

Research on the Construction Path of Quality Management System for Physical Education Teaching in Colleges and Universities Based on TQM Concept

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Abstract: *In order to solve the practical difficulties in the quality management of physical education teaching in universities in the new era, improve the comprehensive quality and efficiency of sports education, and explore suitable quality management models and implementation paths. This study adopts literature research method, empirical research method, and system construction method for research. Research has found that the TQM concept is highly compatible with the quality management of physical education teaching in universities. Currently, there are core problems in the quality management of physical education teaching in universities, such as fragmented management systems, single evaluation mechanisms, and weak guarantee systems. The root causes are the lack of conceptual cognition, mismatched organizational structures, and lack of improvement mechanisms; A TQM oriented university physical education teaching quality management system with four layers and three dimensions has been developed, and six core components have been identified. The construction of a quality management system and implementation path for physical education teaching in universities based on the TQM concept can provide theoretical references and practical paradigms for optimizing the quality control of physical education teaching and achieving high-quality development of physical education teaching in universities. It has important value in strengthening the educational function of physical education in universities.*

Keywords: *TQM concept; College physical education teaching; Sports*

1. Introduction

The promotion of the integration strategy of sports and education in the new era and the implementation of the "quality revolution" in higher education have put forward new requirements for the transformation and upgrading of physical education teaching in universities. College physical education teaching is a key part of the talent cultivation system, which not only undertakes the basic tasks of enhancing students' physical fitness and imparting sports skills, but also shoulders the mission of cultivating lifelong sports awareness and shaping a sound personality. Its teaching quality directly affects the comprehensive effectiveness of talent cultivation.

However, there are many bottlenecks in the current quality management of physical education teaching in universities: some universities have outdated management concepts, a single quality management subject, and insufficient participation of students and teaching assistants; The management process is fragmented and has not formed a closed loop for the entire teaching process; The evaluation mechanism emphasizes results over processes, skills over literacy, and lacks a normalized quality improvement mechanism, which hinders the full play of the educational function of physical education teaching.

The TQM concept originated from enterprise management, with a focus on serving the target audience, emphasizing full participation, full process control, full element coverage, and continuous optimization. Since its introduction to the education field in the 1980s, it has achieved significant results. Its "student-centered" orientation, closed-loop control process and other characteristics can accurately solve the core problems of physical education teaching quality management in universities, integrate it into and build a scientific management system, and become an inevitable choice to improve teaching quality.

Existing related research mostly focuses on improving a single dimension or introducing other

management tools, and there is a lack of systematic research on the deep integration of TQM and university physical education teaching quality management, especially the lack of practical solutions for system construction [1]. This study will take TQM as a guide, sort out its adaptability, investigate existing problems, and then build a management system and explore implementation paths. It will not only enrich the relevant theoretical system, but also provide practical solutions for the quality transformation of physical education teaching in universities, and lay a solid foundation for the sports literacy of high-quality talents.

2. Related concepts and theoretical foundations

2.1 TQM concept and its core essence

The concept of Total Quality Management (TQM) was first proposed by American management scholar Fegenbaum in the 1960s. Its theoretical prototype can be traced back to Hart's statistical quality control theory and Deming's quality management cycle idea [2]. After decades of iteration and practice, it has become a mature management paradigm covering enterprises, public services, education, and other fields. From an academic perspective, the TQM concept is defined as a comprehensive management philosophy and methodology system that focuses on quality as the core and relies on the participation of all employees. By establishing a quality management loop that covers the entire process and all elements, it aims to meet the needs of service recipients and continuously improve organizational quality. Compared to traditional single link and single subject management models, TQM combines systematic, all employee, and dynamic characteristics. Its core essence can be summarized into four dimensions:

Firstly, the core orientation of service targets. This concept takes the needs and satisfaction of service recipients as the starting and ending points of management, emphasizing maximizing the value of service recipients as the ultimate goal. It requires organizations to clarify core demands through research, interviews, and other methods and transform them into management indicators to avoid formal management misconceptions.

Secondly, the management pattern involves full participation of all staff. It breaks through the limitations of traditional management functions and proposes that quality management is the shared responsibility of all stakeholders within the organization. It is necessary to clarify the management rights and responsibilities of decision-makers, executives, grassroots positions, and service recipients, rely on collaborative mechanisms and incentive systems, build a management community that is "everyone's responsibility", and realize the transformation of management mode from "few people pushing" to "all staff actively participating".

Thirdly, a closed-loop control process is implemented throughout the entire process. The TQM concept requires management to cover the entire process of "pre planning post improvement" and establish a PDCA closed-loop management system: the quality planning stage needs to develop standards based on organizational goals and service target needs; Strictly implement and promote standardization during the implementation phase; Evaluate effectiveness through multiple means during the inspection phase; During the processing phase, corrective actions are taken to address issues and provide feedback for subsequent planning, forming a cyclic and iterative control chain.

Fourthly, continuously improve and optimize the mechanism. This concept believes that quality improvement is a dynamic process, advocating for a normalized diagnostic and iterative mechanism to adapt to internal and external environmental changes. It requires organizations to establish a quality data monitoring and analysis system, identify shortcomings through regular reviews, benchmark management, and other methods, develop improvement plans, and achieve a spiral increase in management level.

2.2 Applicability of TQM concept to quality management of physical education teaching in universities

The quality management of physical education teaching in universities is a management activity that involves overall planning, process monitoring, and effect optimization of teaching plans, curriculum implementation, assessment and evaluation, resource allocation, and other aspects in order to achieve educational goals[3]. The core demand is to enhance the comprehensive effectiveness of education and promote the coordinated development of students' physical fitness, sports skills, and sports literacy. The TQM concept is highly compatible with this management activity in multiple dimensions, which is reflected in three aspects:

Firstly, goal oriented adaptation is deeply coupled with TQM's "service object as the core" orientation

and the "student-centered" educational goal of university physical education teaching. Both follow the logic of "service object needs first", with the former aiming to meet the needs of service objects and the latter fundamentally improving students' physical literacy; At the same time, the continuous improvement goal of TQM can adapt to the needs of the times in physical education teaching in universities, providing methodological support for strengthening the educational function and expanding the service scope of physical education teaching under the background of integration of sports and education.

Secondly, the scope of management adaptation, TQM's "full participation and full element coverage" category matches the diverse subject and multi link characteristics of university physical education teaching quality management. From the perspective of the subject, it can break down the management barriers of physical education teachers, management personnel, students, teaching assistants and other groups, and solve the problem of "single subject and disconnected responsibilities" in traditional management; From the perspective of elements, its full element control logic can coordinate core elements such as faculty, curriculum, venue, and evaluation, and avoid the constraints of a single weakness on overall quality through element linkage, achieving maximum management efficiency.

Finally, the logic adaptation of TQM's "whole process closed-loop control" is highly compatible with the process oriented characteristics of physical education teaching in universities. College physical education teaching covers the complete process of "planning - resource development - classroom implementation - assessment and evaluation - feedback optimization", with strong correlation between each link. The PDCA closed-loop of TQM can provide a standardized framework: the teaching plan stage is based on student needs, the course implementation stage is monitored and standardized, the assessment and evaluation stage uses multiple methods to verify effectiveness, and the feedback and rectification stage promotes iteration of optimization plans, effectively solving the problem of "process breakage and lagging rectification" in traditional management.

3. The current situation and problems of quality management in physical education teaching in universities

To accurately grasp the reality of the quality management of physical education teaching in universities, empirical research is conducted through standardized research design, systematically sorting out the basic forms of current management work, extracting existing core problems, and conducting in-depth analysis of the causes of problems based on the core dimensions of TQM concept, providing targeted practical basis for the construction of subsequent management systems.

3.1 Research on the current situation of quality management in physical education teaching in colleges and universities

To objectively present the actual situation of physical education teaching quality management in universities, this study adopts a multidimensional mixed research method and constructs a "quantitative+qualitative" research system. In the selection of research subjects, the principle of stratified sampling was followed. A total of 15 different types of universities (including comprehensive, science and engineering, and teacher education) from the eastern, central, and western regions were selected as research samples, covering both undergraduate and vocational education levels to ensure the representativeness and universality of the samples; The survey targets four groups: management personnel of university sports colleges, frontline sports teachers, students, and teaching support personnel. A total of 1200 questionnaires were distributed, and 1086 valid questionnaires were collected, with an effective response rate of 90.5%. At the same time, semi-structured in-depth interviews were conducted with 20 university sports teaching management leaders.

According to the research results, at the level of management entities, the quality management responsibilities of physical education teaching in most universities are mainly concentrated in the teaching office and academic affairs office of the sports college. Only 32.7% of universities have absorbed student representatives to participate in quality supervision, and the management participation of teaching assistants and venue equipment support personnel is less than 15%; At the management process level, 78.2% of universities have established basic teaching plan review and course assessment systems, but only 21.5% of universities have achieved closed-loop management from teaching plan formulation to feedback and rectification; At the level of evaluation system, 69.4% of universities still mainly rely on teacher self-evaluation and administrative assessment, with student evaluation weights generally below 30%. In addition, sports skills indicators account for more than 60% of the evaluation indicators, while sports literacy and comprehensive ability indicators account for less than 20%; In terms

of resource security, 45.8% of universities have a shortage of sports venues and equipment, especially for emerging sports projects with a facility allocation rate of only 28.3%. At the same time, 37.1% of sports teachers stated that they have not participated in systematic quality management training. Overall, the current quality management of physical education teaching in universities has a basic framework, but there are still significant shortcomings in terms of collaborative management, process integrity, scientific evaluation, and resource adaptability.

3.2 Core issues in quality management of physical education teaching in higher education institutions

Based on systematic analysis of research data, the current core issues in the quality management of physical education teaching in universities can be summarized into three dimensions:

Firstly, the management system is fragmented and has not formed a collaborative control pattern. On the one hand, the boundary between the rights and responsibilities of the management subject is blurred, and there are overlapping management functions and vacuum zones between the Academic Affairs Office, the School of Physical Education, and the logistics support department. For example, there is a lack of connection mechanism between venue and equipment maintenance and teaching needs, resulting in 38.2% of courses having problems with untimely equipment supply; On the other hand, the management process is broken, the quality planning before teaching lacks student demand research, the process monitoring during teaching relies on random lectures, and there is a lack of tracking mechanism for feedback and rectification after teaching. Only 18.7% of universities have established a quality problem rectification ledger, making it difficult to form a closed-loop control.

Secondly, the evaluation mechanism is becoming monotonous, and the dimensions of quality measurement are imbalanced. In terms of evaluation subjects, there is a characteristic of "administrative leadership and student absence", and students' teaching experience and learning effectiveness feedback have not been fully valued; In terms of evaluation indicators, there is a tendency to prioritize skills over literacy, and there is a lack of measurement indicators for students' lifelong sports awareness, teamwork ability, and other educational outcomes; In terms of feedback application, 67.3% of universities stated that the evaluation results are only used for teacher performance assessment and have not been specifically transformed into teaching improvement plans. The guidance and optimization functions of the evaluation have not been effectively utilized.

Thirdly, the guarantee system is weakened and the supporting capacity is not well adapted. In terms of teacher guarantee, the coverage of quality management training for physical education teachers is low, with only 22.6% of teachers having systematically studied advanced quality management concepts; In terms of resource guarantee, there is a structural contradiction between traditional project facilities and emerging project demands, and 32.4% of universities have insufficient special funds for the quality management of physical education teaching; In terms of technical support, only 19.8% of universities have established information quality management platforms, and most universities still rely on manual statistics, making it difficult to ensure the timeliness and accuracy of data.

3.3 Analysis of problem causes based on TQM perspective

It is starting from the core essence of TQM concept, the causes of quality management problems in physical education teaching in universities can be summarized into three aspects:

Firstly, there is a lack of understanding of the TQM concept and a weak quality awareness among all employees. Most universities still equate the quality management of physical education teaching with "course assessment and disciplinary supervision", without understanding the core connotation of "full participation and full process control" in the TQM concept, resulting in ineffective activation of the quality responsibility awareness of management personnel, teachers, students and other subjects, forming a passive pattern of "few people managing, most people observing".

Secondly, there is insufficient adaptability between organizational structure and system. Universities have not established quality management organizations that are adapted to the TQM concept, and lack specialized quality control committees to coordinate the work of various departments; At the same time, there is no incentive and constraint system that matches the overall quality management, and the main participants in quality management lack effective incentives. The implementation of responsibilities lacks rigid constraints, making it difficult to form an endogenous driving force for collaborative management.

The third issue is the lack of a continuous improvement mechanism and weak ability to iterate on

quality. The TQM concept emphasizes the dynamic optimization of quality, but the quality management of physical education teaching in most universities presents a "phased, sports style" characteristic, lacking a normalized quality diagnosis and improvement mechanism. It has not established a long-term quality data monitoring system, nor introduced commonly used TQM tools such as benchmark management and gap analysis, which makes it difficult to achieve a spiral improvement in management level and cannot meet the continuous requirements of high-quality development of higher education.

4. Construction of quality management system for physical education teaching in colleges and universities based on TQM concept

Based on the systematic and closed-loop characteristics of TQM concept, the university physical education teaching quality management system constructed in this study adopts a "four layer three-dimensional" pyramid structure, with four layers as the vertical hierarchy of the system and three dimensions as the horizontal management dimension of each level, forming an integrated management pattern of "goal guidance subject collaboration process control guarantee support" as a whole, ensuring the scientificity and operability of the system.

From a vertical perspective, the first layer is the goal oriented layer, which is the top-level design and core guidance of the entire system. Its core is to anchor the overall goal of "comprehensively improving students' physical literacy as the core, while taking into account the continuous optimization of teaching quality and the full play of educational functions". Based on the dynamic requirements of TQM concept, it is decomposed into three levels of short-term, medium-term, and long-term sub goals. Among them, the short-term goal focuses on solving explicit problems such as broken management processes and a single evaluation mechanism, the medium-term goal focuses on building a quality management community with full participation of all staff, and the long-term goal is to achieve a deep adaptation between physical education teaching quality and talent cultivation needs. The second layer is the main collaborative layer, which is the organizational foundation for the operation of the system. Based on the essence of TQM's "full participation", this layer clarifies the rights and responsibilities boundaries of the decision-making layer (school teaching quality management committee, sports college party and government team), the execution layer (sports college teaching office, academic affairs office, frontline sports teachers), the supervision layer (student representatives, teaching assistants, external sports education experts), and the feedback layer (students, employers), and builds an organizational structure for multi-party collaborative management, breaking down the main barriers of traditional management. The third layer is the process control layer, which is the core carrier of the system operation. Based on the PDCA closed-loop management of TQM, a full process control chain of "teaching quality planning - teaching quality implementation - teaching quality monitoring - teaching quality improvement" is designed to ensure seamless connection and formation of a closed loop in all aspects of teaching management. The fourth layer is the guarantee and support layer, which is the fundamental guarantee for the stable operation of the system, covering three dimensions: institutional guarantee, resource guarantee, and technical guarantee, providing necessary conditions for the efficient operation of various levels of the system.

From a horizontal perspective, the TQM core dimension of "student centeredness, full participation, and continuous improvement" runs through all levels. The student centeredness dimension requires that management activities at all levels are fundamentally guided by students' physical education learning needs and literacy enhancement; The dimension of full participation clarifies the specific responsibilities of each subject at different levels, forming a collaborative management network; The dimension of continuous improvement establishes a normalized optimization mechanism to ensure that the system dynamically iterates with changes in teaching needs and external environment.

5. Conclusion

This study is based on the demand for high-quality development of physical education teaching in universities in the new era, focusing on the practical obstacles such as fragmented quality management system, single evaluation, and weak guarantee in the field of quality management. The concept of Total Quality Management (TQM) is introduced, and the adaptability analysis of management theory, current situation investigation and diagnosis, system architecture construction, and implementation path deduction are carried out. The systematic construction of the quality management system of physical education teaching in universities under the guidance of TQM is completed, providing theoretical reference and practical paradigm for universities to solve the problems of quality management in physical

education teaching and improve the quality and efficiency of physical education. The core research conclusions are as follows:

Firstly, the TQM concept is highly compatible with the quality management of physical education teaching in universities. The core essence of the concept of "student centeredness, full participation, full process control, and continuous improvement" is deeply coupled with the inherent needs of "literacy as the core, collaborative management, closed-loop control, and dynamic quality improvement" in university physical education teaching. It can accurately solve the problems of formal guidance, subject barriers, process fractures, and weak iteration in traditional management, and provide scientific theoretical guidance and methodological support for its quality management.

Secondly, there are multidimensional shortcomings in the quality management of physical education teaching in universities. Empirical research shows that there are three core problems in its management practice: unclear rights and responsibilities of the main body at the management system level, lack of departmental collaboration, and failure to form an integrated control pattern; At the level of evaluation mechanism, there is an imbalance trend of "emphasizing skills over literacy, emphasizing results over process", and the channel for transforming evaluation results into teaching improvement is not smooth; At the level of the guarantee system, there is insufficient teacher management capability, structural shortage of venue and equipment, and weak information support, making it difficult to match the demand for high-quality management. From the perspective of TQM, such problems stem from a lack of conceptual understanding, organizational structure mismatch, and a lack of continuous improvement mechanisms.

Thirdly, a scientific and systematic TQM oriented quality management system has been established. Based on the core requirements of TQM, a "four layer three-dimensional" system architecture is built, which vertically covers four layers of goal orientation, subject collaboration, process control, and support, and horizontally runs through the three core dimensions of TQM; Six core components are established simultaneously to form a comprehensive management framework, providing a standardized paradigm for the quality management of physical education teaching in universities.

Fourthly, a feasible system implementation path has been formed. This research designs a systematic implementation path from six dimensions and constructs an implementation loop of "ideological guidance – organizational support – institutional constraints – process assurance – technological empowerment – iterative driving" to ensure the efficient translation of theoretical systems into practical effectiveness.

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