improving students' practical operation ability.

At the same time, based on the regular analysis report of the evaluation results, colleges and universities have carried out a more reasonable allocation and optimization of teaching resources, improved the efficiency of the use of teaching facilities, and further promoted the refinement and wisdom of teaching management.

5. Conclusion

After nearly two years of research, through the in-depth analysis of the School of Architectural Engineering in Chongqing City Vocational College and extensive practical testing, this study successfully established a set of practical teaching quality evaluation system for engineering majors under the background of information technology, laying a solid foundation for the overall improvement of teaching quality in higher vocational colleges.

This evaluation system not only fully considers the characteristics of practical teaching of engineering majors, but also integrates the latest information technology with The Times, realizes the digitalization and intelligence of teaching evaluation, and greatly improves the scientificity and efficiency of evaluation.

The results show that the scientific and perfect teaching quality evaluation system plays an important role in promoting the innovation of teaching methods, optimizing the allocation of educational resources and improving the level of teaching management.

In the subsequent application process, we will focus on the real-time update and optimization of the evaluation system to ensure that it always meets the needs of teaching practice and continuously leads to the improvement of education and teaching quality.

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