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Study on Teaching Quality Monitoring System of Applied Colleges and Universities Based on OBE Concepts

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Abstract

Under the background of the connotative development of higher education and the construction of new engineering disciplines, applied colleges and universities need to build an industry-adapted teaching quality monitoring system to improve the quality of talent cultivation. With a view to the problems of single evaluation standard, missing process evaluation, insufficient industry participation and lagging feedback in the traditional system, this paper builds a whole process, multi-dimensional and dynamic quality monitoring system based on the concept of Outcome-Based Education (OBE): through the reverse design of the course objective matrix, the system quantitatively integrates the industry demand into the teaching standard, relies on the intelligent platform to collect classroom and project data in real time to strengthen the process monitoring. The university-enterprise collaboration optimizes the curriculum and practical assessment; establishes the dynamic evaluation index of "knowledge-competence-literacy" and the closed-loop system of "monitoring-feedback-rectification-review". We have innovatively put forward a three-dimensional synergy framework of time, space and value, formed an organizational decision-making, diversified evaluation and continuous improvement mechanism for school and college linkage, and promoted teaching from "teaching-centered" to "learning-centered". The study provided the theoretical support and practical paradigm for the connotative development of applied colleges and universities and to help the regional economic high-quality development.

Keywords

Teaching Quality Monitoring System, Applied Colleges and Universities, OBE Concepts, System Construction

1. Introduction

In the course of development of higher education, it is a far-reaching shift from scale expansion to the stage of connotative development gradually. Connotative development pays more attention to the improvement of education quality and emphasizes the cultivation of talents with innovative spirit, practical ability and comprehensive quality to meet the social demand for high-quality education. As an important part of the higher education system, applied colleges and universities bear the heavy responsibility of conveying applied talents for regional economic development, and the quality of their talent cultivation is directly related to the prosperity and development of regional economy. Under the background of today's era of rapid development of science and technology and continuous upgrading of industries, the society has put forward higher requirements for applied talents in terms of professional skills, practical experience and innovation ability.

The concept of Outcome-Based Education (OBE) has emerged, which is student-centered and outcome-oriented, emphasizes the clarity and measurability of educational goals, and provides a solid theoretical support for the reconstruction of the teaching quality monitoring system. The OBE concept requires educators to focus on students' final learning outcomes in the process of teaching design, implementation and evaluation, and to ensure that students have the abilities and qualities to meet the needs of the society when they graduate. This concept is highly compatible with the talent cultivation orientation of applied colleges and universities, and provides new ideas and methods for improving the quality of education in applied colleges and universities.

However, there are many problems in the current traditional teaching quality monitoring system, which has been difficult to adapt to the needs of the cultivation of applied talents in the context of new engineering disciplines. In terms of evaluation standards, there are problems including excessive reliance on test scores, taking test scores as the major basis for measuring learning outcomes and teaching quality, and seriously neglect of students' comprehensive qualities, such as such as practical ability and innovation ability. In today's society, practical ability and innovation ability are crucial for applied talents, and the traditional evaluation standard cannot comprehensively and accurately reflect the real level and ability of students. In the process evaluation, the monitoring work mainly focuses on the teaching results and lacks dynamic tracking of the teaching process such as classroom interaction and project practice. Classroom interaction can stimulate students' thinking and cultivate their communication and collaboration skills; project practice helps students apply theoretical knowledge to practice and improve their problem-solving ability. Neglecting these processes makes it difficult to identify problems in the teaching process and adjust teaching strategies in a timely manner. Insufficient participation of the industry is also a prominent problem. The lack of enterprise evaluation in teaching quality monitoring leads to a disconnect between the course content and industrial demand. As the demand

side of the talents, enterprises have a keen insight on the industry development trend and talent-skill requirements. Lacking of enterprise participation will lead to the gap between talents cultivation and the market demand, resulting in the unappropriated evaluation of teaching and corresponding monitoring.

Therefore, building a teaching quality monitoring system based on OBE concept covering the whole process, multi-dimensional and dynamic has become a key path to improve the quality of education in applied colleges and universities. This paper combines existing research and practice cases to discuss how to build a scientific and systematic teaching quality monitoring system with OBE concept as the core, aiming to provide theoretical support and practical reference for talent cultivation of applied colleges and universities, and help applied colleges and universities to improve the quality of talent cultivation on the road of connotative development, and better serve the regional economic development.

2. Current Research Situation at Home and Abroad

Teaching quality monitoring is the main means of quality monitoring and regulation of the teaching process and results, through the continuous supervision of teaching quality, timely regulation of teaching behavior in order to stabilize the process of improving teaching quality. Teaching quality monitoring is related to the implementation and realization of teaching rules and regulations, and is especially crucial to ensuring teaching quality, improving students' quality, and cultivating high-quality talents that meet the requirements of social development (Guo, 2021). In this context, how to further strengthen the teaching quality assurance of applied undergraduate colleges and universities, optimize the school's internal quality management system, and build a teaching quality monitoring and evaluation system that adapts to the development of higher education and conforms to the characteristics of applied undergraduate education has become an important issue for the reform and development of China's higher education (Jia & Zhao, 2020).

At present, the current domestic colleges and universities have generally established a teaching quality monitoring system with certain characteristics, which monitors, evaluates and improves teaching quality through a series of procedures and mechanisms (Li et al., 2020). The two-tier teaching monitoring and evaluation system with school-level-faculty-level interactions is the most widely used teaching management system at present. While the Teaching Quality Evaluation Center formulates the work plan of teaching supervisors, organizes teaching supervisors to carry out the work of monitoring teaching quality, and collects and regulates the feedback of students' evaluation information, in order to guarantee the smooth progress of monitoring and evaluation of teaching quality (Li et al., 2022). Secondary colleges set up teaching and research groups, teaching quality monitoring working groups, etc., which mainly monitor and manage the faculty's teaching tasks, teaching plans, course arrangements and social practices.

Spady (1994) proposed that the core of OBE is to design the teaching and learn-

ing process with learning outcomes as the orientation, and this concept has attracted wide attention in the education sector once it was proposed and has been widely used in the field of engineering education accreditation and other fields. Outcome-oriented education requires colleges and universities to carry out regular, whole-process, all-round, full-participation supervision and management of teaching quality on the basis of students' learning outcomes. However, at present, most colleges and universities focus more on the monitoring of teachers' teaching and less on the evaluation of students' learning outcomes, pay less attention to students' innovative ability and practical ability, and supervise and evaluate less on talent cultivation, graduation requirements, and the degree of support of the curriculum system for graduation requirements, and the effectiveness of students' learning, etc. In addition, the monitoring of teaching quality focuses more on the basic quality of teaching and learning, which is the basis for the quality of teaching. In addition, teaching quality monitoring pays more attention to basic data statistics, and the evaluation of feedback application and rectification and implementation effects is not sufficient, resulting in the failure of teaching quality monitoring and evaluation to emphasize the central position of talent cultivation and teaching quality in actual operation (Lu et al., 2024). In general, it seems that there are still some practical dilemmas in the teaching quality monitoring and evaluation system of colleges and universities, and it fails to realize the transformation from "teaching-centered" to "learning-centered", truly implement the concept of student-centered quality monitoring and evaluation, and it is difficult to meet the requirements of the current reform of the quality of higher education. It is difficult to meet the requirements of the current quality reform of higher education (Tian, 2020). Zhang & Zong (2023) pointed out that in engineering education, the OBE concept prompts educators to pay more attention to students' learning outputs and ensure that students achieve the expected learning outcomes in terms of professional knowledge, practical skills and comprehensive qualities, so as to improve the quality of engineering education and cultivate engineering talents that better meet the needs of the industry. Singapore Polytechnic applied integrated OBE with industry-linked curricula, resulting in 90% graduate employability. University of Melbourne adopted OBE in engineering programs, aligning courses with Engineers Australia competencies. Aalto University in Finland utilized OBE and project-based learning to enhance innovation skills, supported by strong industry partnerships.

In the construction of teaching quality monitoring system, Zhang (2024) pointed out that the construction of teaching quality monitoring system based on the concept of OBE needs to start from several aspects. Qian & Li (2024) designed the "three-three-three" quality monitoring system, i.e., "three lines of monitoring, three levels of supervision, and three-party evaluation". The "three-line monitoring" covers the work lines of student management, teaching operation management, and teaching quality management; the "three-level supervision" includes school-level supervision, teaching unit supervision, and faculty supervision; and

the "three-party evaluation" involves teacher evaluation, student evaluation and social evaluation. Wang et al. (2024) pointed out in his study of the teaching quality evaluation system of applied colleges and universities' courses in the context of new engineering disciplines that it is necessary to strengthen the evaluation of industrial docking and innovation ability. Zhang (2018), on the other hand, emphasized the importance of information technology in process monitoring. In the study of monitoring and evaluation of open education courses, it is proposed to use informatization technology to carry out monitoring of the whole process of course operation. The application of informatization technology can improve the efficiency and accuracy of teaching quality monitoring and realize the dynamic tracking and management of the teaching process.

Although scholars have made some achievements in the application of OBE concept, there are still some shortcomings in the existing research. Most of them focus on the construction of the theoretical framework, and there are fewer discussions on how to establish a dynamic adjustment mechanism in actual teaching, so that the teaching quality monitoring system can be adjusted in time according to the changes in industry demand, education policy and student characteristics. In terms of continuous improvement path, although some improvement measures have been proposed, there is a lack of systematic and in-depth research on how to establish an effective continuous improvement mechanism to ensure that the quality of teaching is continuously improved, which still needs to be further explored.

3. The Main Problems of the Current Teaching Quality Monitoring System in Applied Colleges and Universities and the Focus of System Construction

3.1. Main Problems

1) Single evaluation standard

In the traditional monitoring of teaching quality, excessive reliance is placed on examination results to evaluate students' learning outcomes and teachers' teaching quality (Qian & Li, 2024). This evaluation method has certain limitations, the examination results can only reflect the degree of students' memorization and understanding of knowledge, and cannot comprehensively measure the students' comprehensive quality such as practical ability, innovation ability, teamwork ability and so on. For students in applied colleges and universities, practical ability and innovation ability are the key abilities that will play an important role in their future work. In real work scenarios, students need to apply what they have learned to solve practical problems, and the lack of practical ability will make it difficult for them to adapt to the needs of the workplace. Excessive attention to test scores may lead students to rote memorization in pursuit of high scores, ignoring in-depth understanding and application of knowledge, which is not conducive to the long-term development of students.

2) Lack of process evaluation

At present, teaching quality monitoring often focuses on teaching results, and there is a lack of dynamic tracking of the teaching process such as classroom interaction and project practice (Wang et al., 2024). Classroom interaction is an important part of the teaching process, through teacher-student interaction and student-student interaction, students can broaden their thinking horizons and develop communication skills and critical thinking. Project practice, on the other hand, is an important way for students to transform theoretical knowledge into practical ability, in which students need to synthesize and apply what they have learned, solve practical problems, and improve their practical ability and innovation ability. However, the existing teaching quality monitoring system fails to pay sufficient attention to these processes, and is unable to detect problems in the teaching process in a timely manner, such as whether the teachers' teaching methods are appropriate, whether the students' motivation is high, etc., which makes it difficult to make effective adjustments and improvements to the teaching process.

3) Insufficient industry participation

In the process of teaching quality monitoring, enterprise evaluation is absent, and the curriculum content is out of touch with industrial demand (Zhang, 2024). The talent cultivation goal of applied colleges and universities is to deliver applied talents for regional economic development, and enterprises, as the final users of talents, have the most direct feelings about the industry development trend and talent skill requirements. However, at present, colleges and universities lack in-depth cooperation with enterprises in curriculum design, teaching implementation and other aspects, resulting in the curriculum content lagging behind the needs of industrial development, and the knowledge and skills learned by students cannot meet the requirements of the actual work of enterprises. This not only affects the competitiveness of students' employment, but also makes it difficult for the talents cultivated by colleges and universities to provide strong support for regional economic development.

4) Lagging feedback improvement

In the current teaching quality monitoring, the evaluation data has not formed a closed loop, and the rectification of problems lacks timeliness (Sheng, 2022). The purpose of teaching quality monitoring is to identify problems and make timely improvements to enhance teaching quality. However, after collecting evaluation data, the existing monitoring system often fails to analyze the data in depth and utilize it effectively, resulting in untimely rectification of problems and difficulty in sustained improvement of teaching quality. The feedback channels of evaluation data are not smooth, and the relevant departments and teachers cannot obtain evaluation information in time, or there is no corresponding mechanism to ensure that the problems are effectively solved after obtaining the information, which makes the monitoring of teaching quality a mere formality and fails to play its due role.

3.2. Focus of System Construction

Reconstructing the evaluation standards with OBE concept and realizing the unity of "ability-oriented" and "result-oriented" are the focuses of the construction of the quality control system of applied colleges and universities. The OBE concept emphasizes that it is oriented to the learning results of students, which requires that the evaluation standards should not only focus on students' mastery of knowledge, but also focus on the cultivation and development of students' abilities when constructing the quality control system. The OBE concept emphasizes that students' learning outcomes are oriented, which requires that when constructing the quality control system and related evaluation standards, we should not only pay attention to students' mastery of knowledge, but also pay more attention to the cultivation and development of their abilities. How to determine the competency indicators that are closely aligned with the needs of the industry to ensure that the evaluation criteria can comprehensively and accurately measure the competency level of students. In engineering majors, specific indicators such as engineering design ability, project management ability, innovation ability, etc. should be determined according to the industry's ability requirements for engineering talents. How to transform these competency indicators into operable evaluation standards, through the formulation of detailed evaluation rules, clarifying the specific levels that students should achieve in each competency, as well as the corresponding evaluation methods and weights.

The use of information technology means to improve the real-time and comprehensive process monitoring is an important direction to optimize the teaching quality monitoring system. With the rapid development of information technology, the application of information technology means in the field of education is becoming more and more widespread. Through the introduction of intelligent teaching platform, it is able to collect real-time data on classroom interaction, project practice and other data to realize the dynamic tracking of the teaching process. By using the attendance function and interaction record function of the intelligent teaching platform, it is possible to understand the classroom participation of students in real time; by analyzing the results submitted by students in project practice, discussion records and other data, it is possible to comprehensively grasp the performance of students in project practice. However, in the process of utilizing information technology means, it also faces problems such as data security, platform compatibility, etc. How to solve these problems and ensure that the information technology means to maximize the effectiveness of the process monitoring is an issue that needs to be studied in depth.

Integrating industry resources and building a school-enterprise collaborative multiple evaluation mechanism is of great significance to improving the quality of teaching. Enterprises, as the demand side of talents, have unique advantages in the evaluation of teaching quality. Inviting enterprises to participate in curriculum design can make the course content more closely match the actual needs of the

industry; allowing enterprises to participate in practical assessment and graduate quality evaluation can objectively evaluate the practical ability and comprehensive quality of students from the perspective of enterprises. However, in practice, how to establish an effective school-enterprise cooperation mechanism, clarify the rights and obligations of both parties, and safeguard the enthusiasm of the enterprises to participate; how to organically combine the evaluation of the enterprises with the internal evaluation of the school, and form a unified evaluation system, are all key issues that need to be solved.

Establishing a closed-loop system of "evaluation-feedback-improvement" to promote the continuous improvement of teaching quality is the core goal of the teaching quality monitoring system. To achieve this goal, it is necessary to establish a perfect data collection, analysis and feedback mechanism. Collect teaching quality evaluation data through a variety of channels, use big data analysis technology to dig deeper into the data, and find out the problems that exist in the teaching process. The results of the analysis are promptly fed back to the relevant departments and teachers, targeted improvement measures are formulated, and the effect of the improvement is tracked and evaluated. However, in the process of establishing the closed-loop system, it is necessary to solve the problems of data accuracy, feedback timeliness and the effectiveness of improvement measures to ensure that the closed-loop system can operate effectively and realize the continuous improvement of teaching quality.

4. Construction of Teaching Quality Monitoring System for Applied Colleges and Universities Based on OBE Concepts

4.1. Objective of System Construction

Based on OBE concept, explore student-centered The reform goal of this project is to explore the construction of student-centered teaching quality monitoring system in applied colleges and universities based on OBE concept, to take talent cultivation goals as the target construction guide of teaching quality monitoring system, and to overcome the imperfections and failures of the traditional teaching quality monitoring system in terms of the value orientation of quality monitoring, evaluation center of gravity, the effectiveness of play, and the continuous improvement mechanism. and other problems, to effectively improve the quality of teaching and guarantee the achievement of talent cultivation goals (see **Figure 1**). The specific reform objectives are as follows:

1) Establish the value orientation of "student-centeredness": Based on the OBE concept, align with the talent cultivation objectives, and reflect the value concept of "student-centeredness" in the construction phase, monitoring process and feedback improvement phase of the quality control system.

2) Construction of "output-oriented" monitoring process: Based on the OBE concept, the whole process of talent cultivation is monitored before, during and after the implementation of teaching.

3) Constructing "effect-oriented" quality evaluation: focusing on the achievement of students' learning effect objectives as the core content, and evaluating the value-added ability of students' learning "effect".

4) Constructing an improvement mechanism characterized by "continuity": the cycle of "planning-execution-inspection-processing" is carried out in a spiral mode to realize the quality of teaching and learning monitoring. The quality of teaching and learning monitoring will be continuously improved in a spiraling mode.

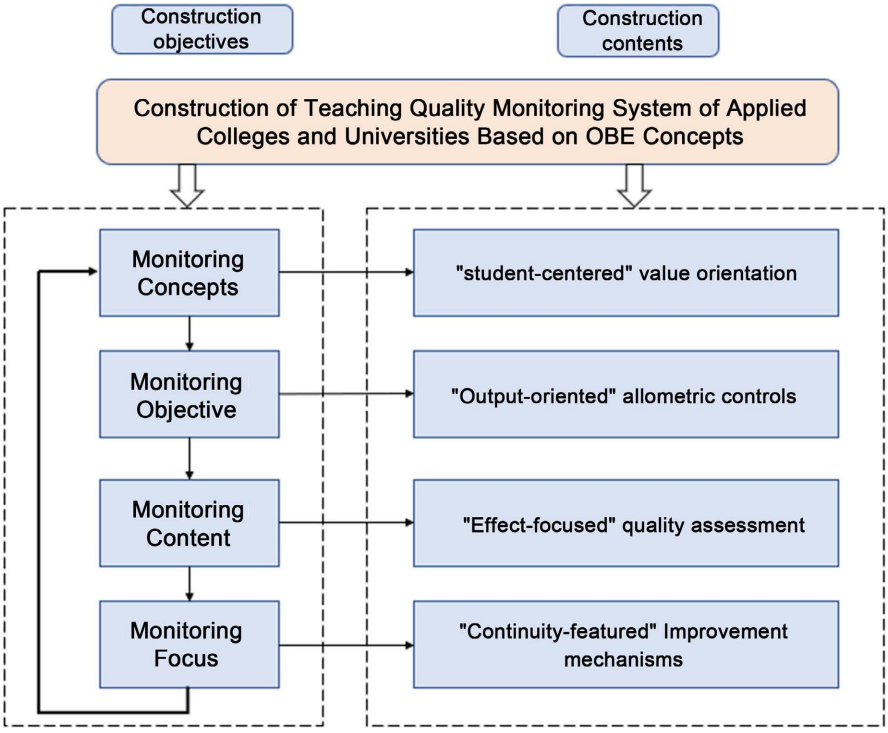

Figure 1. Correspondence between system building objectives and content.

Student-centeredness is one of the core objectives of building a teaching quality control system based on the OBE concept. In this system, all teaching and learning activities are centered on students' learning outcomes and ability value-added. Attention is paid to students' experiences and needs in the learning process, and personalized learning support and guidance are provided to students. According to the different characteristics and learning progress of students, differentiated teaching plans and tutoring programs are formulated to help students give full play to their potential. To emphasize the development of students' independent learning ability and lifelong learning awareness, so that students can continue to learn and improve themselves even after leaving school. By guiding students to self-reflection and self-evaluation, we cultivate their independent thinking and self-management abilities, laying a solid foundation for their future career development and personal growth.

Being output-oriented requires that the teaching quality monitoring system be

closely aligned with the needs of the industry. When formulating graduation requirements and course objectives, we fully investigate the development trend of the industry and the employing needs of enterprises, so as to ensure that students are equipped with the knowledge, skills and qualities that meet the needs of the industry upon graduation. In cooperation with industry experts, we jointly formulate graduation requirements in line with industry standards, and clarify the level that students should achieve in terms of professional knowledge, practical ability and professionalism. Refine the course objectives according to the graduation requirements so that each course can provide strong support for students to realize the graduation requirements. In the course of course teaching, the teaching content and methods are constantly adjusted to ensure that the course objectives are achieved and to improve students' competitiveness in employment and career development.

The teaching quality monitoring system of applied colleges and universities based on the standard of effect focuses on the actual achievement of teaching results, and establishes a closed-loop management of the whole chain from the setting of goals to the verification of results. When formulating graduation requirements and course objectives, it is necessary to systematically analyze the core competency standards of industry positions and the development needs of students, take "quantifiable and evaluable effect" as the core principle, and make clear the specific achievement standards of students in the dimensions of knowledge application ability, practice and innovation ability, and vocational competency. Jointly construct a graduation competency index database by level and module with industry experts and technical backbones of enterprises, and develop operable evaluation tools (such as competency certification model, practical assessment scale, etc.), so as to ensure that the teaching effect is accurately matched with the industry demand. Based on the graduation competency indexes, reverse design the course objectives and teaching contents, and require each course to specify its supporting competency modules and corresponding effect verification methods (such as project results acceptance, enterprise scene simulation assessment, etc.). In the process of teaching implementation, the deviation of teaching effect from the preset standard is verified in real time through dynamic monitoring of students' learning data (e.g. skill mastery curve, project completion quality), feedback from enterprise internships, third-party competency assessment and other multidimensional information. For the unattained links, a "diagnosis-intervention-reassessment" mechanism is established. For example, if the ability to apply management theories to solve real-world problems does not meet the industry standard, it is necessary to add a real case training module in the course, and introduce enterprise mentors to participate in the process of evaluation until the ability to meet the standard. Through this effect-based monitoring mechanism, we can ensure that students not only meet the requirements of knowledge reserve, but also have the practical ability verified by the industry, so as to realize the seamless con-

nection between the quality of talent cultivation and the needs of career development.

Continuous improvement is the key to guaranteeing the continuous improvement of teaching quality. The teaching process is optimized through dynamic monitoring of the teaching process and timely feedback of the teaching effect. Establish a teaching quality monitoring index system, collect and analyze teaching data on a regular basis, and discover problems in the teaching process in time. In response to these problems, practical improvement measures are formulated to adjust the teaching plan, improve teaching methods and optimize the allocation of teaching resources. The effect of the improvement measures will be tracked and evaluated, and the teaching process will be further adjusted and improved according to the evaluation results, so as to form a benign cycle of continuous improvement of teaching quality, and to continuously improve the quality of teaching and the level of talent cultivation.

4.2. System Framework Dimension

In the time dimension, the teaching quality monitoring system covers the whole cycle before, during and after the implementation of teaching (**Figure 2**). Before the implementation of teaching, the cultivation program is strictly reviewed. Cultivation program is the overall plan of teaching activities, and its rationality directly affects the quality of teaching. Experts are organized to validate the training program to ensure that the training objectives are clear, the curriculum is reasonable, and the teaching methods are appropriate. In the process of review, the training program is optimized with full consideration of the industry demand, students' characteristics and the actual situation of the school, so as to lay the foundation for the smooth implementation of teaching activities. In the implementation of teaching, the monitoring of classroom and practical teaching is strengthened. Through the teaching supervisor listening to classes, student evaluation, teaching inspections and other ways, timely understanding of the teaching situation of teachers and the learning situation of students. For practical teaching, we strengthen the monitoring of the construction of internship bases, the equipping of internship supervisors, and the performance of students in internships, etc. to ensure the quality of practical teaching. After the implementation of teaching, the quality of employment is tracked. By collecting employment information of graduates and feedback from employers, we understand the performance of students in the job market, analyze the gap between school teaching and industry demand, and provide a basis for teaching reform.

The spatial dimension covers the three major areas of teacher teaching, student learning and teaching management, and strengthens the synergy between the university and college levels. In the area of teacher teaching, teachers' teaching preparation, teaching process and teaching effect are monitored. By checking the implementation of teachers' lesson plans and syllabi, it assesses whether teachers' teaching methods are appropriate and whether their teaching contents are rich.

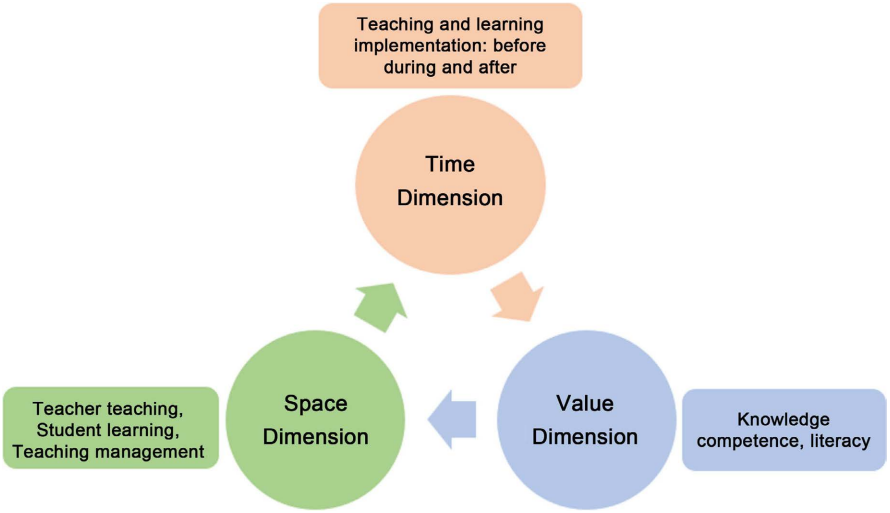

Figure 2. Teaching quality monitoring system framework dimension.

In the area of student learning, focus on students' learning process and learning outcomes. Through the assessment of classroom performance, completion of homework, test scores, etc., to understand the learning status and learning results of students. In the field of teaching management, monitor the efficiency and service quality of the teaching management department. Evaluate whether the work of teaching management departments is in place in the allocation of teaching resources, arrangement of teaching programs, and monitoring of teaching quality. In the area of school and college level synergy, the school level is responsible for formulating the overall policy and planning of teaching quality monitoring, and the college level is responsible for the concrete implementation and realization, forming a working mechanism of up and down linkage and synergy.

The value dimension is based on institutional standards and pursues the value-added of the trinity of "knowledge-competence-literacy" (Huang et al., 2024). Establish a perfect teaching quality management system and standard system to provide clear norms and guidance for teaching activities. In course teaching, it is not only necessary to teach students professional knowledge, but also focus on cultivating students' professional ability and comprehensive literacy. Through practical teaching, course design, innovation and entrepreneurship activities, students' practical ability, innovation ability and teamwork ability are cultivated; through carrying out ideological and political education, humanistic quality education and other activities, students' ideological and moral qualities and humanistic qualities are upgraded. In the process of monitoring the quality of teaching, the effectiveness of teaching is evaluated by the standard of "knowledge-competence-literacy", so as to promote the all-round development of students.

4.3. Structure of the System

As shown in Figure 3, the teaching monitoring system includes five aspects, as organizational decision systems, operational assurance systems, operational assurance systems, feedback improvement systems, support assurance systems.

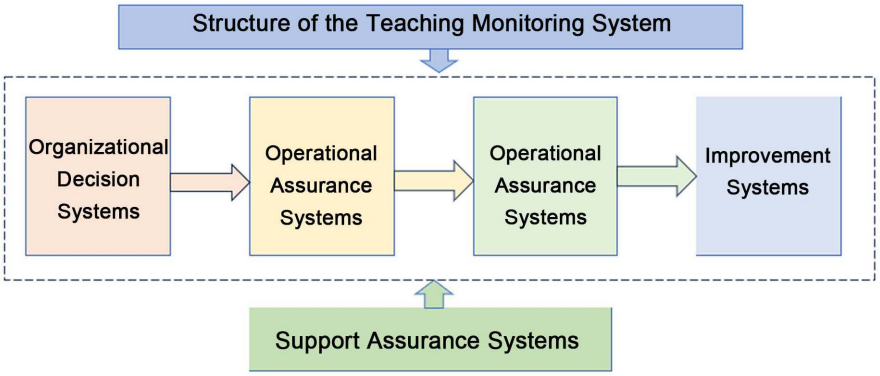

Figure 3. Structure of the teaching monitoring system.

1) Organizational decision-making system

The organizational decision-making system consists of three-level linkage among the university, faculties and majors, with the establishment of the Teaching Quality Committee and the Industry Expert Advisory Group.

First of all, the Teaching Quality Committee at the school level plays the key role of macro-control, with members including school leaders, leaders of various disciplines and key personnel of teaching management. Based on the overall development strategy of the school, it formulates the overall strategy and policy of teaching quality control. In the process of formulating policies, the long-term development goals of the school and the short-term demand for teaching quality improvement are fully considered, and the differences between different disciplines and specialties are balanced to ensure that the policies are universally applicable and targeted. For example, according to the strategic planning of the university's transformation to an applied university, the Teaching Quality Committee has formulated a policy to strengthen the quality monitoring of practical teaching, to increase the proportion of practical teaching in the talent cultivation program, and to put forward clear requirements on the assessment methods and base construction of practical teaching. At the same time, it coordinates the work between departments, breaks down departmental barriers, and promotes the synergy and cooperation among the teaching management department, the faculty building department, the student management department, etc. to jointly promote the improvement of teaching quality.

Secondly, the teaching quality committee at the college level is responsible for the implementation of the school's teaching quality monitoring policy, and develops a specific implementation plan by combining the college's own disciplinary characteristics, professional advantages and student characteristics. For example, an engineering college has formulated detailed management measures for practical teaching of engineering majors in accordance with the school's policy, clearly stipulating the length of internship for each major, the requirements of internship content, and the responsibilities of internship supervisors, etc., so as to ensure that the quality of practical teaching is in line with the college's objectives of talent

cultivation.

Thirdly, at the level of specialties, the quality standards and monitoring programs are formulated according to the characteristics of specialties. The head of the specialty joins hands with the key teachers to study in-depth the development dynamics of the specialty field, the industry standards and the demands of the occupational positions, and formulate the teaching quality standards in line with the characteristics of the specialty. These standards cover professional knowledge, skills, literacy and other aspects, and have clear measurable indicators. Taking the computer profession as an example, the professional teaching quality standards may include specific requirements on the programming language that students should master, the proficiency of software development tools, the ability to solve practical programming problems, and the adherence to industry norms. At the same time, a corresponding monitoring program is formulated to clarify the time nodes, ways and means of monitoring, etc., to ensure that the quality of professional teaching is steadily improved.

2) Operation guarantee system

The operation guarantee system formulates OBE-oriented teaching standards and supports teacher training and resource input. Teaching standards specify the objectives, contents, methods and evaluation methods of teaching activities, providing clear guidelines for teachers and students. In formulating the teaching standards, the OBE concept is taken as the core, and the teaching content and teaching methods are designed around the learning outcomes that students should achieve upon graduation. For a professional core course, firstly, it is clear what professional skills and knowledge level students should have after learning in the course, and then specific teaching contents are determined according to these outcomes, and appropriate teaching methods are selected, such as project-driven teaching method, case teaching method, and so on. At the same time, the development of appropriate evaluation methods to ensure that students can accurately measure whether they have achieved the expected learning outcomes, the evaluation may include project assignments, course examinations, practical assessment and other forms.

3) Quality Rating System

The quality rating system integrates multiple evaluation methods such as student evaluation of teaching, supervisor evaluation of classes, enterprise feedback and third-party assessment. Student evaluation of teaching is an important part of teaching quality evaluation. By organizing regular student evaluation of teachers' teaching, we understand students' satisfaction and learning experience in terms of teaching content, teaching methods and teachers' teaching attitude. A scientific and reasonable student evaluation questionnaire is designed to cover all aspects of the teaching process, such as the practicality of the course content, the effectiveness of the teaching methods, and the clarity of the teacher's explanation. Students can evaluate the teaching through the online platform to ensure the convenience and anonymity of the evaluation process, so that students can truly ex-

press their opinions. The results of the evaluation are fed back to teachers in time to help them find problems in teaching and adjust their teaching strategies:

Firstly, the supervisors evaluate the teachers' teaching from a professional point of view and put forward suggestions for improvement. The school has set up a teaching supervision team, whose members include experienced retired teachers and master teachers. The supervisory team conducts a comprehensive evaluation of teachers' teaching by listening to classes, reviewing teaching materials, and communicating with students. In the process of listening to the lectures, the supervisors pay attention to the teachers' teaching content organization, teaching methods, classroom management ability, etc. After the class, they have an in-depth communication with the teachers, affirming the merits, pointing out the deficiencies, and putting forward specific suggestions for improvement. For example, when listening to a course, the supervisor found that the teacher had too much theoretical explanation in the teaching process and less practical cases, so he suggested the teacher to increase the actual case study to improve the students' application ability. Supervisors not only pay attention to the teaching performance of teachers, but also pay attention to the problems in the teaching process, providing a basis for decision-making for the school's teaching management department.

Secondly, enterprise feedback evaluates the comprehensive quality and ability of students from the perspective of employers and provides direction for teaching improvement. Establish a long-term cooperative relationship with enterprises and regularly collect feedback from enterprises on graduates. Through enterprise return visits and graduate tracking surveys, we understand the evaluation of enterprises on graduates in terms of professional knowledge, practical ability and professionalism. Feedback from enterprises can directly reflect the gap between school teaching and industry demand, and the school adjusts the professional curriculum and optimizes the practical teaching links according to the feedback from enterprises. For example, if an enterprise feedbacks that graduates of a certain specialty have insufficient project management ability in actual work, the school will increase project management related courses in the curriculum system of the specialty, and organize students to participate in actual project management practice to improve students' project management ability.

Finally, the third-party evaluation is professional and objective, which can make a comprehensive and fair evaluation of the teaching quality. Professional educational assessment organizations are invited to assess the teaching quality of the school, and the assessment organizations conduct a comprehensive assessment of the school's teaching management, faculty, teaching conditions, and talent cultivation quality according to the scientific assessment index system and methods. The results of the third-party evaluation can provide schools with an external perspective, help them discover their own strengths and weaknesses, and provide a reference basis for their development planning and teaching reform. For example, a university invites a third-party evaluation organization to evaluate the under-

graduate teaching work of the school. The evaluation organization carries out a comprehensive evaluation of the teaching quality of the school through questionnaire surveys, data analysis, on-site visits, etc., and issues a detailed evaluation report, which is used by the school to formulate improvement measures and enhance the quality of teaching based on the problems and suggestions put forward in the report.

4) Feedback Improvement System

The feedback improvement system utilizes the big data platform to analyze data in real time, forming the "monitoring-feedback-rectification-review" closed loop.

First of all, various data in the teaching process are collected through the big data platform, including students' learning behavior data (e.g., online learning hours, completion of course assignments, participation in classroom interaction, etc.), teachers' teaching behavior data (e.g., use of teaching resources, frequency of application of teaching methods, etc.), and data on teaching management (e.g., reasonableness of the course arrangement, utilization rate of teaching facilities, etc.). These data are deeply mined and analyzed using data analysis techniques to discover problems in teaching. Through the analysis of student learning behavior data, it is found that the completion rate of students' assignments in a certain course is low and the error rate is high, which may mean that there is a problem with the teaching content or teaching methods of the course.

Secondly, the problems are fed back to the relevant departments and teachers, and corrective measures are formulated and implemented. For the problems found, timely feedback to the corresponding teachers and teaching management departments. Based on the feedback information, teachers analyze the causes of the problems and formulate targeted corrective measures. For example, in response to the coursework problems mentioned above, teachers may adjust the difficulty and progress of the teaching content, improve the teaching methods, and increase classroom interactions to help students better understand and master their knowledge. The teaching management department, on the other hand, coordinates and supports from the macro level, such as providing teaching resources support and organizing teacher training.

Thirdly, reviewing the effectiveness of rectification is an important part of the feedback improvement system. After the rectification measures have been implemented for a period of time, relevant data are collected again through the big data platform to assess the effectiveness of the rectification measures. If the completion rate of students' homework increases and the error rate decreases after rectification, it means that the rectification measures are effective; if the problem still exists, it is necessary to further analyze the reasons, adjust the rectification measures, and continue to carry out rectification and review until the problem is solved. Through this closed-loop management of "monitoring-feedback-rectification-review", the teaching process is continuously optimized, the quality of teaching is improved, and the teaching activities are ensured to be always in the direction of improving students' learning outcomes.

The model integrates OBE principles with multi-dimensional monitoring (time, space, value) and closed-loop feedback, distinguishing it from traditional systems that often focus narrowly on exam scores. The ABET accreditation framework (USA) for engineering education emphasizes outcome-based criteria, similar to OBE, and has improved graduate employability, which is a successful example. While some OBE implementations in Western universities faced challenges due to rigid competency frameworks that lacked industry adaptability. This model addresses such pitfalls by emphasizing dynamic industry alignment and real-time data-driven adjustments, enhancing responsiveness compared to static international systems.

5) Support and guarantee system

The support and guarantee system includes three aspects, namely, industry experts, teacher training, and resource input, to provide human and material resources for the whole system.

First of all, the industry expert advisory group consists of senior experts from the business sector, who, with their rich industry experience and keen market insight, provide suggestions and guidance from the industry perspective for the monitoring of teaching quality. In the process of formulating the professional training program, the expert advisory group participates in the argumentation to ensure that the curriculum and practical teaching links in the training program are closely integrated with the actual needs of the industry. For example, in the revision of the training program for the electronic information program, the industry experts proposed to increase the teaching of knowledge related to the development of new electronic technologies such as artificial intelligence chips, so that students can keep pace with the development of industry technology. In the teaching quality assessment, the expert advisory group participates in the assessment process, evaluates the comprehensive quality and ability of students from the perspective of enterprise employers, and provides directions for teaching improvement.

Secondly, in terms of teacher training, teachers are regularly organized to participate in OBE concept training, teaching skills training and other activities, so as to improve their teaching level and their ability to understand and apply the OBE concept. Experts in the field of education are invited to give an in-depth interpretation of the OBE concept and help teachers understand the connotation and implementation points of the OBE concept through theoretical explanations and case studies. Organize teaching skills training, such as the use of information technology teaching tools, classroom interaction skills, curriculum design methods, etc., to improve teachers' teaching ability. Encourage teachers to participate in industry practice activities, go deep into enterprises to understand the latest technology and development trend of the industry, and integrate industry practice experience into teaching. For example, a university regularly selects teachers to work in cooperative enterprises and participate in the actual project development of the enterprise, and the teachers return to the school and introduce the enterprise pro-

ject cases into the classroom teaching, which enriches the teaching content and improves the students' learning interest and practical ability.

Thirdly, in terms of resource investment, we increase the investment in teaching facilities, laboratory construction and textbook preparation, so as to provide good hardware and software support for teaching activities. In terms of teaching facilities, modernized smart classrooms are constructed, equipped with advanced multimedia teaching equipment, intelligent interactive systems, etc., to enhance the convenience and interest of teaching. Strengthen laboratory construction and build specialized laboratories according to the needs of majors, such as chemical analysis laboratories for chemistry majors, intelligent manufacturing laboratories for mechanical majors, etc., to provide students with platforms for practical operation and innovative practice. In terms of teaching materials preparation, support teachers to prepare teaching materials in line with the OBE concept, highlighting practical teaching content and focusing on cultivating students' application ability and innovative thinking. Organize teachers' teams to write school-based teaching materials, combining the teaching characteristics of the school and the needs of the industry, and integrating the latest research results and practice cases into the content of the teaching materials, so as to make the teaching materials more targeted and practical.

The system adopts student-centered and differentiated teaching plans, which addresses the diverse needs of students, especially those from varying educational and cultural backgrounds. Such as for personalized Learning Support, intelligent platforms track individual learning behaviors (e.g., online participation, assignment completion) to identify struggling students and provide targeted interventions. Diverse evaluation methods are used, which combines quantitative metrics (test scores) with qualitative assessments (project teamwork, innovation activities) to accommodate varied learning styles. And cultural adaptability is empathized, as courses integrate humanistic literacy education and collaborative projects to foster cross-cultural communication skills.

5. The Realization Path of the Teaching Quality Monitoring System of Applied Colleges and Universities Based on OBE Philosophy

5.1. Reverse Design of Course Objectives

In the teaching quality monitoring system of applied colleges and universities based on the OBE concept, the reverse design of course objectives is the key starting point. This requires colleges and universities to formulate quantifiable course objective matrices based on industry needs and graduation requirements, to ensure that course teaching can accurately meet actual needs and provide clear guidance for students' learning outcomes.

Industry demand is changing dynamically, and colleges and universities need to build a regular industry research mechanism. Regularly organize professional teachers to go deep into the front line of the enterprise, participate in the enter-

prise's project research and development, production and operation and other links, and enterprise management personnel, technical backbone for in-depth exchanges, to collect the latest developments in the industry, the trend of technological innovation and the position of the ability of the specific requirements of the talents. Taking computer science and technology majors as an example, with the rapid development of artificial intelligence, big data technology, the industry has a surge in demand for talents with relevant technical capabilities. Through the research, universities have learned that enterprises expect graduates to be proficient in machine learning algorithms, big data processing frameworks and other knowledge and skills, which provides an important basis for the development of curriculum objectives.

Graduation requirements are the competency standards that students should achieve after completing their studies, which are determined based on the industry needs and combined with the talent cultivation orientation of the school. Colleges and universities should focus on the core competence of the specialty, and clarify the graduation requirements from multiple dimensions such as knowledge, skills and quality. For example, the graduation requirements for mechanical design and manufacturing and automation majors may include the ability to design and manufacture mechanical products, mastery of advanced manufacturing technologies and processes, good engineering literacy and teamwork spirit. These graduation requirements should be measurable and achievable, providing a clear framework for the reverse design of the course objectives.

After clarifying the industry needs and graduation requirements, colleges and universities proceed to develop quantifiable course objective matrices. The course objective matrix further refines the graduation requirements into each course, so that each course has clear teaching objectives and tasks. Taking the "Software Project Management" course of software engineering as an example, according to the industry's demand for software project management talents and the graduation requirements of this specialty, the course objective matrix can be set as follows: at the knowledge level, students should master the basic concepts, methods and tools of software project management, such as project plan development, progress tracking, cost control, etc.; At the skill level, students should be able to use project management tools to complete the management of a small software project, including the development of project plans, organizing the project team, monitoring the project progress, etc. At the quality level, students should cultivate teamwork, communication and problem solving skills. All these objectives are measured by specific quantitative indicators, such as students' task completion rate, project progress compliance, and team member satisfaction in project management practice.

Through the reverse design of course objectives, colleges and universities can ensure that the course teaching content closely centers on the industry needs and graduation requirements, avoiding the blindness and arbitrariness of teaching. At the same time, quantifiable course objectives provide clear standards for teaching

quality monitoring, facilitate effective evaluation and feedback of the teaching process and learning outcomes, and promote the continuous improvement of teaching quality.

The proposed system tailors to different fields through reverse design of course objectives and industry collaboration. For each discipline, a quantifiable course objective matrix is developed by dynamically aligning with industry-specific competency requirements. For example, in computer science, course objectives are adjusted to include machine learning algorithms and big data processing frameworks based on enterprise demands. In mechanical engineering, graduation requirements focus on advanced manufacturing technologies and project management skills. Industry experts participate in curriculum design and practical assessments, ensuring alignment with real-world needs. Additionally, the system allows for dynamic adjustment of competency indicators through regular industry research and school-enterprise collaboration, enabling discipline-specific flexibility.

5.2. Strengthening Process Monitoring

Strengthening process monitoring is an important part of the teaching quality monitoring system based on the concept of OBE, and the introduction of an intelligent teaching platform is an effective means to achieve this goal. With the help of advanced information technology, the intelligent teaching platform is able to collect real-time data on classroom interaction, project practice and other data, which provides powerful support for the dynamic monitoring and optimization of the teaching process (Li, 2023).

The intelligent teaching platform provides diverse ways for the collection of classroom interaction data. Through the classroom attendance function, the platform is able to automatically record students' attendance, helping teachers understand students' learning attitude and participation in a timely manner. In the interactive session, the platform supports real-time quiz, group discussion, voting and other functions, and the system automatically records data such as the number of students' participation, the content of their speeches and the quality of their discussions. Teachers can also use the platform's questioning function to understand students' mastery of knowledge points, and the platform will count the accuracy of students' answers, answer time and other information. These data can intuitively reflect the students' learning status and active thinking in the classroom, and teachers can timely adjust the teaching rhythm and methods based on the data feedback, such as increasing the time of explanation or adopting more understandable ways to explain the knowledge points that are difficult for students to understand.

In terms of project practice, the Intelligent Teaching Platform provides students with an environment for project management and practical operation, and at the same time comprehensively collects project practice data. When students carry out project design, development and testing on the platform, the platform records data such as students' operation steps, number of code submissions, and project

progress updates. For team projects, the platform also tracks collaboration among team members, such as task allocation, communication frequency, and conflict resolution. By analyzing these data, teachers can assess students' performance in project practice, including the use of professional skills, teamwork ability, and problem-solving ability. For example, if a team is found to be lagging behind in the process of project development, teachers can analyze the platform data to find out the reasons, which may be the unreasonable division of labor among team members or the obstacles encountered in technical difficulties, and then give targeted guidance and assistance.

The intelligent teaching platform can also analyze data to uncover potential problems and provide a basis for teaching improvement. Through the long-term accumulation and analysis of students' learning data, the platform can discover students' learning patterns and trends and predict possible learning difficulties. Through the comprehensive analysis of students' homework completion, test scores, classroom performance and other data, it is found that a student gradually shows a downward trend in the learning of a certain course, and the platform issues an early warning to teachers and students in a timely manner. Based on the early warning information, the teacher will provide personalized counseling to the student, help the student find out the reasons for learning difficulties, and formulate a corresponding learning plan to avoid further decline in learning performance.

In addition, the data collected by the Intelligent Teaching Platform also provides an objective basis for teaching quality assessment. Schools and education administrations can assess the teaching quality of teachers and the teaching effectiveness of courses by analyzing a large amount of teaching data. The analysis of classroom interaction data of different teachers and student learning outcome data compares the differences in teaching quality of different courses and provides reference for the optimal allocation of teaching resources. For teachers and courses with higher teaching quality, more support and promotion will be given; for teachers and courses whose teaching quality needs to be improved, training and improvement activities will be organized to promote the overall teaching quality.

5.3. Deepening School-Enterprise Cooperation

Deepening school-enterprise cooperation is an important way to improve the teaching quality of applied colleges and universities, inviting enterprises to participate in curriculum design, practical assessment and graduate quality evaluation can effectively promote the deep integration of teaching and industry (Xiao & Zhu, 2020).

In the stage of course design, enterprise participation can make the course content more in line with the actual work demand. Colleges and universities should establish a close cooperative relationship with enterprises and jointly form a curriculum design team. With their rich industrial experience, enterprise experts par-

ticipate in the development of course syllabus, the selection of teaching content and the preparation of cases. In the course design of accounting majors, enterprise financial personnel are involved in advising the teaching content of the "Financial Accounting" course based on the financial processes and business needs in actual work. They pointed out that with the popularity of financial sharing centers, students need to master the account handling process and the application of information technology tools under the financial sharing mode. Based on this, the course design team added relevant contents in the course and introduced actual financial cases of enterprises for teaching, so that students can better understand and master the application of financial knowledge in practical work.

The introduction of enterprise participation in practical assessment can ensure that the assessment results are more objective and practical. The way in which enterprises participate in the practical assessment can be diversified, such as enterprise experts acting as judges of the practical assessment, providing real projects as the assessment content and so on. In the practical course assessment of computer science, enterprises provide real software development projects for students to complete in groups. Enterprise experts and school teachers jointly form an assessment team to make a comprehensive evaluation based on the students' performance in the project, including technical ability, teamwork, project management and other aspects. The enterprise experts focus on the students' ability to solve practical problems and their compliance with industry norms from the perspective of actual work, so that the assessment results can better reflect the students' actual working ability and provide more targeted feedback for their career development.

Graduate quality evaluation is one of the important contents of school-enterprise cooperation. Enterprises, as employers of graduates, have the most direct feelings about the comprehensive quality and ability of graduates. Colleges and universities should regularly collect feedback from enterprises on graduates to understand the performance and problems of graduates at work. Through questionnaires, enterprise return visits, graduate symposiums and other methods, collect enterprise evaluation of graduates in professional knowledge, practical ability, professionalism and other aspects. Enterprises feedback that graduates of a certain specialty lack in communication skills and teamwork ability, universities can follow this feedback to strengthen the design of relevant courses and practical activities in the subsequent teaching, such as opening communication skills courses, organizing team project practice, etc., to enhance the overall quality of students.

Deepening school-enterprise cooperation can also be extended to the joint construction of internship training bases, carry out industry-university-research cooperation projects and other aspects. School-enterprise co-construction of internship training bases provides students with a real working environment and practice opportunities, so that students can better master professional skills in practice and understand the development of the industry. Through the University-Industry-Research Cooperation Program, university teachers and enterprise techni-

cians carry out scientific research activities together, which can not only improve the practical ability and scientific research level of teachers, but also transform scientific research results into teaching resources in time, enrich the content of teaching, and cultivate the innovation ability and scientific research literacy of students.

5.4. Constructing Dynamic Evaluation Indicators

Constructing dynamic evaluation indicators is one of the core contents of the teaching quality monitoring system based on OBE concept. Incorporating innovation ability and teamwork into the evaluation system and adopting a combination of quantitative and qualitative methods can more comprehensively and accurately assess students' learning outcomes and teachers' teaching quality.

Incorporating indicators of innovation ability in the evaluation system helps to cultivate students' innovative thinking and practical ability. Colleges and universities can measure students' innovative ability in many ways, such as students' participation in scientific research projects, the number of academic papers or patents published, and the results of participating in various disciplinary competitions and innovation and entrepreneurship competitions. In disciplinary competitions, students need to apply what they have learned and come up with innovative solutions, and the results of the competitions can intuitively reflect students' innovative ability. For students who participate in research projects, their innovative contribution in the project is assessed, such as the promotion of the project by the new ideas and methods proposed.

Teamwork ability is also an indispensable ability in the modern workplace. When evaluating students' teamwork ability, it can be considered in terms of role positioning, communication and collaboration in the team project, and achievement of team goals. In a curriculum design team project, observe the role of students in the team, whether they are leaders, coordinators or executors, assess their performance in team communication, including the accuracy of information transfer, the attitude of listening to others, etc., as well as the team's finalization of the project's quality and efficiency, and synthesize these factors to evaluate the teamwork ability of students.

In the actual evaluation process, quantitative and qualitative evaluations are combined organically. In evaluating students' course learning outcomes, both quantitative data such as test scores and qualitative evaluations such as students' performance in class discussions and group projects are taken into account. For the evaluation of teachers' teaching quality, quantitative indicators such as students' evaluation scores, teaching achievements (e.g., students' awards in competitions, quality of graduates' employment, etc.), and qualitative opinions such as peer evaluations and evaluations by teaching supervisors are integrated to comprehensively assess teachers' teaching quality. Such an evaluation method can avoid the limitations of a single evaluation method, reflect the actual situation of teaching quality more comprehensively, and provide a more targeted basis for teaching im-

provement.

5.5. Improving the Continuous Improvement Mechanism

Perfecting the continuous improvement mechanism is a key link to guarantee the continuous improvement of teaching quality. Regularly releasing teaching quality reports and formulating special improvement plans for weak links can timely identify and solve problems in the teaching process and promote the continuous improvement of teaching quality (Liu et al., 2021).

Colleges and universities should establish a standardized teaching quality report system to comprehensively assess and summarize teaching quality on a regular basis. The content of the teaching quality report should cover teaching management, faculty, curriculum construction, practical teaching, student learning outcomes and other aspects. In teaching management, the implementation of the teaching management system and the efficiency of the allocation of teaching resources shall be assessed; in faculty, the teaching level, scientific research ability, and professional development of teachers shall be analyzed; in curriculum construction, the reasonableness of the curriculum system, the updating of the curriculum content, and the effectiveness of the teaching methods shall be assessed; in practical teaching, the construction of internship bases and the quality assurance measures of practical teaching shall be examined; in student learning outcomes, the quality report shall cover a variety of aspects, such as teaching management, curriculum construction, and student learning outcomes. quality assurance measures, etc.; in terms of students' learning outcomes, analyze students' academic performance, employment, career development, etc.

Through the comprehensive assessment of these aspects, the teaching quality report objectively presents the current status of the teaching quality of the university, analyzing the existing problems and their causes. A university pointed out in the teaching quality report that the teaching content of some specialized courses is out of touch with the actual needs of the industry, which leads to certain difficulties faced by students in employment; the teaching methods of some teachers are relatively traditional, which makes it difficult to stimulate students' interest in learning and innovative ability. The raising of these problems provides a clear direction for the subsequent improvement work.

In view of the weaknesses pointed out in the report on teaching quality, universities should formulate special improvement plans. The special improvement plan should have clear goals, specific measures and time nodes. For the problem of the disconnection between teaching content and industry demand, schools can formulate a plan for updating course content, organize teachers to conduct in-depth research in enterprises, and invite experts from enterprises to participate in course revisions, so as to ensure that the course content follows the development trend of the industry. It is set to complete the revision of course syllabus in one semester and start to implement the new teaching content in the next semester. For the problem of teachers' teaching methods, the university can carry out training ac-

tivities on teaching methods, invite teaching experts to give lectures and demonstration teaching, and encourage teachers to carry out teaching reform practices. It is planned to conduct a round of training on teaching methods for all teachers within one year, and teachers are required to actively apply new teaching methods in their teaching practice.

In the process of implementing the special improvement plan, colleges and universities should strengthen supervision and evaluation. They should establish a sound monitoring mechanism, specify the responsible departments and responsible persons, and regularly check and supervise the implementation of the improvement plan. A leading group for teaching quality improvement is set up to coordinate and supervise the implementation of the special improvement plan. At the same time, a scientific evaluation mechanism is established to evaluate the implementation effect of the improvement plan. By comparing the teaching quality indicators before and after the improvement, such as students' academic performance, employment quality, employers' satisfaction, etc., it is assessed whether the improvement plan achieves the expected goals. If the improvement effect is unsatisfactory, analyze the reasons and adjust the improvement measures in a timely manner to ensure that the improvement work is effective.

Through the regular release of teaching quality reports and the formulation of special improvement plans, colleges and universities are able to form a virtuous cycle of continuous improvement of teaching quality. Constantly discover the problems in the teaching process, take timely and effective improvement measures, promote the continuous improvement of teaching quality, and cultivate applied talents that better meet the needs of society.

In addition, the anticipated costs or universities and institutions include technology infrastructure costs, such as intelligent teaching platforms, data analytics tools; teacher training costs, i.e. regular OBE workshops and industry immersion programs; industry collaboration costs, such as funding for enterprise partnerships and joint projects; institutions can secure funds through government grants, industry sponsorships, and reallocating existing budgets toward strategic quality improvement initiatives.

specific training provided to teachers may include OBE concept teaching, technical skills used on intelligent platforms, data analysis tools, modern pedagogies, and industry immersion[1].

6. Conclusion

In the strategic transformation of higher education from scale expansion to connotative development, applied colleges and universities, as an important support for regional economic development, the quality of their talent cultivation is directly related to the appropriateness of social demand and industrial upgrading. This paper takes the concept of Outcome-Based Education (OBE) as the core, and systematically discusses the construction path of the teaching quality monitoring

[1]Teachers participate in enterprise projects to align teaching with industry trends.

system of applied colleges and universities. The study points out that the traditional teaching quality monitoring system has significant defects in evaluation standards, process tracking, industry participation and feedback improvement, and it is difficult to adapt to the high requirements of innovation ability, practical ability and comprehensive quality of applied talents in the context of new engineering disciplines. Based on this, this paper proposes a framework for reconstructing the teaching quality monitoring system based on the OBE concept: at the goal level, emphasizing the value orientation of "student-centered" and the monitoring logic of "output-oriented", and transforming the industry demand into quantifiable graduation competence indicators; at the structural level, a multi-dimensional synergistic monitoring system is constructed by covering the time dimension of the whole teaching cycle, integrating the spatial dimension of teacher-student-management, and pursuing the value dimension of "knowledge-competence-literacy"; at the implementation level, the process monitoring is strengthened by the reverse design of the course objectives and the intelligent platform; at the implementation level, relying on the reverse design of course objectives, intelligent platform to strengthen process monitoring, school-enterprise cooperative multivariate evaluation, and multi-dimensional feedback of dynamic indicators, a closed-loop mechanism of "evaluation-improvement-enhancement" is formed. The study shows that this system can effectively solve the problems of single standard, missing process and industry disconnection in traditional monitoring, promote the spiral rise of teaching quality through data-driven dynamic adjustment and continuous improvement, and provide theoretical support and practical paradigm for applied colleges and universities to realize connotative development.

For the future, the optimization of the teaching quality control system of applied colleges and universities should continue to make breakthroughs in the following directions: first, deepen the mechanism of industry-teaching integration, and promote the upgrading of school-enterprise cooperation from "formal participation" to "substantive co-construction". In the future, we can explore the establishment of joint certification mechanisms between schools and enterprises, embed enterprise technical standards directly into the curriculum system, and realize the deep coupling of the teaching process and the production process through the "dual tutor system" and "project co-research". Second, strengthen the technical empowerment and build an intelligent monitoring ecosystem. With the deep integration of artificial intelligence and education big data, it is necessary to develop an intelligent platform that integrates learning behavior analysis, ability portrait modeling, and teaching risk early warning, so as to realize real-time diagnosis and precise intervention of teaching quality. Third, improve the dynamic adjustment mechanism to enhance the system's responsiveness to the external environment. Under the background of rapid iteration of industry and adjustment of education policies, it is necessary to establish a dynamic perception system of industry demand, regularly reconstruct the competency index database, and enhance the

adaptability of teaching content through flexible course module design. Fourth, improve the institutional guarantee for continuous improvement, and internalize the quality culture into organizational genes. It is necessary to build an all-member quality responsibility system covering the school-institute-profession, promote the internalization of the OBE concept among teachers through regular training, and establish a linkage mechanism between teaching quality and resource allocation to stimulate the endogenous motivation for continuous improvement. Although challenges still exist, such as the lack of a coordination mechanism for the interests of schools and enterprises, the insufficiency of educational data governance capacity, and the needs of teachers' traditional teaching inertia breakthrough; however, through policy guidance, technological innovation, and the concerted efforts of educational subjects, the teaching quality monitoring system based on the OBE concept will surely become the core engine of applied colleges and universities to empower students' growth and serve the regional economic development, and will contribute practical wisdom to the high quality development of higher education.

Supporting Project

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Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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