

Construction of Professional Teaching Quality Management System in Industry Characteristic Universities: from Principle, Structure to Practice

-- Take the industrial engineering major as an example

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Abstract: In view of the difficulties of teaching quality management in colleges and universities, this paper deeply analyzes the practice and influence of ISO 9000 standard in the field of education, extracts the seven basic principles of teaching quality management, and carefully constructs the blueprint of teaching quality management system. Focusing on the industrial engineering major, it elaborates how to skillfully integrate this system skillfully, covering the strategic layout of top-level design, the innovative integration of course content, the intensive training of practical skills, and even the optimal allocation of teaching resources, emphasizing the importance of continuous improvement and stakeholder participation. It provides the theoretical framework and practical guidance for improving the teaching quality of colleges and universities, and also has the reference value for the teaching quality management of other majors or universities.

Keywords: ISO 9000 standard; Characteristic university; Teaching quality management

1. Foreword

The "ISO 9000" standard published by the International Organization for Standardization, as a standard for quality management and quality assurance, has been widely recognized and adopted worldwide. This series of standards are not only applicable to the traditional fields such as manufacturing and service industry, but also their application in the field of education has gradually shown its unique value. The core concept of ISO 9000 family standard emphasizes the importance of process management and continuous improvement, which is exactly the goal of the current teaching management in higher education. In the domestic and foreign academic circles, there have been many discussions and practice cases on the application of ISO 9000 group standard in the field of education. Foreign studies mainly focus on the case analysis of ISO 9000 standard in higher education and the evaluation of the actual effect of teaching quality improvement^[1]. Domestic research focuses more on the theoretical discussion and the preliminary practice of system construction^[2]. However, there are relatively few studies on the construction of teaching quality management system in industrial characteristic universities, especially in-depth studies on the implementation strategy and management mechanism. In addition, most domestic and foreign studies point out the challenges of implementing group ISO 9000 standards in the field of education, including how to ensure educators understanding and acceptance of standards, how to deal with resource allocation during the implementation of standards, and how to evaluate and continuously improve the quality of teaching.

Based on the above status and needs, this study aims to explore how to build a teaching quality management system adapted to the professional characteristics of the industry characteristic universities based on the ISO 9000 standard, and put forward specific implementation strategies and management suggestions. This is not only helpful to enrich and improve the theoretical framework of teaching quality management system, but also provides reference for professional teaching quality management in universities with other industries.

2. Teaching quality and teaching quality management

About the quality of teaching, scholars from different angles gave the definition or research, including Swedish scholars hus view "teaching quality is the quality of teaching results, namely the quality of the students"^[3], and our xus view "teaching quality including teaching quality and student quality, students at the core of the quality of education, work quality is the key to improve the quality of students"^[4], etc. In fact, the teaching quality is a comprehensive index, is the core index of the education effect, covers the quality of the teaching results (the

quality of students learning results, including knowledge, skills development level and innovation ability), the quality of teaching (involving the implementation of the design of teaching methods and the use of teaching resources, etc.) and the quality of the teaching process (focus on teaching interaction, classroom atmosphere and teaching link coherence, etc.). Teaching quality is the organization of the school, which meets the sum of the particularity of the ability to meet clear or implicit needs " in teaching activities.

Teaching quality management refers to the planning, implementation, monitoring and improvement of teaching work through a series of systematic management activities, so as to improve the teaching quality and meet the needs of internal and external customers. It not only focuses on the final teaching results, but also includes the comprehensive management of^[5] for the teaching process and resource input. The research on teaching quality management has important theoretical and practical significance, which can improve the teaching effect, ensure the standardization and internationalization of education quality, and cope with the changes of social and market demand. Therefore, the research on teaching quality management is of great significance to improving the teaching effect, ensuring the standardization and internationalization of education quality, and coping with the changes of social and market demand. Through the research and implementation of teaching quality management, the problems in the teaching process can be more accurately identified and solved, resource allocation is optimized, and teaching methods are innovated, so as to effectively improve the teaching effect. At the same time, the establishment of teaching quality standards in line with international standards to enhance the international competitiveness of China's education. In addition, the rapid development of society and economy has put forward new requirements for the quality of talents, and the research on teaching quality management is helpful to timely adjust the teaching plans and contents to ensure that talent training matches the social needs.

3. The basic principles of teaching quality management

3.1 Focus on students

The core of teaching quality management is to meet the needs and expectations of students. Colleges and universities should put students at the center of the educational mission, and provide students with high-quality teaching services through in-depth understanding of the needs of students, employers and the society. This means that curriculum design, teaching methods and evaluation criteria should all aim to promote the overall development of students, ensuring that teaching activities can meet students individualized needs and career development goals. According to the International Certification Standards for Industrial Engineering Education (ACCE, 2015), students majoring in industrial engineering should have the ability of systematic analysis and process optimization. Thus, curriculum design should be built around these core competencies, ensuring that students can meet the expectations of prospective employers.

3.2 Role of the management team

The management of colleges and universities should clarify their educational goals, formulate strategic plans, establish communication channels and provide resource support, and play a leading role. Management needs to ensure that educational decisions and actions are in the best interests of students and adapt to changing educational environments through regular assessments and program adjustments. In addition, the management should encourage teachers to adopt innovative teaching methods to improve the quality of teaching. Industrial engineering cultivates senior compound talents with solid foundation of natural science, social science, professional engineering technology, master the knowledge and methods of economy and management, and can be engaged in teaching, scientific research, operation management and practice of industrial engineering. Therefore, clear educational objectives and strategic plans need to be developed to ensure that teaching activities keep pace with the latest developments in industrial engineering. At the same time, we should seek to connect with industry partners, provide students with internships, employment opportunities, and opportunities to participate in research projects, and enhance the practicality and relevance of the curriculum.

3.3 The active participation of all the staff

The improvement of teaching quality requires the joint participation of teachers, students, administrators and support personnel. Teachers should constantly update teaching methods, students should actively participate in teaching feedback, administrators should ensure that policies and procedures are effectively implemented, and support personnel should provide high-quality services. Through full participation, a community dedicated to educational excellence can be built. In industrial engineering majors, teachers should constantly update their teaching methods, such as introducing case studies and simulation training, to improve students ability to solve practical engineering problems. Students should actively participate in the teaching feedback to help teachers optimize the course content.

4. The system structure of the university teaching quality management system

Based on the ISO 9001 quality management system and PDCA cycle theory, the teaching quality management system of colleges and universities is constructed, as shown in the figure below, aiming to improve the teaching quality and meet the needs of students, employers and the society through systematic and standardized management methods. The system emphasizes process management, continuous improve-

ment and full participation to ensure the efficient operation and quality improvement of teaching activities. It mainly includes the following key work:

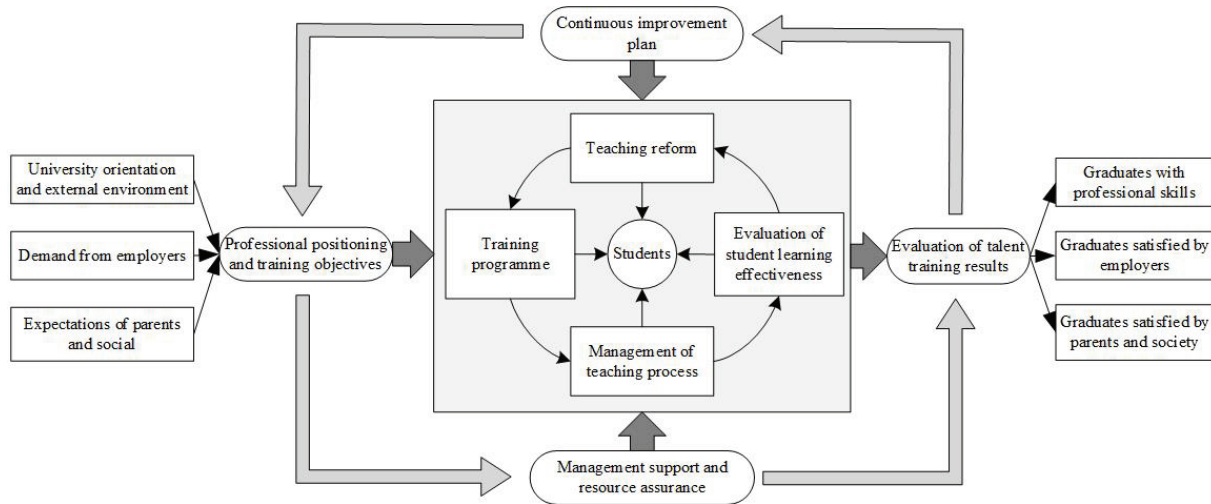


Figure 4.1 Architecture diagram of university teaching quality management system

4.1 Positioning of colleges and universities and the objectives of talent training

Colleges and universities need to clarify their own positioning, especially those with industrial characteristics, including their mission, vision and core values. At the same time, it is necessary to determine the goal of talent training according to the external environment (such as social needs, industry development trend, etc.) and internal conditions (such as teachers, teaching facilities, etc.), namely, that is, what professional skills and quality of talents they hope to cultivate. For majors with school characteristics or industry characteristics, it is necessary to go through sufficient market demand research, according to the demand analysis results, formulate talent training programs in line with the actual needs, including curriculum setting, teaching methods, practical links, etc.

4.2 Education and teaching needs

Colleges and universities through market research, student feedback, unit of choose and employ persons interview, identify and understand different stakeholders (such as students, parents, unit of choose and employ persons, society, etc.) of education teaching needs, including students demand for professional knowledge and skills, parents expectations of education quality, unit of choose and employ persons to graduate ability, etc. In order to cope with the rapidly changing social needs, colleges and universities should also conduct demand analysis and prediction regularly or irregularly, and modify and adjust the training program in time.

4.3 Process management

The quality of education and teaching process is the most direct factor affecting the quality of teaching. Colleges and universities need to ensure that every link of teaching activities meets the predetermined quality standards, including updating teaching content, innovating teaching methods, and rationally allocating teaching resources. To this end, PDCA cycle can be used to manage the teaching process, plan and monitor every link of teaching activities to ensure that the teaching quality meets the expected standards.

5. Implementation strategy and management recommendations

In order to ensure the effective implementation of the teaching quality management system, the following specific implementation strategies and management opinions are put forward according to the characteristics and needs of the industrial engineering major.

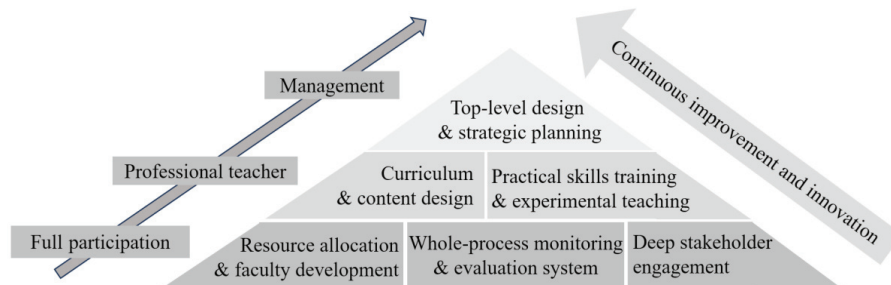


Figure 5.1 Implementation route of teaching quality management

5.1 Strengthen the top-level design and strategic planning.

The management of universities should take teaching quality management as a strategic focus and clarify the positioning and development goals of industrial engineering. By working with industry experts and enterprises to understand industry trends and needs, integrate this information into the teaching quality management system, ensure that teaching content and methods keep pace with industry standards, and provide students with education that meets market needs. At the same time, the leadership should regularly evaluate the operation of the system, solve the problems in the implementation in time, and provide a strong backing for the effective operation of the system.

5.2 Innovative curriculum and teaching content design

In order to adapt to the development of industry 4.0 and intelligent manufacturing, the courses of industrial engineering majors need to be constantly updated. Universities should introduce new technologies and tools, such as data analysis, artificial intelligence and machine learning, as well as automation and robotics. At the same time, the curriculum should focus on the integration of interdisciplinary knowledge to cultivate students innovative thinking and the ability to solve complex engineering problems.

5.3 Deepen practical skills training and experimental teaching.

Industrial engineering graduates are usually engaged in key positions such as the design, planning, implementation, monitoring, regulation, optimization of production processes and systems, as well as product quality management and production cost control. They should have skills such as improving labor productivity, ensuring quality and reducing costs. Practical skills training in enterprises is in line with the basic requirements of industrial engineering professional personnel training. Therefore, colleges and universities should cooperate with enterprises to provide students with internship opportunities to learn and apply theoretical knowledge in a real working environment.

6. Conclusion

In this paper, in industrial engineering, for example, analyzes the importance of university teaching quality management research and weak link, based on ISO 9000 standard, puts forward the seven basic principles of teaching quality management, build the teaching quality management system architecture, and put forward the seven aspects of targeted Suggestions, to ensure the effective implementation of the teaching quality management system. In conclusion, this paper provides a comprehensive framework and implementation strategy for the teaching quality management of universities with industry characteristics, especially for industrial engineering majors. Through the construction and implementation of the system, colleges and universities will effectively improve the quality of teaching, better meet the needs of students, employers and the society, and provide valuable reference and reference for other majors or universities. In the future, continuous evaluation and improvement will be the key to ensure that the teaching quality management system adapts to educational development and market demand.

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