

Beyond Compliance: Unveiling the Knowing-Doing Gap in China's Higher Education Quality Assurance Through Cluster Analysis

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Abstract: Under the context of the new round of undergraduate education teaching quality assurance audits in China, a common “knowing-doing gap” prevails in the construction of university quality assurance systems. This study innovatively employs text clustering analysis on the self-evaluation reports of 53 universities participating in the recent audit cycle. The findings reveal a distinct dual structure within the discourse of university quality assurance. On one hand, a high degree of consensus and a comprehensive narrative framework are established at the level of “superficial constructs,” encompassing institutional design, organizational support, and monitoring and feedback. On the other hand, “existing problems” collectively reveal deep-seated execution issues such as inefficient system operation, underutilization of data, and weak interdepartmental collaboration. This structural disjunction underscores the difficulties inherent in translating formal commitments into organizational practice. A feasible pathway for constructing an integrated mechanism of “The unity of knowledge and action” is proposed after identifying critical bottlenecks hindering the transition of quality assurance systems from the superficial to the deep level. This study offers practical pathways to optimize internal teaching governance and promote a shift toward effectiveness-driven operation of education quality assurance.

Keywords: Quality Assurance in Higher Education; Knowing-Doing Gap; Text

Cluster Analysis; Procedural Compliance; Effectiveness-Driven Operation; China

1. Introduction

The gap between policy design and practical implementation in higher education quality assurance systems is a common governance challenge worldwide. Internationally, despite continuous efforts to improve quality assurance frameworks—from Europe’s Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG), to the United States’ CHEA Standards and Procedures for Recognition, and the United Kingdom’s UK Quality Code for Higher Education—many countries still face persistent tensions between policy aspirations and actual outcomes due to various underlying factors [1,2].

In 2021, China’s Ministry of Education launched the Implementation Plan for Teaching Audit and Evaluation in Higher Education (2021–2025) (TAE Plan), with the aim of fostering an institutional quality culture grounded in self-awareness, reflection, discipline, examination, and correction. This initiative strives to establish an undergraduate education quality assurance system that aligns with international norms while reflecting local characteristics. Notably, the new audit cycle emphasizes the evaluation of student learning outcomes and reinforces the principles of “student-centeredness, outcome orientation, and continuous improvement”. It guides universities to build endogenous, closed-loop quality assurance mechanisms to achieve substantive development and sustained quality enhancement [3].

Self-evaluation reports, as the core evidence of the audit, provide direct insights into the construction and implementation of university quality assurance systems and thus constitute critical data for analyzing these systems and their challenges. These reports must be supplemented with supporting materials to ensure credibility. However, international research reveals a widespread phenomenon of “selective disclosure” within self-evaluation reports: institutions tend to overemphasize the completeness of their systems while evading execution deficiencies, resulting in self-evaluations becoming mere compliance performances and quality assurance turning into a formalistic exercise [4,5]. This divergence between “policy texts” and “organizational practice” reflects a profound “knowing-doing gap” in quality assurance system development—that is, a disconnect between institutional design and operational effectiveness [6].

Text clustering algorithms offer a means to transcend the surface narratives of individual reports by conducting semantic mining across 53 self-evaluation reports from universities participating in the new audit cycle, thereby constructing a high-dimensional semantic space. This learning approach identifies latent pattern distributions in university quality assurance discourse at the group level, overcoming limitations inherent in manual coding of voluminous administrative texts [7,8]. It proves particularly effective in capturing two key features: one is superficial constructs, including declarative descriptions of system integrity, organizational soundness, and process compliance; the other is deep execution, including practical statements revealing ineffective activation of quality assurance feedback loops, inadequate data analysis and application. These clustered features provide empirical evidence from firsthand textual materials that enrich our understanding of the real state of China’s university quality assurance system construction, especially the prevalent “knowing-doing gap”.

This study empirically explores the alienation dilemma of “procedural compliance” in university quality assurance systems based on clustering results and further analysis of self-evaluation report texts, offering practical pathways to optimize internal teaching governance and promote a shift from

“compliance-based construction” toward “effectiveness-driven operation”. The research addresses the following questions:

- (1) What structural contradictions exist between the design and operational effectiveness of university quality assurance systems?
- (2) Within the discursive practices of self-evaluation reports, what specific patterns and discourse characteristics emerge concerning quality assurance system construction and operational bottlenecks?
- (3) What are the key bottlenecks restricting the effective transition of quality assurance from superficial construction to deep operational implementation?

2. Method

2.1 Research Context

This study utilizes self-evaluation reports from universities participating in the new round of undergraduate education teaching audit and evaluation conducted between June 2021 and June 2024. A total of 53 reports were collected, including 9 from institutions undergoing the first category of evaluation (all “Double First-Class” universities) and 44 from those undergoing the second category. According to the Undergraduate Education Teaching Audit and Evaluation Indicator System, the first category’s primary indicator, named “Quality Assurance Capability,” comprises secondary indicators such as quality assurance philosophy, standards, mechanisms, culture, and effects. For the second category, the sixth primary indicator, named “Quality Assurance,” includes secondary indicators covering quality management, quality improvement, and quality culture.

2.2 Research Procedure

This study employed the open-source data science platform Anaconda, which integrates numerous scientific computing, data analysis, and machine learning libraries, along with robust environment management capabilities. Using Anaconda’s embedded Jupyter Notebook, an open-source web application, the study efficiently executed tasks ranging from data cleaning and transformation to numerical simulation, statistical modeling, and machine learning. Centered on Python programming, Jupyter Notebook provided a flexible and powerful toolkit for analyzing quality assurance systems. The specific methodological steps are

as follows (see Figure 1).

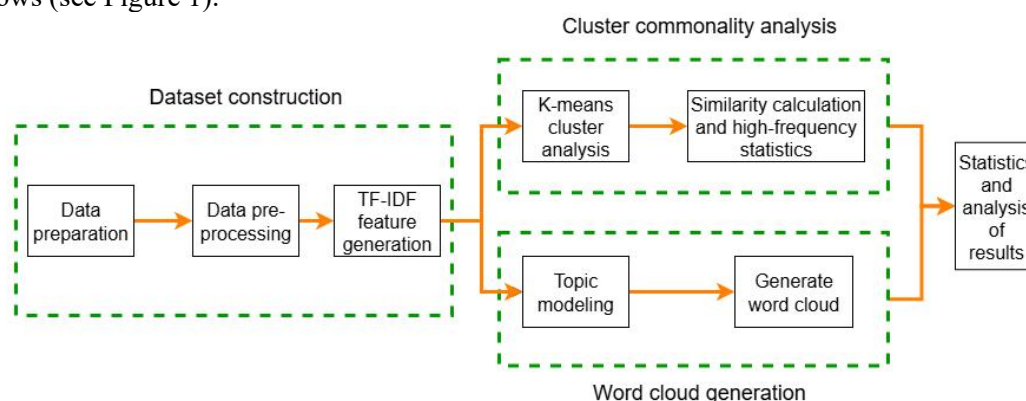


Figure 1. Data Processing Flowchart

2.2.1 Data preparation and preprocessing

The initial phase involved collecting the self-evaluation reports for the new audit cycle. Subsequently, text preprocessing was conducted using regular expressions to segment the text into sentences, ensuring each sentence ended with a Chinese period (。), exclamation mark (!), or question mark (?). Sentence cleaning then removed whitespace and non-Chinese punctuation symbols to enhance data quality and processing efficiency [9,10].

2.2.2 TF-IDF feature generation

The study utilized the `TfidfVectorizer` class from `sklearn.feature_extraction.text` to convert text data into numerical feature vectors based on the Term Frequency-Inverse Document Frequency (TF-IDF) principle. This approach effectively highlights the importance of key terms within the text, laying a solid foundation for subsequent clustering and topic modeling analysis.

2.2.3 Cluster analysis

Leveraging the TF-IDF feature vectors [11], the study applied the K-means clustering algorithm [12] to group the vectorized sentences. The algorithm partitioned data points into five clusters—predefined in this study—aiming to minimize intra-cluster variance and maximize inter-cluster separation. To improve reliability and accuracy, a multi-run random initialization strategy was implemented to identify the optimal solution. This method successfully categorized sentences by semantic similarity, facilitating the identification of core issues and salient features within the self-evaluation reports.

2.2.4 Similarity calculation and high-frequency analysis

Following clustering, cosine similarity with a threshold of 0.8 was employed to identify highly similar sentence pairs across clusters. Given that institutional self-evaluation reports in teaching

and learning assessments often exhibit substantial overlap in phrasing and structure-reflecting common templates or standardized narratives—a relatively high similarity threshold was adopted to ensure that only the most lexically and semantically consistent statements were considered recurrent. This stringent criterion helps filter out superficially similar content and focuses on identifying viewpoints that are nearly identical across multiple institutions, thereby capturing genuinely shared concerns. Additionally, detailed frequency analyses were conducted to highlight issues and characteristics commonly appearing across reports, further emphasizing widespread patterns and systemic phenomena in higher education quality assurance.

2.2.5 Topic modeling

Latent Dirichlet Allocation (LDA) [13] was applied to the TF-IDF text matrix to uncover latent thematic structures within the self-evaluation reports [2]. LDA assumes that each document is a probabilistic mixture of topics, with each topic characterized by a distribution over words. Five topics were specified in this study, with a fixed random seed of 42 to ensure reproducibility. The top 10 keywords per topic were extracted to assist in interpreting the thematic content and its representation across reports.

2.2.6 Word cloud generation

All reports' textual data were aggregated to extract keywords and generate word clouds, visually representing the frequency and prominence of terms. The process included text cleaning and segmentation, TF-IDF-based feature extraction, and the application of LDA for thematic identification. Based on topic modeling results, representative keywords were selected for word clouds, whose visual

attributes—such as color and size—were adjusted to intuitively convey the distribution and relative importance of frequent terms. This provided valuable visual support for deeper analysis.

2.2.7 Statistics and analysis of results

In-depth examination of clustering results revealed recurring key themes and patterns across reports, illuminating the challenges faced by current quality assurance systems. The word clouds quickly highlighted high-frequency terms and thematic areas warranting focused attention. Based on these analyses, the study proposed several concrete strategies aimed at the continuous improvement of university quality assurance systems. These recommendations are designed not only to address existing issues but also to foster comprehensive enhancement of higher education quality.

3. Results

3.1 Word Cloud Analysis

The word cloud vividly illustrates the core themes and keywords within the universities' self-evaluation reports (See Figure 2). Prominent terms such as "school," "faculty," "quality," "education," and "students" appear in larger fonts, indicating their centrality to the discourse. These keywords, alongside "curriculum," "teaching," "management," "evaluation," "culture," "continuous," and "improvement," collectively construct a multidimensional framework of higher education quality assurance systems. The presence of words like "monitoring," "assurance," "standards," and "system" underscores the emphasis placed on the establishment and implementation of educational quality assurance frameworks. Meanwhile, terms such as "reform," "development," and "innovation" reflect universities' pursuit of reform and innovation within quality assurance processes. Words including "assessment," "evaluation," and "feedback" relate to mechanisms critical for the ongoing improvement and effectiveness of educational quality and assurance systems. Moreover, the visibility of terms like "culture," "environment," and "atmosphere" highlights the importance of educational culture and the learning environment in fostering students' holistic development and overall educational quality. Keywords such as "continuous," "improvement," and "optimization" further

committees, degree assessment committees, and teaching supervision teams with clearly defined responsibilities; construction of a three-tier quality monitoring system spanning university, faculty, and grassroots teaching organizations.

Resource assurance: Establishment of teaching quality monitoring units operating through multi-departmental collaboration; creation of combined full-time and part-time teaching supervision teams.

3.2.2 Cluster 2: Routine monitoring and information transparency

Routine monitoring: Development of internal data systems tracking basic teaching conditions; implementation of routine and targeted inspections.

Information transparency: Regular reporting of teaching quality data; public disclosure of admissions, employment, and faculty information to facilitate social oversight.

3.2.3 Cluster 3: Evaluation feedback and continuous improvement

Evaluation and feedback mechanisms: Conducting professional accreditation and establishing multi-dimensional teacher teaching evaluations; periodic teaching work meetings to diagnose issues and communicate feedback to relevant departments.

Internal and external collaboration: Integration of internal and external evaluation and accreditation systems.

Continuous improvement: Implementation of mechanisms for ongoing quality enhancement based on evaluation feedback; strengthening top-level design of quality culture with targeted continuous improvement measures; reinforcing application of evaluation results.

3.2.4 Cluster 4: Guiding philosophy and innovative practice

Philosophical guidance: Emphasizing quality as the lifeline of the institution and adhering to principles of student-centeredness and quality-led governance; establishing outcome-based education (OBE) as the foundation for optimizing the quality assurance framework.

Industry-education integration and innovation: Collaboration with leading enterprises to build joint education platforms; promoting a “co-consultation, co-construction, co-sharing” model to enhance practical teaching systems.

Digital transformation: Developing intelligent teaching management systems; advancing reforms in teaching process evaluation and

value-added assessment.

3.2.5 Cluster 5: Identified challenges

Teaching management and quality monitoring efficiency: The synchronous advancement of teaching management and quality monitoring requires improvement; the two-tier management system of university and faculty levels remains to be perfected.

Student-centered philosophy implementation: The practical application of student-centered principles is insufficient; evaluation indicators inadequately reflect this philosophy, with limited student participation; student learning outcomes lack multi-dimensional developmental assessments.

Weak quality culture awareness: There is inadequate understanding of quality culture, hindering the cultivation of autonomous quality consciousness; comprehension of quality standards is shallow, lacking systematic design and comprehensive promotion; efforts to explore and publicize institutional quality culture remain insufficient; the monitoring of teaching quality improvement and establishment of sustainable continuous improvement mechanisms are deficient.

Insufficient informatization and data utilization: Information systems for quality management lag behind, affecting efficient handling of quality data; modern digital tools are underutilized, and data collection platforms do not fully cover information acquisition processes; capacities for data analysis and application need enhancement.

4. Discussion

4.1 Analysis of Problems in the Higher Education Quality Assurance System

A cluster analysis of the self-evaluation reports from 53 universities undergoing audit assessments reveals two contrasting facets of the current construction of higher education quality assurance systems. The first four clusters — “Institutional construction and organizational support,” “Routine monitoring and information disclosure,” “Evaluation feedback and continuous improvement,” and “Philosophical guidance and innovative practices” — systematically outline consensual experiences and achievements universities have gained in the top-level design and framework development of quality assurance systems, spanning from macro institutional arrangements to concrete innovative practices. However, the fifth cluster, titled

“Existing problems,” concentrates on common challenges faced during actual system operation. This contrast suggests that although universities have constructed apparently comprehensive quality assurance systems at the normative (“ought-to-be”) level, their operational effectiveness (“as-is” state) significantly deviates from expectations, exposing a profound tension between knowledge (“knowing”) and action (“doing”). A pervasive disconnection exists between superficial construction and deep execution: universities display sound institutional frameworks, organizations, and processes, yet acknowledge that these systems do not function effectively. Based on the universities’ self-assessments and clustered findings, the core contradictions in quality assurance systems are analyzed as follows:

4.1.1 Lack of institutionalized drivers for building a quality culture

Since the Ministry of Education’s 2018 directive on accelerating the building of high-level undergraduate education to enhance talent cultivation capacity, universities have been clearly guided towards establishing a quality culture. The 2021 implementation plan for undergraduate education assessment emphasizes the “student-centered, outcome-oriented, continuous improvement” (OBE) philosophy, highlighting quality culture as a key evaluation criterion. Additionally, the 2021 “Chinese University Quality Culture Construction Guidelines (Trial)” attempted to provide concrete reference points and advocated fostering a culture of self-awareness, self-reflection, self-discipline, self-examination, and self-correction.

Nevertheless, these macro-level advocacies have not been accompanied by effective institutionalized measures. As of 2025, China has yet to issue binding, instructive standards or implementation guidelines specifically for university quality culture construction. Consequently, the fundamental questions of “what constitutes quality culture” and “how to build it” remain ambiguous in practice. Universities face a contradiction between high-level advocacy and low-level absence: while evaluation frameworks require attention to this soft indicator (quality culture), operationalizable, referenceable, and assessable official standards are lacking.

In the absence of endogenous institutional incentives, external evaluation pressures have

become the principal force shaping university behaviors. This results in an “externally adaptive” compliance posture whereby quality culture initiatives aim primarily to satisfy administrative requirements or facilitate smooth evaluation passage, rather than genuinely cultivating intrinsic quality values embedded in university spirit. This distortion manifests in:

Formalism and superficiality: Many universities possess complete quality assurance documentation and seemingly sound systems, but these fail to translate into habitual norms and behaviors among faculty and staff. Quality assurance activities rarely become normalized or pervasive, often devolving into “emergency projects” timed for evaluation visits.

Passive cycles favoring assessment over improvement: Although “continuous improvement” is central to quality culture, universities tend to allocate more resources to “assessment preparation” rather than “problem solving”. Faculty and departments often perceive the quality assurance system as an externally imposed administrative burden, resulting in low engagement and weak execution. The recurring cycle of “assessment–rectification–reassessment” frequently remains procedural and ineffective.

Data revealing deeper issues: Analysis of the first round (2014–2018) of undergraduate education assessment reports showed that although 82.35% of universities received expert recognition for establishing quality assurance systems, their performance in key operational aspects—quality monitoring, information analysis and application, and quality improvement—dropped sharply to 44.54%, 33.33%, and 21.85% respectively [14].

Internationally, leading higher education countries offer valuable insights into institutionalizing quality culture. The US embeds a quality accreditation culture via diverse professional accreditation systems. The UK reorganized its university funding bodies to incorporate a “Quality Assessment Committee,” linking quality assurance with governmental funding and thereby strengthening universities’ quality consciousness. These models share core features: clear, stable institutional arrangements aligned with core interests.

In contrast, China’s approach is characterized by a “top-down” or “outside-in” construction pattern, which facilitates rapid initial framework development but has notable drawbacks: the first is that it fosters homogenization across diverse

universities, neglecting unique cultural traits and developmental needs [15]; the second is that overreliance on external directives diminishes universities' autonomy and dynamism as quality assurance agents; the third is that simplistic transplantation of Western institutional forms without adapting cultural underpinnings leads to "institutional incompatibility," causing dissonance between system structures and organizational member acceptance.

Thus, a localized dilemma emerges: on one hand, a lack of binding, concrete national standards and guidance for quality culture; on the other, strong external evaluative pressure produces formalistic, externally adaptive cultures that suppress endogenous, conscious quality culture growth. Learning from international practices, designing institutional tools that combine macro guidance with empowerment of university actors is pivotal to resolving current quality culture construction challenges.

4.1.2 Functional silos hinder overall effectiveness of quality assurance systems

Quality assurance systems constitute complex, systemic engineering requiring coordinated design, monitoring, evaluation, and improvement to sustainably elevate talent cultivation quality. Yet, entrenched "siloed" management modes within universities severely undermine system integrity and synergy. Although different departments fulfill their respective roles—such as academic affairs managing daily teaching operations, quality monitoring centers handling specialized evaluations, supervisory teams inspecting classroom quality, and student affairs, human resources, and enrollment offices managing key student and faculty data—they do so independently. The clear boundaries of authority and responsibilities enhance execution in discrete areas but lack inner impetus for integration or cross-silo collaboration.

At the university–faculty level, these silos manifest prominently. Self-reports from non-Double First-Class universities commonly state that while independent teaching quality monitoring units exist at the university level, coordination between the university and colleges requires strengthening. This "school–college disconnect" means standards and directives formulated at the university level weaken, distort, or even become ineffective by the time they reach faculties. Faculty-level implementation suffers due to limited management capacity,

resource constraints, or divergent understandings of quality assurance.

"Double First-Class" universities generally display more mature two-level quality assurance teams with superior resources and institutional support. However, their public reports rarely discuss cross-departmental and cross-level data sharing mechanisms vital for efficient system operation. Although these universities often build unified data exchange centers reflecting better technical infrastructure and management norms, it remains unclear whether these capabilities effectively integrate disparate departmental quality data to enable comprehensive and correlative teaching quality analyses.

4.1.3 Formalization of the "Student-centered" philosophy in quality assurance

"Student-centeredness" is a core principle of modern higher education quality assurance. Europe and the United States attach great importance to student participation in the quality assessment and certification processes [16]. However, in Chinese universities, this philosophy has yet to fundamentally supplant traditional knowledge- or teacher-centered paradigms. As primary stakeholders in quality assurance, student involvement is insufficient both in breadth and depth, causing significant disparities between system operation and the philosophy's original intent. This challenge varies among university types.

Non-Double First-Class universities exhibit more explicit student participation deficits. Many admit inadequate student engagement and maintain evaluation indicators that inadequately embody student-centeredness or pay insufficient attention to student learning processes and outcomes. Students tend to be passive recipients or evaluation subjects, with their learning experiences and development needs not central to quality metrics.

In comparison, "Double First-Class" universities more frequently advocate "student-centered" rhetoric. Yet, their concrete measures largely emphasize "student achievement" rather than empowering students as active "quality co-creators". Resources, enriched educational offerings, and enhanced campus support mainly aim to facilitate student success. Quality assurance focuses on collecting student satisfaction and academic achievement data to inform teaching improvements. Student involvement in core quality standard setting,

curriculum reform, and other fundamental matters remains marginal or absent. The ubiquitous student evaluations of teaching represent a passive, post hoc participation form. This formalization stems from a fundamental mispositioning of student roles within quality assurance systems. Students are generally viewed as “evaluation objects” or “data providers” rather than “co-producers” of quality culture. Whether through insufficient participation in non-Double First-Class universities or satisfaction-centered approaches in “Double First-Class” counterparts, students rarely engage as proactive agents across the full quality cycle—planning, standard formulation, curriculum enhancement, and effect assessment. The root lies in mechanisms failing to empower students effectively. Channels for student participation are limited, and their voices lack influence. University governance structures remain dominated by administrative and faculty academic power, marginalizing student rights and inputs in decision-making [17].

4.1.4 Superficial data analysis and insufficient decision support in quality assurance

Amidst the digital transformation of higher education, data is a core element in the quality assurance system. Nevertheless, despite growing data volumes, their effectiveness in supporting instructional management decisions and driving continuous quality improvement remains severely underutilized. Commonly, quality assurance data analyses are superficial, lacking deep diagnostics, risk warning, and predictive interventions. This results in a breakdown within the data value chain at the analysis and decision stages, critically restricting the closure of the quality assurance feedback loop.

Universities of all types confront challenges in converting data into actionable decision support. Non-Double First-Class universities especially suffer from an underdeveloped information infrastructure. Their data collection is often driven by external assessments or supervisory requirements, exhibiting a “collect-to-report” mentality. Internal business systems frequently lack unified data standards, resulting in information silos and disconnected data sources. Data gathering relies heavily on manual counts and static snapshots, producing low-quality and outdated information. This task-oriented data work primarily fulfills administrative obligations rather than serving internal quality diagnostics or improvements.

“Double First-Class” universities invest more in information technology and often operate “basic teaching status data systems”. However, even with advanced platforms, data use generally remains confined to broad, static depictions of teaching conditions. Existing research shows these systems mainly provide descriptive analytics, lacking in-depth exploration of interrelations among teaching inputs, processes, and outcomes [18]. No reports indicate use for dynamic monitoring of teaching quality risks or intelligent forecasting. Thus, even schools with relatively advanced infrastructure have yet to shift from descriptive to predictive analytic paradigms, leaving data systems as “warehouses” rather than “decision engines”.

The core problem is the widespread inability to transform massive datasets into profound insights and actionable strategies. After collection, data typically undergoes mere aggregation, computation, and visualization to produce various reports for compliance and annual summaries. Critically missing is the step of deep analytics founded on educational and pedagogical patterns. Contributing factors include: a shortage of professionals skilled in both big data analytics and educational evaluation, hindering effective modeling and interpretation [19]; the absence of robust data governance frameworks leading to inconsistent standards, unclear responsibilities, and poor quality control; and a lack of data-driven decision-making culture, with leadership decisions relying heavily on traditional experience.

The essence of quality assurance lies in “continuous improvement,” functioning as an “assessment-feedback-improvement” closed loop. When data analysis is shallow and decision support inadequate, the loop fractures at vital points. Without robust diagnostic evidence and early warnings, interventions for improving teaching quality become blind or delayed. Managers cannot accurately identify issues; instructors lack detailed feedback on teaching effectiveness, thus reforms tend to be superficial or symptomatic. Although data is continuously collected and stored, it rarely feeds back effectively to teaching practice or management decisions, constituting a one-way, fragmented data stream rather than a circulatory, value-enhancing feedback flow.

4.2 Integrated Mechanism of “Unity of

Knowledge and Action” in Quality Assurance

Welzant et al. pointed out that although the terms “quality” and “quality assurance” may share commonalities across different cultural contexts, their specific meanings can vary significantly across regions and countries [20]. A quality culture is an ideological construct, a fact that cannot be glossed by a set of prescriptions or recipes for implementation. In the context of higher education management in China, governance predominantly follows a top-down bureaucratic model [21], wherein the government leverages legal authority to enforce an external quality assurance system that emphasizes instrumental rationality. Consequently, quality assurance is often perceived as an externally imposed burden rather than a mechanism that supports and promotes educational excellence [22]. This model tends to give rise to a “knowing-doing gap”, characterized by a disconnect between conceptual understanding and practical implementation. To overcome this dilemma, it is necessary to transform the quality assurance system towards a cultural paradigm guided by intrinsic value identification and pursuit [23]. This philosophical foundation can be traced back to the traditional Chinese concept of “unity of knowledge and action”.

The concept of “unity of knowledge and action” originates from Confucius’s idea of “learning for practical application” and was systematically elaborated by Wang Yangming as a philosophy of praxis encapsulated in the maxim “true knowledge necessitates action, and without action, there is no true knowledge”. This framework emphasizes the teleological integration of cognition and behavior. Within the discourse of Chinese higher education, addressing this dilemma requires centering “action” as the pivot, employing a four-dimensional integrated mechanism encompassing institutional embedding, empowerment of stakeholders, restructuring of rights and responsibilities, and digital-intelligence facilitation. This approach aims to translate quality concepts into sustainable practices. Analysis of self-assessment reports from Double First-Class universities such as Tongji University and Dalian University of Technology reveals that these institutions are innovatively exploring ways to concretize the philosophy of “unity of knowledge and action” into effective strategies

to overcome the quality assurance dilemma, earning broad recognition for their quality assurance achievements.

4.2.1 Institutional embedding of quality culture

Quality culture is the most effective and meaningful way for quality assurance mechanisms to ensure and enhance quality levels while supporting university transformation. Its vitality depends on a range of internal and external factors, necessitating an integrated consideration of both internal and external quality assurance processes. China should promptly develop guidelines or standards for building quality culture that clearly define core indicators, implementation pathways, and evaluation criteria, thereby establishing a binding quality value system that concretizes “knowledge” through institutionalization.

In self-assessment reports, many universities emphasize the importance of “strong top-level design” and “strengthening quality culture construction,” with the central goal of shifting quality assurance from externally compliant models to intrinsically driven ones. This involves transforming quality concepts into concrete institutional regulations deeply embedded in the interests of faculty and students. Achieving this requires abandoning “accountability-driven” management mindsets and promoting the internalization of standards through dialogue mechanisms such as broad educational reflections and teaching workshops. It also calls for shifting the focus of quality assurance from university and college levels down to grassroots teaching units, fostering a deep understanding and widespread consensus on quality among faculty and students.

Integrating the outcomes of quality culture construction into core dimensions of institutional quality evaluation will guide universities through a profound transformation—from experiential management to data-driven governance, from passive assessment to proactive assurance, and from institutional constraint to cultural immersion—ultimately internalizing a quality consciousness characterized by self-awareness, self-reflection, self-discipline, self-examination, and self-correction as a shared value and collective practice across the entire academic community.

4.2.2 Deepening full-chain student participation

Establishing a sustainable mechanism for substantive student participation in quality assurance addresses the “subject absence” in the

knowledge-action contradiction by operationalizing the “student-centered” philosophy. At the institutional level, students’ rights to participate in quality governance are explicitly defined, with voting student representatives included in both university- and college-level teaching steering committees. Student involvement is formalized through structured forums and hearings in key processes such as program accreditation, course evaluation, and syllabus revision. Additionally, evidence of student learning outcomes is systematically collected and utilized, positioning student feedback as a critical foundation for quality improvement [24]. The promotion of outcome-based education (OBE) shifts evaluation focus from “what teachers teach” to “what students learn”. Additionally, training initiatives equip students to engage in governance and review activities effectively. Dedicated funds support student-led teaching quality research projects, empowering students to critically examine teaching processes and reflect on quality issues as researchers. Through such research-oriented participation (“action”), students’ understanding of quality (“knowledge”) deepens, enabling their transformation from passive evaluators of quality assurance into active co-creators, thereby preventing the dilution of the “student-centered” ideal.

4.2.3 Constructing collaborative governance of rights, responsibilities, and interests

To dismantle departmental silos and rigid institutional barriers, a cross-functional collaborative quality assurance “responsibility community” is established through formalized mechanisms. A university-level teaching quality assurance committee, led by a senior administrator, coordinates key departments by developing a cross-departmental collaboration responsibility matrix that clarifies core rights, responsibilities, and collaborative boundaries. A performance evaluation system linked to collaboration outcomes is instituted. The management structure at the university and college levels transitions towards an “empowered decentralization” model, delegating authority over program assessment, course evaluation, and faculty development to colleges, while the university focuses on setting standards, resource allocation, and process oversight. Drawing on mature experiences from Double First-Class universities, dedicated full-time quality assurance positions are established

within colleges. A centralized data platform integrates information systems across academic affairs, student services, human resources, and resource management, breaking down information silos and generating comprehensive “enrollment-to-employment” talent profiles. Through restructuring rights and responsibilities (institutionalizing “knowledge”) and enabling data integration (supporting “action”), this framework translates collaborative accountability from awareness into practice, achieving the “unity” of cognition and execution.

4.2.4 Digital-intelligence empowerment of quality assurance

Digital and intelligent technologies advance quality assurance by enhancing decision-making scientificity, promoting efficient stakeholder interaction, systematizing interdepartmental coordination, and visualizing continuous improvement efforts [25]. Digital tools and data-driven systems significantly enhance real-time monitoring and evaluation of educational quality [26]. Establishing a unified university-wide data governance framework defines clear data standards, accountability structures, and quality control processes, shifting data collection from a “passive reporting” model to “active diagnosis”. By integrating disparate institutional business systems, data workflows enable the convergence of diagnostic cognition (“knowledge”) and targeted improvement actions (“action”). The adoption of educational data mining platforms enables associative analyses that transcend static descriptive statistics, facilitating dynamic risk monitoring and proactive forecasting. Embedding analytical insights into the “assessment-feedback-improvement” cycle positions data as the technological nexus linking cognition and action, driving management decisions from experience-based to evidence-based, and fostering an enhanced loop characterized by “precise cognition, efficient action, and real-time feedback”.

5. Conclusions

This study contributes to the Chinese philosophical concept of “unity of knowledge and action” in the research on higher education quality assurance systems, offering a unique theoretical perspective to address the “knowing-doing gap”. By incorporating this philosophy, the study not only emphasizes the

integration of theory and practice but also highlights the crucial role of “action” (practice), thereby providing a novel theoretical framework for constructing effective quality assurance systems in higher education. Moreover, this research employs text clustering analysis to deeply examine self-assessment reports from 53 universities, further uncovering the dualistic structure within the discourse of quality assurance—namely, the contradiction between “surface-level construction” and “deep-level implementation”. This revelation not only offers fresh insights into the operational mechanisms of university quality assurance systems but also presents valuable practical recommendations for policymakers. From a policy and practice standpoint, the study proposes concrete pathways for developing an integrated mechanism based on the “unity of knowledge and action,” thereby furnishing both theoretical support and practical guidance for optimizing higher education quality assurance systems.

Although this study brings practical pathways to optimize internal teaching governance, several limitations remain. First, the sample is restricted to universities participating in the latest round of accreditation, which may limit the generalizability of the findings. Significant differences in the construction and implementation of quality assurance systems may exist across regions and institution types—such as between Double First-Class universities and regular undergraduate institutions—but this study does not adequately address such variations. Future research should broaden the sample to include a wider range of institutions to enhance the external validity of the conclusions. Second, the text clustering analysis relies primarily on the content of self-assessment reports, lacking field observations and in-depth interviews concerning universities’ quality assurance practices. This single data source may result in an incomplete understanding of the knowing-doing gap. Subsequent studies could adopt mixed methods—including case studies, interviews, and surveys—to gather richer data and provide a more nuanced exploration of the operational mechanisms of quality assurance systems in practice. Furthermore, this study focuses exclusively on the context of China’s recent accreditation cycle; its applicability to quality assurance systems in other countries or regions remains to be verified. Future research might

undertake cross-national comparative studies to examine how the knowing-doing gap manifests across different higher education systems and to identify potential solutions. Such efforts could contribute to developing a more universal theoretical framework for global higher education quality assurance.

Future research directions may include several key areas. First, further investigation into the practical strategies for implementing the “unity of knowledge and action” integration mechanism is warranted. Studies could analyze the specific challenges and opportunities faced by various types of universities in establishing this mechanism, offering more targeted and actionable recommendations. Second, attention should be given to the role of data-driven decision-making within quality assurance systems. Research might explore how data governance and analytical technologies can enhance operational efficiency and bridge the gap between superficial structural design and deep execution. Additionally, examining the roles and influences of internal stakeholders—such as faculty, students, and administrative staff—in quality assurance processes is critical. Future work could focus on stakeholder engagement and collaboration as a means to build more effective quality assurance frameworks. Lastly, with the ongoing internationalization and digitalization of higher education, future research should explore the potential applications of emerging technologies, including artificial intelligence and big data analytics, in quality assurance system development. Investigating how international cooperation and exchange can further elevate the global standards of university quality assurance would also be valuable.

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