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Application of Total Quality Management on Higher Education Teaching Quality: A Systematic Review Based on PRISMA, and Research Implications (2015–2025)

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Abstract. With the increasing emphasis on quality assurance and continuous improvement in higher education, total quality management (TQM) is being widely applied to enhance teaching quality. However, research into the core practices, effects and implementation challenges of TQM remains fragmented. This study conducted a systematic literature review according to the PRISMA framework. A systematic search of Scopus and Web of Science identified 1 058 records, from which 14 eligible studies published between 2015 and 2025 were selected. The included studies were analysed using thematic and inductive analysis. The findings indicate that key TQM dimensions include leadership support, teaching process management, quality measurement and evaluation, continuous improvement, faculty development and stakeholder orientation. TQM generally contributes to improved teaching quality, faculty performance, organisational effectiveness and stakeholder satisfaction. However, implementation is constrained by insufficient leadership support, limited teacher participation, weak quality culture and inconsistent evaluation practices. Overall, TQM can enhance higher education teaching quality when it is systematically integrated with institutional leadership, teaching processes, faculty development and continuous improvement mechanisms. The findings provide practical implications for educators, university administrators and policymakers.

Keywords: total quality management; higher education; teaching quality; PRISMA; systematic review

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1. Introduction

Against the backdrop of the continuous expansion of the global higher education system and increasingly fierce international competition, teaching quality has become one of the key indicators for measuring the development level and core competitiveness of universities. While they promote large-scale development, universities in various countries are facing greater demands from their governments, society and stakeholders to achieve continuous improvement in education quality (Harvey & Green, 1993).

In the context of digital transformation and the superposition of diverse education needs, achieving continuous improvement in teaching quality through systematic and scientific management methods has become an important issue in higher education research and practice (Yusuf, 2023). Total quality management (TQM), a management concept that emphasises whole-process control, full participation and continuous improvement, has, since its introduction in the field of higher education at the end of the 20th century, been widely regarded as an important path to improve the teaching quality and governance effectiveness of universities (Sallis, 2014).

1.1 Research Background

In recent years, quality assurance and continuous improvement have gradually become important issues in higher education reform. Governments and educational institutions worldwide have strengthened the supervision and improvement of teaching quality by establishing accreditation systems, quality assessment mechanisms and performance evaluation systems (Seyfried & Pohlenz, 2018). However, traditional quality management methods are mostly results-oriented, they lack systematic control and fail to continuously optimise the teaching process, which, to an extent, limits the depth and sustainability of teaching quality improvement (Biggs, 1999; Yusuf, 2023).

Against this backdrop, TQM, as a management philosophy that emphasises systematic, process-wide control and continuous improvement, has gradually been introduced in the field of higher education. TQM was first applied in manufacturing, where it achieved comprehensive improvement in product and service quality by emphasising customer orientation, total participation and continuous improvement (Deming, 2018). As education management concepts have changed, scholars have started to apply TQM to university governance and teaching management, in the belief it could provide a systematic solution for improving the quality of higher education (Sallis, 2014).

In recent years, with the rise of the digital transformation of education and the Quality 4.0 concept, the application of TQM in higher education has evolved. TQM in higher education has gradually expanded from its predominantly administrative focus on quality control to a more comprehensive approach that integrates continuous improvement, stakeholder involvement and organisational performance, including data-driven optimisation of micro-level teaching processes and collaborative governance involving multiple stakeholders (students, teachers, employers and society) (Kayyali, 2024).

TQM is widely regarded as an important tool for improving education quality, especially in developing countries and emerging higher education systems. Related research shows that, by introducing TQM concepts, universities can optimise curriculum design, teaching implementation, quality assessment and resource allocation, thereby improving overall teaching quality and organisational performance (Asif et al., 2013). Recent empirical studies and meta-analyses indicate that, by systematically implementing the core elements of TQM, universities can improve their internal quality assurance effectiveness and significantly improve students' learning experiences and academic satisfaction (Rosidin, 2025; Yusuf, 2023).

1.2 Theoretical Framework

From a theoretical perspective, the application of TQM in higher education is mainly reflected in the holistic and process-oriented management of the education system. TQM emphasises total process control, a concept that aligns closely with the structure of educational and teaching activities. The formation of teaching quality is not the result of a single link, but rather the result of the synergistic effect of multiple links, such as curriculum design, teaching implementation, learning process and evaluation feedback (Biggs, 1999). Furthermore, the continuous improvement concept in TQM is highly consistent with outcome-based education, which emphasises learning outcomes and optimises teaching through continuous feedback and adjustments. TQM ensures the effective implementation of this process through systematic management tools and process improvement mechanisms (Spady, 1994).

TQM theory emphasises the synergistic effect of 'hard factors' and 'soft factors'. Hard factors include institutional norms, process control and technical tools (such as the ISO quality management system and quality function deployment [QFD]); soft factors are leadership, organisational culture and employee participation (Powell, 1995). In the context of higher education, this theoretical framework helps explain that teaching quality depends not only on institutional design but also on teacher participation, teaching philosophy and organisational atmosphere. Therefore, theoretically speaking, TQM provides multidimensional support for building a systematic teaching quality management system, which enables it to extend from the management level to the teaching level and achieve comprehensive improvement in education quality.

1.3 Research Gap

Despite the widespread attention given to TQM in higher education, research still exhibits several shortcomings.

First, the literature focuses largely on macro-management levels, such as the construction of quality assurance systems, organisational performance evaluation, and certification mechanisms, while paying relatively little attention to the teaching process itself (such as classroom teaching, course implementation and teaching interaction). This results in the application of TQM in education remaining largely at the level of a management tool, rather than being deeply integrated in teaching practice (Kayyali, 2024).

Second, studies report significant differences in the dimensional classification and measurement methods of TQM. For example, some studies analyse it from the perspectives of leadership, strategy, and resource allocation, while others focus on process control and performance evaluation (Kayyali, 2024). This inconsistency leads to fragmented research results that lack a unified theoretical framework and integrative analysis.

Furthermore, although studies generally agree that TQM has a positive impact on education quality, its specific mechanisms of action remain unclear, especially regarding the crucial question of 'how to improve teaching quality through TQM', which lacks in-depth exploration (Talib et al., 2013). In addition, studies generally involved single-country or case studies and lack systematic integration across regions and research areas. Therefore, a systematic literature review approach would be useful to summarise and compare relevant research and to reveal overall development trends and research gaps.

1.4 Objectives and Research Questions

As a result of the aforementioned research background and limitations, this paper employed a systematic literature review approach and applied the PRISMA framework to conduct a systematic analysis of research on the application of TQM for assessing higher education teaching quality. Scholarly studies published between 2015 and 2025 were examined to investigate how TQM has been applied in higher education and its reported effects on teaching quality. This study set the following objectives:

- 1) To systematically review the research status and development trends of TQM in higher education teaching quality;
- 2) To summarise the core dimensions and key practices of TQM in teaching quality management;
- 3) To identify the main problems of and challenges facing the implementation of TQM; and
- 4) To propose future research directions and practical implications for the effective implementation of TQM in higher education based on the findings of the review.

With these research objectives in mind, this paper proposed the following research questions (RQ):

- 1) What are the main characteristics and development trends of research on TQM and teaching quality in higher education from 2015 to 2025?
- 2) What are the core dimensions of TQM in the management of teaching quality in higher education?
- 3) What main aspects of teaching quality does TQM affect?
- 4) What challenges hinder the effective implementation of TQM in higher education, and what strategies can be adopted to address these challenges?

1.5 Significance and Contributions of the Study

This study systematically integrated empirical evidence on the integration of TQM in higher education. Among the core dimensions that were identified are leadership, process management, continuous improvement, teacher development and stakeholder orientation, which could provide a structured framework for

improving teaching quality. The study also reveals real-world challenges such as insufficient leadership support, low teacher participation, a weak quality culture and inconsistent assessments, which provide a basis for policymaking, teacher training and the optimisation of assessment mechanisms. Furthermore, the study addresses gaps such as inconsistent indicators, unclear mechanisms and insufficient cross-contextual research, and lays a theoretical foundation for constructing a contextualised TQM framework and exploring mechanisms for improving teaching quality further.

2. Methodology

A systematic literature review approach was selected for this study because research on the application of TQM in higher education to improve teaching quality is fragmented across contexts, disciplines, and methodological approaches. Unlike traditional narrative reviews, a systematic literature review follows a transparent, structured, and reproducible process for identifying, screening, evaluating and synthesising relevant studies, thereby helping to reduce potential selection bias and enhancing the rigour and transparency of the review process (Tranfield et al., 2003). This approach was, therefore, considered appropriate for synthesising the available evidence, identifying common TQM dimensions, examining its reported effects on teaching quality, and identifying research gaps and implementation challenges.

To ensure a systematic and transparent review process, this study followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework. PRISMA provides a standardised framework for reporting the identification, screening, eligibility assessment and inclusion of studies and is widely applied in education, management, and social science research (Page et al., 2021). Accordingly, the use of PRISMA supported a rigorous and transparent synthesis of the literature on the application and development of TQM in higher education teaching quality.

2.1 Research Design

This study adopted a systematic literature review design based on the PRISMA framework and followed the standard steps of identification, screening, eligibility and inclusion (Moher et al., 2009; Page et al., 2021). The core of this method is its step-by-step screening and quality control of relevant studies through predefined search strategies and criteria, which ensured the scientific rigour and representativeness of the literature that was included. Simultaneously, this method effectively integrated the findings of different studies and provided a reliable data foundation for subsequent analysis.

2.2 Data Sources and Search Strategy

To ensure the authority and representativeness of the literature sources, this paper selected two mainstream international academic databases for searching: Scopus and Web of Science. These databases have good coverage and academic influence in the fields of education and management and are widely used in systematic review research (Mongeon & Paul-Hus, 2016). This paper adopted a keyword combination search method using the following keywords:

This study employed a keyword-based search strategy combining terms related to TQM, higher education, and teaching quality using Boolean operators (AND/OR). The search fields were set to TITLE in Web of Science and TITLE-ABS-KEY in Scopus. The complete search strings and database-specific search strategies are presented in Table 1 (Kitchenham & Charters, 2007).

Table 1: Database search field and search strings

Database	Searchfield	Search string
Web of Science	TITLE	("Total Quality Management" OR "TQM" OR "Quality Management" OR "Continuous Quality Improvement") AND ("Higher Education" OR "University" OR "College" OR "Tertiary Education") AND ("Teaching Quality" OR "Educational Quality" OR "Instructional Quality")
Scopus	TITLE-ABS-KEY	("Total Quality Management" OR "TQM" OR "Quality Management" OR "Continuous Quality Improvement") AND ("Higher Education" OR "University" OR "College" OR "Tertiary Education") AND ("Teaching Quality" OR "Educational Quality" OR "Instructional Quality")

2.3 Inclusion and Exclusion Criteria

To ensure the scientific rigour, relevance and comparability of the included literature, this paper established clear inclusion and exclusion criteria during the literature screening process, based on the research objectives. First, regarding timeframe, studies published between 2015 and 2025 were selected to ensure that the literature reflected the latest development trends of TQM in the field of higher education teaching quality. Second, regarding research content, only empirical or applied studies explicitly related to the topics of TQM and higher education teaching quality were included, and studies unrelated to education or not involving teaching quality were excluded.

To ensure accessibility and consistency of analysis, only studies published in English were included; studies in other languages were excluded during the initial screening stage. Furthermore, to ensure the integrity of the research data, only studies with full-text availability (accessible through open access or institutional subscriptions) were included and, to ensure research quality, only peer-reviewed journal articles were selected, and literature review articles, conference papers and book chapters were excluded.

Regarding research design, this review included empirical studies related to TQM implementation in higher education teaching. The included studies consisted of quantitative surveys, qualitative case studies and mixed-methods research. Studies focusing solely on non-empirical theoretical discussions without concrete application to higher education teaching quality were excluded (Petticrew & Roberts, 2006). Accordingly, this study established criteria to guide the screening process, which are summarised in Table 2. This standard helped ensure that the

selected literature was highly relevant to the research topic and improved the reliability and comparability of the research results.

Table 2: Inclusion and exclusion criteria

Criteria	Eligibility	Exclusion
Timeline	2015–2025	Prior to 2015
Scope	Application of TQM in higher education teaching quality	Unrelated to TQM or education
Language	English	Languages other than English
Publication type	Academic journal articles	Conference papers, books, etc.
Article access	Full text available	No full-text access

2.4 Screening Process

This study systematically implemented a literature screening process based on the PRISMA 2020 framework. This screening process followed the standard procedure of a systematic review, which can effectively reduce bias and improve the transparency and reproducibility of a study (Page et al., 2021). The process is illustrated as a flowchart in Figure 1.

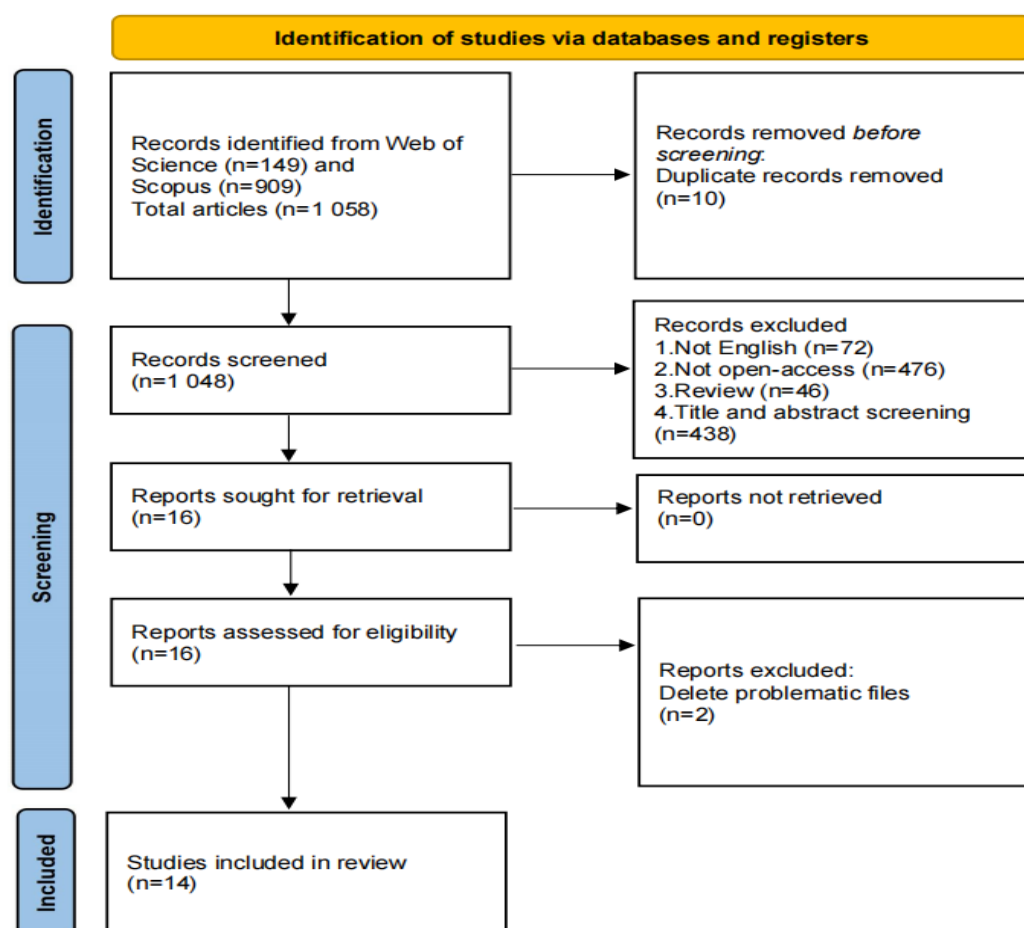


Figure 1: Data collection process based on the PRISMA guidelines

In the literature identification phase, a total of 1 058 records were retrieved from the Web of Science and Scopus databases. After removing 10 duplicate records, 1 048 records advanced to the initial screening stage. During the initial screening process based on titles, abstracts, and predefined criteria, a total of 1 032 records were excluded for the following reasons: not published in English, non-open-access status, review articles, and failure to meet the topical relevance criteria.

Consequently, 16 reports were sought for retrieval and successfully retrieved. These 16 reports were then assessed for full-text eligibility. In this phase, 2 reports were excluded due to problematic files or insufficient data. Ultimately, 14 studies met all inclusion criteria and were included in the final systematic review.

2.5 Data Extraction and Analysis

In the data extraction phase, a structured data extraction table was constructed according to the research objectives, and the 14 articles were systematically organised and coded. The extracted content included the following aspects:

- Basic information: author, publication year and research region;
- Research design: research method type (quantitative, qualitative or mixed method);
- TQM implementation dimensions such as leadership, process management, continuous improvement and quality assessment;
- Research subjects: university teachers, students or managers;
- Core research conclusions: the impact and mechanism of TQM on teaching quality; and
- Research limitations and suggestions.

The analytical method of this review was thematic analysis, which was used to summarise and integrate the findings of the included studies (Braun & Clarke, 2006). The analysis process involved three main steps. First, the included studies were carefully reviewed, and initial codes were generated to identify key concepts and practical elements related to TQM. Second, similar codes were grouped into broader categories to develop preliminary themes. Third, the identified themes were compared and refined through cross-study analysis, resulting in a systematic analytical framework.

Based on the thematic analysis, this paper, furthermore, employed inductive analysis to compare TQM practices reported by different studies and identify the core dimensions of TQM implementation in higher education teaching quality. Through the comparison and synthesis of research findings, the study examined the potential pathways and mechanisms through which TQM influenced teaching quality. To enhance the reliability of the analysis, consistency in coding standards was maintained throughout the data extraction and thematic development process. The included studies were repeatedly reviewed and compared to minimise subjective interpretation bias (Nowell et al., 2017).

2.6 Quality Appraisal of Included Studies

To ensure the methodological rigour of the systematic review, a quality appraisal assessment was conducted for all included studies. This study adopted the Mixed Methods Appraisal Tool (MMAT) developed by Hong et al. (2018), which is widely used for evaluating the methodological quality of qualitative, quantitative and mixed-methods studies in systematic reviews. The MMAT was selected because the included studies had employed diverse research designs, including quantitative surveys, qualitative case studies, mixed-methods studies, conceptual studies and model-development studies. The MMAT provided a flexible framework for assessing methodological quality of different types of research designs.

Each included study was evaluated according to the relevant MMAT criteria, including the appropriateness of the research design, data collection procedures, sampling strategies, data analysis methods, and the consistency between research questions and methodologies. Two reviewers independently assessed the methodological quality of the included studies, and any disagreements were resolved through discussion.

The quality appraisal results were not used as an exclusion criterion but were considered during the interpretation and synthesis of the findings. The appraisal process aimed to identify potential methodological limitations and improve the transparency and reliability of the systematic review.

3. Results

3.1 Characteristics of Included Studies on TQM in Higher Education

Table 3 shows the characteristics of the systematically reviewed TQM studies. This paper systematically analysed the research characteristics of TQM in higher education by reviewing 14 papers. Overall, this field shows a continuous growth trend from 2015 to 2025, which reflects an increasing focus on quality assurance and continuous improvement in global higher education systems. However, this research field exhibits unevenness regarding geographical distribution, methodological applications and research content.

First, research is primarily concentrated in Asia, the Middle East and Europe, particularly in countries such as Jordan, Saudi Arabia, the United Arab Emirates, Vietnam, China and Italy. This suggests that the application of TQM in higher education is more prevalent in countries undergoing education reform or quality improvement. However, some studies fail to explicitly specify the research context, which reduces the contextual explanatory power of the results and limits the possibility of cross-regional comparative analysis.

Second, from a methodological perspective, the studies primarily relied on quantitative questionnaires and case studies, which indicates that empirical and descriptive research dominates this field. Although some studies incorporated meta-analysis, fuzzy multi-criteria decision-making (MCDM) models, and multi-method integrated analysis such as analytic hierarchy process (AHP) and Importance performance analysis (IPA), overall, high-order modelling and

theory-driven studies are relatively few. This methodological structure suggests that TQM research in higher education is still in a transitional stage between applied validation and theoretical deepening and model building.

Furthermore, from the perspective of research themes, the included literature can be summarised as five main research directions: i) Research on the implementation and application process of TQM at universities; ii) The integrated application of quality management tools, such as QFD, the 5S principle, and the ISO 9001 system; iii) Research on the impact of TQM on outcome variables such as teacher performance, teaching quality and university social services; iv) Contextualised application research for specific disciplines (such as pharmacy and medical education); and v) Research on TQM-based evaluation models and decision support systems, such as fuzzy MCDM models and meta-analysis methods. It is worth noting that, in recent years, research has gradually shifted from single implementation analysis to multidimensional integration and system optimisation, which reflects a deepening trend in TQM research.

Overall, research on TQM in higher education has, between 2015 and 2025, expanded in scope and methodological approaches. The literature is mainly concentrated in Asia, the Middle East and Europe, and quantitative surveys and case studies are the dominant research approaches. Research themes have gradually expanded from general TQM implementation towards teaching process improvement, quality assessment, faculty development, stakeholder orientation and context-specific applications. These findings demonstrate the evolving research landscape of TQM in higher education and provide a foundation for examining its core dimensions, effects and implementation challenges in the subsequent analysis.

Based on these findings, the analysis of RQ1 provides important support for subsequent research questions: first, by identifying the structural characteristics of TQM research, it lays the foundation for summarising the core dimensions in RQ2; and second, it reveals the problem of the lack of systematic connection between current research on quality management practices and teaching outcome variables, thereby providing a theoretical entry point for subsequent exploration of the impact of TQM on teaching quality and teachers' related outcome variables.

Table 3: Characteristics of studies on TQM in higher education

No.	Study	Country/region	Methodology	Research focus
1	On the quality enhancement conditions of educational processes in universities (Khairova et al., 2019)	Russia	Conceptual/ analytical study	Quality enhancement conditions in higher education processes
2	Implementation of learning processes using total quality management at Universidade Oriental and Universidade Dili of Timor-Leste (Guterres et al., 2025)	Timor-Leste	Case study	TQM implementation in teaching/learning processes
3	Blending 'hard' and 'soft' TQM for academic excellence: The University of Siena experience in the field of life sciences (Casprini et al., 2023)	Italy	Case study	Integration of hard and soft TQM in higher education
4	Impact of modern technological methods of knowledge management and total quality management on the performance of educational colleges faculty: A case of Jordan (Ayasrah et al., 2024)	Jordan	Quantitative survey	TQM and academic staff performance
5	Implementation of quality function deployment to improve online learning and teaching in higher education institutes of engineering in Oman (Al- Yaarubi & Rajakannu, 2024)	Oman	Case study/ applied research	QFD in online learning
6	Applying total quality management tools using QFD at higher education institutions in Gulf area (Case Study: ALHOSN University) (Al-Bashir, 2016)	United Arab Emirates	Case study	Application of QFD in university quality improvement
7	Measuring quality practices at Prince Sattam Bin Abdulaziz University from the perspective of total quality management (Al-Mekhlafi, 2023)	Saudi Arabia	Quantitative survey	Level of TQM implementation at universities
8	The degree of implementation of total quality management in	Jordan/United Arab Emirates	Quantitative survey	Relationship between TQM and

No.	Study	Country/region	Methodology	Research focus
	universities and its relationship to the level of community service from the perspectives of faculty members (Al-Zoubi et al., 2023)			community service
9	Implementation of total quality management in higher pharmaceutical education: Opportunity and challenge (Gu et al., 2016)	China	Conceptual/ applied analysis	TQM in professional pharmaceutical education
10	Application of total quality management in developing quality assessment model: The case of Vietnamese higher education (Nguyen et al., 2020)	Vietnam	Model development	Development of quality assessment framework
11	TQM and SDGs for Erasmus+ Programme - Quality education, reducing inequalities, climate change, peace and justice (Nogueiro & Saraiva, 2023)	Europe	Conceptual analysis	TQM and sustainable development in education
12	The analysis of the implementation of 5-S principles integrated with ISO 9001 requirements at higher education level (Nurcahyo et al., 2019)	Indonesia	Mixed methods (AHP + IPA + correlation)	Integration of TQM tools (5S & ISO 9001)
13	A new self-assessment 'TQM hybrid MCDM fuzzy model' for enhancing the KPIs in mega universities (Ragab et al., 2022)	Saudi Arabia	Modelling (Fuzzy MCDM)	TQM-based KPI optimisation model
14	Total quality management (TQM) and quality of higher education: A meta-analysis study (Yusuf, 2023)	Multiple countries	Meta-analysis	Overall effect of TQM on higher education quality

Note. AHP =Analytic hierarchy process; IPA = Importance performance analysis; KPI = key performance indicator

3.2 TQM in the Core Dimensions of Higher Education

Table 4 presents the core dimensions of the systematically reviewed TQM studies in higher education. In the 14 included studies, the core dimensions of TQM in higher education exhibit a clear multidimensional structure rather than a single, unified framework. Compared to the standard dimensions presupposed by

traditional TQM theory, research places greater emphasis on dynamic integration and expansion in specific education contexts.

First, leadership and management support is the most fundamental dimension. Most studies refer to the crucial role of university management in promoting a quality culture, implementing systems and allocating resources. Second, instructional process management is the most direct manifestation of TQM in the education field, with related research generally focusing on instructional process optimisation, standardised management and continuous improvement mechanisms; this is particularly evident in studies integrating the 5S principles with ISO 9001.

At the operational level, the application of quality tools and technologies provides crucial support for institutional quality enhancement, including the introduction of QFD, 5S, and ISO systems. This indicates that higher education is gradually adopting quality management tools from the industrial sector. Meanwhile, earlier studies frequently report performance evaluation and measurement systems, particularly in key performance indicator evaluation and fuzzy decision-making models. These findings demonstrate that TQM in higher education is developing towards data-driven and quantitative management.

Furthermore, some studies emphasise teacher development and capacity building by arguing that teachers' quality awareness and professional competence are important factors influencing the effectiveness of TQM implementation. At the same time, student and stakeholder orientation is gradually gaining attention, not only regarding teaching satisfaction but also extending to external dimensions such as higher education social services and sustainable development goals.

It is worth noting that two new development trends emerged in recent years: first, professional/contextual adaptation, namely the differentiated application of TQM in different disciplines such as pharmacy and engineering; second, data and model-driven management, using methods such as fuzzy MCDM and meta-analysis to quantify and optimise quality management. This indicates that the application of TQM in higher education is gradually evolving from a traditional management tool towards intelligence and systematisation.

Overall, the research has not formed a completely unified dimensional system but presents a structural feature of 'core dimensions + context-extended dimensions. This feature reflects the high context-dependence of TQM in higher education and also suggests that future research should deepen the integration of dimensions and the unification of theories further, especially in areas where a significant research gap still exists; these dimensions must be systematically connected to teaching outcome variables.

Table 4: TQM in the core dimensions of higher education

Dimension	Description	Reviewed studies reporting this dimension
Leadership and management support	Top management commitment, decision-making involvement, and quality culture promotion	7, 8
Teaching process management	Optimisation and standardisation of teaching processes, continuous improvement mechanisms	1, 2, 12
Quality tools and techniques	Application and integration of quality tools such as QFD, 5S, and ISO 9001	5, 6, 12
Performance measurement and evaluation	Use of KPIs, quality assessment systems, and performance monitoring	10, 13, 14
Faculty development and capability building	Teacher training, professional development, and quality awareness enhancement	4, 9
Student and stakeholder focus	Student satisfaction, community service and responsiveness to external stakeholders	8, 11
Quality strategy and continuous improvement orientation	Long-term quality planning, strategic alignment and continuous development	10, 11
Context-specific adaptation	Adaptation of TQM practices across disciplines (e.g., engineering, pharmaceutical education)	5, 9
Data- and model-driven management	Use of advanced models (e.g., fuzzy MCDM) and data analytics for decision-making	13, 14

Note. KPI = key performance indicator; QFD = Quality function deployment

3.3 Main TQM Aspects That Affect Teaching Quality

Based on the systematic reviews of the 14 TQM research articles, Table 5 reveals that TQM has a significant positive impact on the quality of higher education teaching and related outcome variables. However, this impact is not a single, direct effect, but is achieved gradually through a series of mediating organisational and behavioural mechanisms.

First, at the teaching level, TQM effectively improves teaching effectiveness and the consistency of the curriculum by promoting the standardisation and continuous improvement of the teaching process. Related research shows that management practices based on quality tools (such as QFD, 5S, and ISO 9001) help optimise the teaching process, thereby improving overall teaching quality.

Second, at the teacher level, TQM positively affects teachers' professional competence and teaching engagement by strengthening training mechanisms,

enhancing leadership support and fostering a quality culture. Research indicates that, in a TQM environment, teachers are more likely to develop standardised teaching behaviours and continuously improve their teaching skills.

Furthermore, at the organisational level, TQM significantly improves the operational efficiency and quality assurance capabilities of universities by constructing a systematic quality evaluation system (such as KPI indicators and performance evaluation models). Especially after the introduction of fuzzy MCDM models and data analysis methods, quality management is gradually showing a trend towards data-driven and refined management.

Furthermore, at the stakeholder level, TQM, by strengthening its student- and societal needs-oriented management model, not only enhances student satisfaction but also strengthens the social service functions of universities. This finding indicates that the impact of TQM has expanded from internal teaching to the external level of social value.

Table 5: Effects of TQM on teaching quality

Outcome category	Specific outcomes	Mechanism implied in studies	Reviewed studies reporting on this dimension
Teaching quality improvement	Teaching effectiveness, curriculum coherence, learning process optimisation	Process standardisation and continuous improvement enhance instructional quality	1, 2, 5, 12
Faculty-related outcomes	Teaching performance, professional competence, engagement	Training, leadership support and quality culture enhance faculty capability	4, 7, 9
Organisational performance	Institutional efficiency, quality assurance effectiveness, key performance indicator improvement	Structured TQM systems and evaluation frameworks improve organisational outcomes	10, 13, 14
Stakeholder outcomes	Student satisfaction, community service performance	Stakeholder-oriented practices improve external and internal satisfaction	8, 11
System optimisation	Decision-making efficiency, process integration	Data-driven models and quality tools enhance system-level optimisation	6, 12, 13

3.4 Challenges and Improvement Strategies in the Implementation of TQM in Higher Education

The analysis of the included studies identified several challenges that affect TQM implementation. At the organisational level, insufficient leadership support and incomplete quality management systems were reported as major barriers. Several studies emphasise that effective TQM implementation requires strong institutional commitment, strategic planning and continuous improvement

mechanisms (Studies 4, 7, 9, and 10). At the personnel and cultural levels, limited teacher participation and insufficient quality awareness were identified as important challenges. The reviewed studies indicate that faculty involvement and professional development are necessary conditions for sustaining TQM practices (Studies 4, 8, and 9). At the technical level, differences in quality indicators, evaluation frameworks and management tools reduced the comparability and consistency of TQM implementation (Studies 5, 6, 12, and 13).

As a result of these challenges, the included studies suggest several improvement strategies. Universities should strengthen leadership commitment, promote faculty participation through training and professional development, establish consistent quality evaluation systems and develop context-sensitive TQM frameworks that are suitable for different institutional environments.

4. Discussion

This study employed the PRISMA methodology to systematically review research published from 2015 to 2025 on TQM in higher education. Consequently, this review examined research characteristics, core TQM dimensions, impacts on teaching quality and implementation challenges identified by 14 selected studies. The findings indicate that TQM has gradually developed from a general management concept into a more structured approach for improving higher education quality. However, challenges remain regarding theoretical integration, methodological consistency and implementation mechanisms.

4.1 Research Characteristics and Development Trends

The findings show that TQM research in higher education has increased in recent years but remains unevenly distributed across regions. Studies are mainly concentrated in Asian, Middle Eastern and European contexts, and quantitative surveys and case studies are the dominant approaches. This finding is consistent with other research, which found that quality management studies in higher education have primarily focused on empirical evaluation and institutional practices (Tranfield et al., 2003). The limited number of theory-driven and cross-context studies suggests that future research should develop more comprehensive frameworks to explain how TQM practices interact with institutional factors and contribute to education improvement.

4.2 Core Dimensions of TQM Implementation

The review identified leadership commitment, instructional process management, quality assessment, and continuous improvement as the most frequently reported TQM dimensions. This finding is consistent with studies that emphasise that leadership support and continuous improvement are fundamental elements of successful TQM implementation in higher education (Asif et al., 2013; Sallis, 2014). The findings, furthermore, suggest that TQM has evolved beyond traditional management practices by incorporating stakeholder orientation, contextual adaptation and data-driven quality management. This indicates that effective TQM implementation requires not only quality control mechanisms but also organisational commitment, faculty participation and a supportive quality culture.

4.3 Effects of TQM on Teaching Quality

The reviewed studies generally demonstrate that TQM contributes positively to teaching quality, faculty development and institutional effectiveness. This finding represents studies that report that quality management practices can enhance education performance through systematic evaluation, continuous improvement and stakeholder involvement (Talib et al., 2013). Nevertheless, this review highlights that the effectiveness of TQM depends not only on the adoption of quality tools but also on contextual factors such as leadership support, teacher engagement and organisational culture. Therefore, universities should integrate TQM principles in teaching practices and faculty development rather than treating them as administrative requirements.

4.4 Challenges, Implications, and Future Directions

Despite the benefits of TQM, several challenges remain. Previous studies and the present review indicate that variations in TQM dimensions, evaluation indicators and implementation frameworks limit comparisons across institutions. Moreover, research has insufficiently explored the mechanisms through which different TQM elements interact to improve teaching quality. The findings provide important implications for universities and policymakers. Institutions should strengthen leadership commitment, develop systematic quality evaluation mechanisms and promote continuous improvement cultures. Future research should establish more integrated theoretical frameworks and conduct cross-cultural comparative studies to expand the understanding of TQM implementation in diverse higher education contexts.

4.5 Limitations

This review has several limitations. First, only studies published in English and indexed by Scopus and Web of Science were included, which may have excluded relevant research from other databases or published in other languages. Second, the small sample size and heterogeneous research designs of the different studies may limit the generalisability of the findings. Despite these limitations, the review followed the PRISMA guidelines, applied rigorous selection criteria and implemented systematic data extraction to ensure methodological transparency and minimise bias. Future research should broaden database coverage and encompass more diverse institutional and regional contexts.

5. Conclusion

This study, which applied the PRISMA systematic review method, systematically reviewed and analysed 14 studies indexed by Scopus and Web of Science on the topic of TQM in higher education, and published between 2015 and 2025. The findings provide an overview of TQM application in higher education, including research characteristics, core dimensions, effects and implementation challenges. The results indicate that TQM research in higher education has shown a growing trend but remains uneven regarding geographical distribution and research methods. Reviewed studies are mainly concentrated in Asia, the Middle East and parts of Europe, and quantitative and case studies dominate the field. The application of TQM mainly focused on teaching process improvement, implementation of quality tools, performance evaluation and organisational

management. The review identified several core TQM dimensions, including leadership support, instructional process management, quality assessment, teacher development and stakeholder orientation. Although these dimensions vary across contexts, they demonstrate strong consistency and adaptability.

The reviewed studies generally confirmed the positive effects of TQM on teaching quality, organisational performance and university development. However, challenges remain, including insufficient organisational support for TQM, limited teacher participation, inconsistent evaluation frameworks and a lack of methodological diversity. Future research should strengthen theoretical integration, expand cross-contextual comparative studies and explore diverse research approaches to enhance the understanding and implementation of TQM in higher education further.

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