APPLICATION OF TOTAL QUALITY MANAGEMENT IN STUDENT MANAGEMENT OF CHINESE HIGHER VOCATIONAL COLLEGES: LITERATURE REVIEW

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ABSTRACT

Total Quality Management (TQM), recognized as a pivotal strategy for enhancing higher education quality (Fethia Yahiaoui & Khalil Chergui, 2022), has been progressively adopted in educational contexts since its emergence in the United States during the mid-1980s. While widely implemented in developed countries 'higher education institutions, TQM's application in developing nations remains underexplored (Md Mashiur Rahman & Salma Nasrin, 2024), particularly regarding student management practices in China's Higher Vocational Colleges (HVCs). Existing research predominantly focuses on undergraduate institutions or teaching quality management, with limited studies addressing TQM implementation pathways and evaluation systems in vocational education. This paper systematically examines TQM's conceptual framework, theoretical evolution, core dimensions, and international and Chinese research advancements. It identifies four operational dimensions—academic guidance, disciplinary management, career services and employability, and student life/extracurricular activities—for developing evaluation metrics. The study further analyzes how contextual factors including policy frameworks, cultural norms, resource availability, and data infrastructure influence implementation effectiveness. Based on these findings, practical recommendations are proposed for institutional development, capacity building, technological support, and cultural shaping. The paper also addresses current research gaps and outlines future directions. Ultimately, this research provides theoretical and practical references for advancing TQM implementation in student management at China's vocational colleges.

Keywords: Higher Vocational Colleges, Total Quality Management, Student Management.

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INTRODUCTION

China has established the world's largest higher education system. As of 2022, there were 3,013 higher education institutions nationwide, including 1,547 vocational colleges, with 17.0785 million students enrolled−accounting for 35.8% of all higher education students (Ministry of Education, 2023). With China's vocational education reform entering a phase focused on quality enhancement and diversified educational development, student management practices in vocational colleges are undergoing significant transformations. The approach has evolved from traditional "order maintenance and administrative tasks" to a comprehensive governance model emphasizing "learning support, developmental orientation, and quality improvement" (Ling et al., 2023). This shift stems not only from the historical challenges of vocational education's long-standing low status but also from the evolving demand for well-rounded talents with comprehensive personality traits (cognitive, emotional, and volitional) under industrial restructuring. Recent studies highlight that "student affairs management in vocational colleges is transitioning from simple indoctrination to an integrated model combining instruction, management, and service" (Wang et al., 2025). In this context, the Total Quality Management (TQM) philosophy aligns closely with modern student affairs governance objectives through its core principles of customer (student) focus, continuous improvement, full participation, data-driven approaches, process management, and leadership commitment. On one hand, TQM's "student-oriented" approach responds to the personalized support demands proposed by Ling et al. (2023) in their "Personalized Education Model." On the other hand, its "process standardization" and "data-driven decision-making" principles provide systematic tools to address institutional issues like departmental fragmentation and redundant management, offering a comprehensive theoretical framework and practical pathway for enhancing student management quality in vocational colleges. However, over the past three decades, research on TQM applications in higher education has primarily focused on obstacles, customer satisfaction, and accreditation (Teeroovengadum et al., 2021). Existing studies in China's vocational college context still face challenges such as fragmented evidence (e.g., lack of empirical integration between "personalized education" and TQM), insufficient comparative analysis (fewer studies examining the compatibility of international experiences with China's "school-enterprise collaboration" characteristics), and unclear implementation pathways (how to integrate the PDCA cycle with "big data efficiency evaluation"). To address these gaps, this paper systematically examines the current application status of TQM in student management at vocational colleges from theoretical, empirical, and practical perspectives.

RELATED CONCEPTS AND THEORIES

The concept and theoretical evolution of TQM

Total Quality Management (TQM) is a customer-centric approach that engages all employees to achieve long-term success through improved customer satisfaction. Originating from 20th-century manufacturing quality management practices like the Toyota Production System, its core theories are rooted in Deming's PDCA cycle (1986) and Juran's "Quality Spiral" theory (1992).

In the transition from manufacturing to higher education, Total Quality Management (TQM) underwent critical adaptability adjustments. For instance, the shift from standardized production in manufacturing to personalized cultivation in education, and the focus on product qualification rates transitioning to learning achievement standards. This

transformation proves more complex in vocational education, as this specialized educational model must simultaneously meet pedagogical principles and industrial demands. Consequently, TQM's customer-centric principle needs to be expanded into a dual orientation focused on both student development and corporate needs (Ling et al., 2023). As a conceptual framework, educational institutions can only achieve TQM through long-term planning and institutional design (Sallis, 2014).

International research indicates that the TQM model in higher education has evolved from early tool-oriented approaches (such as ISO9000 certification) into a comprehensive system encompassing organizational culture, leadership, and data governance (Teeroovengadum et al., 2021). In China's vocational college context, scholars emphasize the need for deep integration of TQM with industry-education collaboration. For instance, embedding educational standards and industry benchmarks into each phase of the PDCA cycle through corporate participation in quality standard development (Wang et al., 2025). This dual-standard integration approach effectively addresses the traditional disconnect in student management—prioritizing theory over practice and focusing on campus resources while neglecting external opportunities.

Core dimensions of TQM in student management

Based on existing literature research, the application of Total Quality Management (TQM) in higher education requires systematic integration of key elements such as barriers, customers, and certification (Jasti et al., 2022). To adapt to student management practices in vocational colleges, this paper categorizes TQM applications in student management into four main dimensions, covering eight core elements: (Table 1)

Table 1: Core dimensions of TQM and their evaluation indicators in student management

Dimensional Categories	Core Elements	Key EvaluationIndicators	Data Sources
Student oriented	student centered	Student satisfaction, response time of help, coverage of personalized support.	Teeroovengadum et al. (2021).
	Stakeholder engagement	External feedback acceptance rate, number of joint projects, participation rate of satisfaction survey.	Jasti et al. (2022).
Process management category	Process standardization	Process execution time, interrupt point control, cross-department handover error rate.	Deming (1986). Out of the Crisis, MIT Press.
	continuous improvement	Improve project completion rate, review quality score and problem recurrence rate.	GB/T 36077-2018 Six Sigma Management Evaluation Criteria
Data-driven classes	Data-driven decision making	Data integrity, early warning accuracy and intervention success rate.	Mehrabi et al. (2021). AI Ethics, 1(2), 123-135.

	All staff participate in collaboration	Collaborative event handling rate and interdepartmental collaboration satisfaction.	Ministry of Education (2023). Annual Report on the Quality of Vocational Education.
Organizational support	Leadership commitment	Frequency of quality meetings, achievement of quality objectives and proportion of resource input.	Ministry of Education (2023). Annual Report on the Quality of Vocational Education.
	Culture of quality	Cultural identity survey, number of proactive improvement proposals, and rate of decrease of violations.	ISO 29993:2017 International Standard for Vocational Education

Table 1 categorizes the application of Total Quality Management (TQM) in student administration at vocational colleges into four dimensions. First, the student-oriented approach emphasizes a student-centered philosophy and stakeholder engagement. This means student affairs management should not only focus on student satisfaction and personalized support but also actively incorporate external feedback from enterprises, parents, and society to achieve diversified collaboration in educational services. Second, process management highlights standardization and continuous improvement. By establishing clear procedural standards, reducing cross-departmental coordination errors, and strengthening PDCA cycles with Six Sigma improvement mechanisms, vocational colleges can standardize and sustain long-term student management practices while enhancing administrative efficiency. Third, data-driven approaches emphasize evidence-based decision-making and full participation. In the digital era, vocational colleges increasingly rely on data integrity, predictive systems, and early warning mechanisms to support scientific decision-making. Simultaneously, collaborative frameworks involving all staff members enhance interdepartmental coordination, forming a data-driven organizational synergy. Finally, organizational support encompasses leadership commitment and quality culture. Leadership endorsement and resource allocation form the foundation for TQM implementation, while cultivating a quality culture serves as the intrinsic driving force for sustained improvement. Together, these elements ensure the sustainability and depth of TQM in institutional student governance.

On the whole, Table 1 covers both student needs orientation, process and tools and methods, as well as organizational culture and leadership, forming a relatively complete quality management ecosystem.

International comparative studies

From a global perspective, the effectiveness of educational TQM is closely related to institutional completeness, data foundation, training system and cultural fit. Successful practices are often accompanied by information system integration, teacher development programs and indicator systems focused on learning outcomes (Sallis, 2014).

2.3.1 Global research status

Globally, the application of Total Quality Management (TQM) in higher education has evolved from early quality certification initiatives (such as the adoption of ISO9000 systems) to systematic development of a quality ecosystem. International research indicates that the effectiveness of TQM in education heavily depends on key elements including institutional completeness, data foundations, training systems, and cultural alignment.

Table 2: Core dimensions of TQM and their evaluation indicators in student management

Dimension	America	Germany	China
Policy support	State government funding	Dual system legislative guarantee	Double High Plan
Focus on implementation	Learning Outcomes Assessment	Business engagement	School-enterprise standardcoordination
Data infrastructure	State-level data ware house	Industry database sharing	The isolation of colleges and universities
Cultural barriers	Teacher attrition rate	Enterprise cost concerns	Formalism tendency

Table 2 examines the characteristics of TQM implementation in vocational education student management across three countries from an international comparative perspective: the United States, Germany, and China. In terms of policy support, the U.S. relies on state funding, Germany depends on dual-system legislation, while China leverages the "Double High Plan" initiative. This indicates that TQM development in each country is closely tied to national/regional educational policies, though with varying degrees of intensity and approaches. Regarding implementation focus, the U.S. emphasizes learning outcome assessment (SLO), Germany prioritizes deep industry engagement, and China highlights school-enterprise standard coordination. These differences reflect distinct implementation patterns of TQM due to variations in educational models. In data infrastructure, the U.S. typically builds state-level data warehouses, Germany utilizes industry database sharing, whereas China's isolated institutional information systems reveal gaps in educational quality data governance. Cultural barriers include American teachers' resistance to standardization, German corporate cost concerns, and Chinese formalism tendencies. These cultural differences highlight implementation challenges and suggest the need for stronger institutional-cultural alignment.

Table 2 shows that although there are commonalities in the practice of TQM in different countries, there are obvious differences in policy path, implementation focus and cultural resistance. For China, the biggest challenge lies in how to break through information islands, overcome formalism, and find a suitable path in school-enterprise collaboration.

Localization innovation characteristics

The integration of "San Quan Yu Ren" (Three-Aspect Education) into quality management combines the TQM philosophy with China's distinctive "San Quan Yu Ren" system, establishing a comprehensive quality responsibility chain involving all staff. By implementing measures such as appointing student quality liaisons and creating teacher-student dialogue mechanisms, this approach achieves full-process coverage in quality management (Ministry of Education, 2017).

Quality Collaboration in Industrial College-Driven Models: Leveraging industrial college development, we explore innovative quality management frameworks that deeply integrate schools and enterprises. Through comprehensive participation of businesses in program design, curriculum development, and student evaluation processes, a governance

model characterized by "co-construction, co-management, co-cultivation, and shared benefits" has been established. (Gao Jiang, 2022)

VOCATIONAL ADAPTABILITY ANALYSIS

Dual-drive model:

Education-industry standard collaboration: Taking Shenzhen Polytechnic's "Internship Quality Certification Platform" as an example (Shenzhen Polytechnic Digital Transformation White Paper, 2023, p.28), this case demonstrates how blockchain technology enables real-time comparison between educational standards (credit requirements) and industry standards (job competencies) (cited from Wang et al., 2025).

Data-based expression of personality education: The three-dimensional personality traits of cognition, emotion and will proposed by Ling et al. (2023) are transformed into quantifiable TQM indicators (such as the scoring weight of "professional resilience" by enterprise mentors).

Culture-technology synergy

1) Creative transformation of Confucian educational view:

"Education without class" and full participation: through the "three full education" quality information officer system, the traditional view of teacher ethics is integrated into TQM culture.

"Unity of knowledge and action" and process control: Introducing "daily quality micro-log" into internship management, combined with enterprise KPI and student development indicators.

1) Low-cost digital solutions:

Lightweight tools based on the WeChat ecosystem: Build a student behavior database (replace commercial BI system) by using "Tencent Documents + Questionnaire Star", and realize: disciplinary warning (keyword capture of chat records), internship process tracking (GPS check-in + photo watermark)

DISPUTES AND PROSPECTS

Theoretical conflict

Table 3: International practice differences

Country /Area	Implementation strategy	Success Factors	Key Challenges	Applicability Analysis	Data Sources
United States of America	Adopt a student-centered management model, such as the quality management reform of Texas Community College.	Emphasize data-driven decision making and implement the PDCA cycle to optimize student management process.	This requires a large amount of financial support, and the training costs for teachers and administrators are also high.	It is suitable for colleges and universities with abundant financial resources and good information technology foundation	[NCES (2023). State Education Reforms]

Britain	Based on ISO 9001 quality management standard, total quality management is included in the quality evaluation system of higher education.	Through process standardization, emphasis on system management, improve management efficiency.	Excessive standardization may reduce the flexibility of management and make it difficult to meet the individual needs of students.	Suitable for high-end manufacturing related majors	[BMBF (2021). Vocational Education Act]
China	Some higher vocational colleges (such as Shenzhen Vocational and Technical College) have introduced total quality management in student management to strengthen school-enterprise cooperation and practical teaching.	Based on the characteristics of vocational education, strengthen cooperation with enterprises and improve the employment-oriented management mode.	There are differences in the understanding of total quality management in higher vocational colleges, and there are deviations in the implementation process.	Suitable for key construction institutions of " Double High Plan"	[Ministry of Education (2023). Quality Annual Report]
India	Adopt total quality management method, strengthen teaching quality management, pay attention to teacher training and student feedback mechanism.	Improve student and teacher satisfaction by optimizing management processes through regular evaluation and feedback.	Teachers have limited training resources and low acceptance of total quality management.	Suitable for private vocational education institutions	[World Bank (2023). India Report]
Malaysia	Drawing on the Baldrige framework for excellence, it combines TQM with the national education transformation plan and emphasizes results orientation.	State funding for the education transformation plan	Institutions have little autonomy	Suitable for colleges and universities with strong policy execution	Malaysian Education Quality Report (2023)

South Africa	The community participation model is adopted in technical and vocational education to promote TQM, and the influence of local industrial needs on student management is emphasized	Match between local industrial demand and supply	Data acquisition infrastructure is backward	Suitable for regional characteristic majors	World Bank (2022) Vocational Education Assessment

Based on the comparative analysis of the above international practices, Chinese higher vocational colleges face the following localization conflicts when introducing Total Quality Management (TQM):

1) The contradiction between standardization and personalization: International experience (such as the United Kingdom and the United States) shows that the success of TQM depends on systematic and standardized management processes, but excessive standardization may weaken the flexibility of vocational education and make it difficult to adapt to the diversified student needs of Chinese higher vocational colleges (such as differences in different majors, regions and school-enterprise cooperation modes).

2) Local conflicts: China's higher vocational colleges need to find a balance between the standardized quality system required by the "Double High Plan" and the characteristic development of vocational colleges (such as regional industry adaptation, customized training of school-enterprise cooperation).

3) The conflict between policy drive and institutional autonomy: The practice of Malaysia, South Africa and other countries shows that national policy support is the key to the implementation of TQM, but the lack of institutional autonomy may limit innovation.

4) The challenge of resource investment and sustainability: The cases of the United States, India and other countries show that TQM requires continuous financial and training resources, while some vocational colleges in China may face similar problems as South Africa in data collection infrastructure.

5) Cultural compatibility conflict: International experience emphasizes cultural fit, while the administrative culture of Chinese higher vocational colleges may conflict with the concept of TQM's full participation.

The localization of TQM in Chinese higher vocational colleges should focus on "dynamic balance" —— to seek a suitable path between policy norms and institutional characteristics, standardized processes and personalized needs, resource input and long-term mechanism, and reduce the risk of conflict through phased pilot and localized transformation.

FUTURE DIRECTION

Based on the progress of domestic and foreign research and the characteristics of higher vocational education, the application of TQM in student management will present the following trends:

1) Intelligent quality management

The future of data-driven decision-making upgrades will increasingly rely on technologies like big data and artificial intelligence to achieve intelligent quality management. By establishing student behavior databases and learning analytics models, early warnings for quality issues can be generated and precise interventions implemented. It is

projected that by 2025, over 80% of exemplary vocational colleges will have established intelligent quality management platforms.

Personalized service customization Provide differentiated quality management services based on students 'individual differences. Through the analysis of students' learning behaviors, interests and preferences, abilities and strengths, personalized training programs and quality standards are formulated.

2) Systematic integration and deepening

Cross-departmental Collaborative Mechanism Future research should transcend single-dimensional limitations and explore the synergistic mechanisms among TQM elements. It is recommended to establish a dual-responsibility system involving both schools and enterprises: Schools should appoint Chief Quality Officers (CQOs), while companies should assign industry quality experts to jointly lead the development and evaluation of student management quality standards.

Multi-dimensional evaluation and integration integrate academic evaluation, skill evaluation, quality evaluation, enterprise evaluation and other dimensions to establish a three-dimensional quality evaluation system. Through the dynamic weight adjustment mechanism, it can adapt to the evaluation needs of students in different majors and at different development stages.

3) Deepening localization adaptation

Innovative Integration of Cultures: Integrate China's outstanding cultural elements such as the artisan spirit and model worker ethos into quality culture cultivation. Launch the "Corporate Quality Culture on Campus" initiative, using case studies to convey the "zero-defect" philosophy (localized application of Crosby Theory). Establish a quality culture inheritance mechanism to foster students' quality awareness and sense of responsibility.

Policy coordination and alignment should effectively integrate TQM implementation with national initiatives such as the "Double High Plan" and the Quality Enhancement Initiative. It is recommended to incorporate key indicators including "number of school-enterprise collaborative quality improvement projects" and "student satisfaction rates" into institutional performance evaluation systems, thereby establishing policy-driven momentum for quality enhancement.

Resource Constraint Response: To address the reality of weak digital infrastructure in some higher vocational colleges, this study explores low-cost TQM implementation approaches. For instance, open-source learning analytics tools (such as Moodle Analytics) can be utilized to replace commercial platforms, and a quality database co-built by teachers and students can reduce system construction costs.

Research gaps and Contributions of this paper

The existing research has three shortcomings:

1) Dispersed empirical evidence: There is a lack of systematic empirical evidence on key issues such as the integration of personified education and TQM, and the implementation of digital transformation and TQM, which are mostly single-point cases;

2) Weak international comparison: insufficient analysis on the compatibility between international experience of school-enterprise cooperation (such as TQM practice in Germany's dual system) and China's vocational education system;

3) Lagging evaluation system: TQM evaluation indicators that take into account educational laws and industrial demands have not yet been established, such as the quantitative method of personality traits-job matching needs to be broken through (Ling et al., 2023).

The innovation points of this article include two aspects：

Theoretical innovation：Based on the systematic review of TQM theory and practice at home and abroad, combined with the particularity of vocational students management, this paper constructs a "four-dimensional TQM model of vocational students management",

including: Quality planning dimension: based on the dual orientation of students' development needs and industry talent standards；Quality control dimension: including process monitoring, key node control and risk early warning mechanism；Quality improvement dimension: emphasizes data-driven continuous improvement and innovative development；Quality assurance dimension: establish internal and external quality assurance mechanism and multi-party participation evaluation system.

Practice innovation：Based on the PDCA cycle theory, the "Dual quality improvement process" (Education standards and industry standards run in parallel) was designed, and a supporting evaluation index system was developed. The process includes: Plan stage（The university and the enterprise jointly formulate quality objectives and improvement plans）；
Do phase (Implement quality management practices with dual standards in parallel); Check stage (Use multidimensional evaluation tools to evaluate quality); Action phase (quality improvement and standard optimization based on evaluation results).

Through the theoretical construction and empirical analysis, this paper aims to fill the gap of existing research, provide theoretical guidance and practical path for the implementation of TQM in higher vocational colleges, and promote the scientific, standardized and modern development of quality management in higher vocational education.

CONCLUSIONS

This study demonstrates that Total Quality Management (TQM) provides a systematic framework for high-quality development in student management at vocational colleges. Its effectiveness depends on the synergy between educational and industrial dual drivers, as well as the localized adaptation of cultural and technological collaboration. The constructed "four-dimensional model" and "dual-quality improvement process" hold innovative value in vocational college practices, guiding the setting of quality objectives, process control, and continuous improvement. Future research should focus on intelligent quality management, dynamic evaluation system design, and cost-effective implementation pathways to advance the modernization of quality management in vocational education.

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