

Sustainability and Quality Assurance of Online Education Models in Chinese Higher Education in the Post-Pandemic Era

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ABSTRACT

In the post-pandemic era, online education has expanded rapidly across Chinese higher education, raising complex challenges for sustainability and quality assurance. This study employs a narrative literature review with embedded critical synthesis, complemented by an exploratory case study of representative institutional practices between 2019 and 2025. While prior research has addressed technical deployment and teacher adaptation, it often lacks systematic evaluation frameworks and equity-focused analysis. By reviewing both domestic and international scholarship, this study identifies persistent gaps in quality assurance, particularly the absence of unified standards, weak interaction design, and limited student-centered approaches. It also critiques the over-reliance on survey data and the scarcity of longitudinal, cross-institutional evaluations. Through an analysis of key cases such as Rain Classroom and Peking Online, the study reveals how platform proliferation has driven innovation while simultaneously widening digital divides and intensifying data governance risks. In response, the paper proposes actionable strategies, including nationalized QA indicators, adaptive platform design, and targeted support for disadvantaged learners. It further introduces blended learning frameworks tailored to institutional diversity, promoting integration of online and traditional modalities. The findings offer both theoretical grounding and practical pathways for advancing equitable, high-quality, and sustainable digital education in China.

Keywords: Online Education; Quality Assurance; Educational Sustainability; Digital Transformation; Chinese Higher Education

1.0 INTRODUCTION

Since the COVID-19 outbreak in 2019, higher education in China has undergone rapid digital transformation. Online teaching has shifted from an emergency response model to a normalized, blended instructional mode, enabled by national policies and technological infrastructure (Jelinska & Paradowski, 2021). In the post-pandemic era, ensuring the sustainability and quality assurance (QA) of these evolving models has become a central concern for institutions and policymakers (Li & Che, 2022).

Despite continued investment, major challenges remain. Chinese universities still face the absence of unified QA standards, inconsistencies in instructional design, limited teacher-student interaction, and significant digital disparities across regions and institutions (Wei & Yin, 2024; Huang, 2023). While digital transformation has improved students' access and digital competencies, it has also exacerbated digital divides, platform disparities, and data security risks (Li & Xing, 2025). Although existing literature has discussed blended learning and QA innovation, many studies remain fragmented, focus on isolated cases, and rarely integrate policy frameworks with institutional realities (Korchak & Khavenson, 2025).

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To address these gaps, this study adopts a narrative literature review with embedded critical synthesis, complemented by an exploratory case analysis of digital transformation practices in Chinese universities between 2019 and 2025. Its objectives are to synthesize QA models and strategies, identify barriers to pedagogical and governance effectiveness, and propose practical frameworks to guide the development of sustainable and inclusive online education.

This study is guided by three key research questions: What are the major developments and ongoing challenges in online QA systems within Chinese higher education? How has digital transformation impacted equity and platform implementation? What institutional strategies and national policies can support long-term sustainability?

By bridging theoretical perspectives and empirical insights, this review analyzes prominent models such as Rain Classroom and Peking Online, identifies gaps in QA frameworks and governance, and proposes blended learning strategies adapted to institutional diversity. The findings offer both conceptual contributions and actionable policy recommendations for promoting high-quality, equitable digital education in post-pandemic China.

2.0 CURRENT RESEARCH PROGRESS AND THEMATIC OVERVIEW

2.1 Chronological Review

Since the outbreak of COVID-19, online education in Chinese higher education has undergone rapid evolution from emergency digital delivery to long-term integration with hybrid models. Hodges et al. (2020) first distinguished emergency remote teaching (ERT) from systematically designed online learning, highlighting major gaps in interaction, content quality, and assessment design. Their call for “intentional instructional design” has significantly influenced later research.

By 2021–2022, attention shifted to the construction of quality assurance (QA) mechanisms and the development of teacher digital competencies. Studies have found that the effectiveness of online learning is strongly correlated with instructors’ ability to design interactive content and manage student engagement. However, existing QA frameworks were often inconsistent or lacked stakeholder alignment.

In recent years (2023–2025), literature has increasingly emphasized digital equity, platform disparities, and student-centered governance. Although digital platforms have introduced new possibilities for teaching, learning, and institutional management, inequalities across institutions and regions remain evident. At the same time, weak interoperability, fragmented digital ecosystems, and broader barriers to digital transformation continue to constrain pedagogical effectiveness. These developments suggest that quality assurance in higher education should not be confined to technical or procedural measures alone, but should also address issues of governance, inclusion, ethics, and equity (Staring et al., 2022; Singun, 2025; Lim & Graham, 2021).

2.2 Thematic Classification and Analysis

In the post-pandemic transformation of higher education, online learning has become central to pedagogical reform in both China and globally. Recent research trends can be thematically grouped into three domains: (1) Quality Assurance (QA), (2) Digital Transformation and Platform Governance, and (3) Educational Equity and Sustainable Development. A cross-national comparison further reveals structural divergences between Chinese and Western QA practices, emphasizing the need for context-responsive reforms.

Table 1 Synthesis of Online Education Research Themes in China (2019–2025)

Theme	Focus Areas	Key Insights	Research Gaps
Quality Assurance	QA frameworks (TQM, PDCA, AHP-FCE); evaluation criteria	Multidimensional QA models are emerging; emphasis on process quality and feedback	Lack of national standards; weak cross-institutional comparability
Digital Transformation	Platform innovation, regional disparities, usability, tech integration	Rapid deployment; uneven platform maturity across universities	Over-reliance on scale, under-emphasis on learning impact
Educational Equity & Access	Rural vs urban digital divide, self-regulation, engagement, wellbeing	Autonomy improved for some students; others face barriers due to tech gaps and poor infrastructure	Lack of longitudinal data and inclusion of student experience in QA frameworks

Quality Assurance in Education: A substantial body of research on online education centers on quality assurance, focusing on the lack of robust assessment standards in higher education, the application of diverse evaluation methods, such as Total Quality Management (TQM) and the Analytic Hierarchy Process–Fuzzy Comprehensive Evaluation (AHP-FCE) models, and the ongoing innovation of evaluation tools. Some researchers have adopted frameworks such as TQM and the Plan-Do-Check-Act (PDCA) cycle to construct multidimensional, process-oriented mechanisms for monitoring and improving instructional quality. Recent literature also explores scientific evaluation models such as AHP and FCE to enhance the systematicity and fairness of assessment. Additionally, Rapanta et al. (2020) highlight the critical roles of teacher presence, interaction quality, and feedback mechanisms in enhancing learning outcomes. They argue that multidimensional quality indicators should extend beyond academic achievement to include learning experience and developmental gains (Rapanta et al., 2020). Recent literature underscores a shift from outcome-based quality frameworks to multidimensional, process-driven QA mechanisms. In the Chinese context, institutions often adopt administrative, policy-driven QA structures without unified national benchmarks. Tools such as the Analytic Hierarchy Process (AHP) and Fuzzy Comprehensive Evaluation (FCE) models have been applied to design formative QA systems, yet remain fragmented and localized.

In contrast, international QA systems (e.g., QAA in the UK, TEQSA in Australia) emphasize external reviews, stakeholder participation, and a balance of formative and summative evaluation (Karakhanyan & Stensaker, 2020). Notably, OECD-led frameworks advocate integrating student feedback, teacher presence, and learning outcomes into digital QA models.

Digital Educational Transformation and Platform Development: The digital transformation of Chinese universities has driven rapid advances in online teaching platforms, but has also exposed issues such as uneven technology adoption, disparities in platform functionality, and the need to strengthen digital literacy. Research in this area suggests that the evolution of digital platforms and technologies has spurred educational innovation, but has also widened the digital divide among institutions and between faculty and students. Digital literacy, platform application capabilities, and concerns over data security and privacy have emerged as new challenges. While some leading universities have developed relatively mature models of blended learning, progress in digital transformation remains uneven across regions, disciplines, and demographic groups.

Sustainability, Educational Equity, and Student Learning Experience: Recent studies have increasingly addressed topics such as the Sustainable Development Goals (SDGs), pathways to blended instruction, online educational opportunities for disadvantaged groups, data security,

and policy innovation. Daniel (2020) contends that digitalization in higher education should be aligned with the United Nations SDGs, promoting educational equity through blended learning approaches (Daniel, 2020). Empirical research indicates that online education can enhance self-directed learning and digital skills for some students; however, younger students, those with weaker self-regulation, and those from economically disadvantaged regions are more vulnerable to environmental and technological constraints, which may compromise their learning outcomes and sense of engagement. At the same time, there is growing attention to the impacts of online learning on academic performance, participation, well-being, and digital competency, with increasing calls for a student-centered and experience-oriented approach that integrates learning support services into the quality assurance framework.

Overall, current research demonstrates that:

- Quality assurance systems for university online education are evolving from single, outcome-based models toward multidimensional, process-oriented, and dynamic systems, drawing on advanced international practices;
- Digital educational transformation has brought about technological innovation and platform upgrades, but new challenges, such as equity and data security, require coordinated policy, management, and technological solutions;
- Blended learning has become the mainstream model in higher education in the post-pandemic era, and education governance that prioritizes student experience and sustainable development is gradually emerging as a consensus.

The review shows that while China has made commendable progress in policy adaptation and platform deployment, it still trails behind in developing scalable, student-centered, and equity-driven QA systems. Western models provide valuable insights into stakeholder-inclusive governance and learning-centered evaluation, but may require adaptation to local cultural, administrative, and infrastructural contexts. Thus, a hybrid QA approach merging China's policy efficiency with global pedagogical standards can serve as a path toward sustainable and inclusive digital transformation in higher education.

3.0 SUMMARY AND COMPARISON OF KEY RESEARCH

In the post-pandemic era, online education in Chinese universities has transitioned from the emergency and short-term adaptations necessitated by the pandemic to a phase of integrated and normalized development. Institutions have widely adopted blended learning models, intelligent technologies, and diversified digital education platforms. While ongoing efforts to optimize quality assurance are evident, universities continue to face challenges related to the adaptability of faculty and students, curriculum design, technical support, and effective evaluation. According to data from China's Ministry of Education in 2023, over 85% of universities nationwide now offer online courses, and blended learning facilitated by platforms such as "Rain Classroom" and "Chaoxing Learning" has become the prevailing mode of instruction, with more than 85% of institutions implementing hybrid models. In alignment with international trends, Chinese universities have continuously advanced digital educational transformation, accumulating extensive practical experience and theoretical achievements in quality assurance, technological innovation, and educational equity (Rapanta et al., 2020).

Achievements:

- Model Innovation: The adoption of MOOCs, SPOCs, and virtual laboratories has diversified learning modalities, enabling students to select content and pace according to their interests and needs. This has significantly enhanced learner autonomy and broadened access to shared resources (Means & Neisler, 2021), not only advancing educational equity but also laying the groundwork for sustainable development.

- **Platform and Technological Upgrades:** Large-scale digital platforms, such as the National Smart Education Platform and Chaoxing, have promoted the dissemination of high-quality resources and the standardization of curricula, facilitating the flow of quality educational resources across regions. These platforms provide technical support for quality assurance, using data tracking and intelligent analytics to optimize instructional management and quality monitoring.
- **Improvement in Digital Literacy:** Both teachers and students have seen notable improvements in digital competencies. Enhanced platform feedback and personalized recommendations now provide a stronger foundation for high-quality learning and ongoing educational development (Trust & Whalen, 2020).

Limitations:

- **Digital Divide:** Significant disparities in technology and resource access persist between urban and rural areas and across regions, limiting the benefits for disadvantaged groups and certain students.
- **Insufficient Depth of Interaction and Experience:** The interaction mechanisms of some platforms remain inadequate, leading to decreased student engagement in online settings (Rapanta et al., 2020).
- **Data Security and Ethical Risks:** Issues regarding the privacy and security of learning data have become increasingly prominent and demand regulatory attention.

Pressure for Continuous Innovation and Disciplinary Adaptation: Platform homogenization hampers the ability to fully address the diverse needs of different disciplines and student groups (Zawacki-Richter, 2021).

Table 2 Cross-national Comparison of Online Education QA Systems

Dimension	Chinese Context	Western Context	Research Gap
QA Framework	Localized, administrative QA tools (AHP, PDCA); no national-level unified QA system	National QA bodies (e.g., QAA, TEQSA); blended formative-summative models (Karakhanyan & Stensaker, 2020)	China lacks scalable, nationally coherent QA indicators for online education
Tech Platforms	Platform diversity, low interoperability, usability disparities	Emphasis on user-centered design, analytics, adaptability	Limited empirical assessment of platform impact and design scalability in Chinese contexts
Evaluation Models	Predominantly summative; low student involvement; fragmented teacher evaluation	Balanced use of student feedback, performance analytics, and peer review	Weak integration of student experience data in Chinese QA governance
Equity Focus	Emphasis on access coverage; regional & demographic digital divides persist	Growing focus on digital equity, wellbeing, and differentiated support	In China, equity remains marginal in QA discourse; it lacks structural inclusion of digital governance metrics

Overall, digital educational transformation has significantly advanced innovation in educational models and resource optimization, and improved digital literacy, providing strong support for enhancing equity and quality assurance in education. However, challenges remain regarding the digital divide, limited engagement, data security, and the sustainability of innovation. Achieving sustainable educational development will require continued efforts in technology dissemination,

platform innovation, regulatory governance, and targeted support for disadvantaged groups, thereby fostering the high-quality, inclusive, and sustainable growth of digital education.

3.1 Comparative Analysis of Theories and Practices of Online Education Sustainability at Home and Abroad

Theoretical Perspectives:

Both Chinese and international scholars generally agree that sustainable educational development should focus on equity, capacity for innovation, and the modernization of governance. International theories emphasize student-centeredness, standardized assessment, and continuous improvement as their core tenets (Martin et al., 2019; Daniel, 2020). In contrast, Chinese approaches highlight policy-driven initiatives and platform-based collaboration, emphasizing large-scale implementation and precise governance (Liu et al., 2020).

Practical Perspectives:

- **China:** Exemplary platforms such as Tsinghua's "Rain Classroom," Peking University's "Peking Online," and Zhejiang University's "Smart Tree" stress platformization, open sharing, and data feedback, reinforcing collaborative governance between government and universities.
- **International:** Universities in the United States and the United Kingdom prioritize institutional autonomy and personalization, with a focus on learning support and accreditation standards (Means & Neisler, 2021). South Korea implements "Smart Education" through top-level design, while India emphasizes infrastructural development and broad accessibility.

China demonstrates unique strengths in platform proliferation and policy coordination, while Western experiences are distinguished by their diversity and personalized services. South Korea focuses on empowering teachers and improving digital literacy, whereas India continues to address infrastructural challenges. International quality assurance systems tend to be more mature, with greater attention paid to disciplinary and student diversity. Overall, Chinese digital practice aligns closely with international theories at the macro level, including platform-driven and policy-led development, quality assurance, and open resources. However, at the micro level, such as learner-centeredness, deep equity, social participation, and multi-stakeholder collaboration, gaps remain.

Innovations in Blended Learning Models, Platform Development, and Educational Equity

Blended Learning Models: In recent years, blended (hybrid) learning has become a major trend in the digital transformation of global higher education. This evolution is mainly driven by three factors: first, the large-scale "emergency online" teaching during the pandemic exposed the limitations of fully online models, prompting institutions to seek integrated approaches that leverage both online and offline strengths; second, advances in technology and the widespread adoption of digital platforms have enabled more personalized and flexible learning pathways; third, the evolving and diverse needs of learners are pushing educational models toward deeper integration, collaborative innovation, and a learner-centered orientation (Means & Neisler, 2021). In China, universities widely use platforms like "Rain Classroom" and "Smart Tree" to enable full-cycle management of pre-class preparation, in-class interaction, and post-class feedback (Bao, 2020). Nevertheless, there is still room for improvement in areas such as personalized support, participation of disadvantaged groups, and differentiated resource allocation, with pronounced challenges in achieving balanced development across urban and rural regions, disciplines, and student populations.

Platform Development: Platform development entails not only resource aggregation and technological upgrades but also the reshaping of learning ecosystems. National smart education platforms and institution-specific platforms have enriched the pool of high-quality courses and

educational resources, leveraging artificial intelligence and big data to optimize personalized recommendations, academic early warning systems, and learning path planning. This has enabled intelligent resource delivery and precise management of instructional processes (Trust & Whalen, 2020). However, China's current learning platforms face issues such as functional homogenization, limited innovation, and data silos. The pace of improvement in teachers' digital literacy lags behind technological advances, thereby constraining the utilization of quality resources and the effectiveness of instructional innovation. Furthermore, data security, privacy protection, and compliance have become increasingly prominent institutional concerns.

Educational Equity: Educational equity remains a core issue in the digital transformation and sustainable development of online education in Chinese universities. While policies consistently target narrowing digital divides across urban-rural, regional, and demographic lines and seek to enhance support and technological empowerment for disadvantaged students, disparities in platform access and resource distribution persist. International experience demonstrates that Western universities provide differentiated support through social support systems, diverse learning pathways, and inclusive governance mechanisms for students with varying backgrounds and needs. Examples include tailored guidance, equipment subsidies, and community support for students with disabilities or from low-income backgrounds, all of which have contributed to improved educational equity and social inclusion.

Table 3 Comparative Practices in Digital Transformation of the Higher Education Domain

Domain	China	International Practices
Policy Approach	Top-down, platform-driven	Institutional autonomy, diverse governance
Platform Development	Centralized, resource-driven	User-centered, AI-integrated platforms
QA Focus	Technological performance, admin control	Learner experience, multi-stakeholder input
Equity Mechanisms	Broad access, regional policies	Individualized support, inclusive services
Blended Learning	Platform-managed hybrid modes	Flexibility + social learning environments

In summary, the rapid advancement of blended learning and the intelligent development of educational platforms have enhanced the overall quality and flexibility of higher education in China, but they have also introduced new challenges in equity and governance. The sustainability and quality assurance of online education cannot rely solely on technological innovation and platform upgrades; instead, they require coordinated efforts across policy development, governance structures, capacity building for faculty and students, and social support systems. Chinese universities should, while advancing large-scale implementation and standardized governance, further explore personalized services, empowerment of disadvantaged groups, data security, and social engagement. This will foster a shift toward more equitable, inclusive, and sustainable educational models, ultimately achieving truly high-quality development.

4.0 RESEARCH PROSPECT

4.1 Trends and Transformations in the Field

Over the past five years, research on online education in Chinese higher education has evolved substantially. Several significant trends characterize this transformation:

- **Thematic Expansion:** Initial research focused heavily on technological tools and emergency remote teaching. Recently, however, scholarly attention has broadened to include student learning experience, long-term quality assurance, digital literacy, blended instructional models, and educational equity.
- **Methodological Shift:** The field has moved from predominantly descriptive and qualitative approaches toward data-intensive, theory-driven, and mixed-methods studies, enabling more robust evaluation of impact, trends, and disparities.
- **Theoretical Integration:** There is a growing convergence between international QA frameworks (e.g., ENQA, INQAAHE) and localized governance practices. This trend is advancing the institutionalization of digital QA standards that are both globally informed and contextually grounded.
- **Institutional Innovation:** Leading universities in China have developed increasingly mature hybrid learning models, incorporating intelligent feedback, adaptive instruction, and diversified assessment. These practices are gradually reshaping the governance of digital learning ecosystems.

4.2 Strengths, Limitations, and Future Directions

While current research exhibits commendable progress in theoretical integration, empirical analysis, and policy responsiveness, several critical limitations persist:

Thematic redundancy and fragmentation, with limited generalizability due to single-case or institution-specific studies;

- Insufficient longitudinal and comparative studies, especially across regions, disciplines, and marginalized populations;
- Limited exploration of governance-technology-equity intersections, particularly in platform design and social inclusion mechanisms.
- To address these gaps, future research should prioritize the following directions:
- Establish a unified national QA framework for online education, with multidimensional indicators for pedagogy, engagement, equity, and governance, enabling benchmarking and cross-institutional comparability.
- Advance equity-focused research, emphasizing the needs of underrepresented groups, rural institutions, and disciplinary variations, using both macro-level policy analysis and micro-level student experience data.
- Leverage emerging technologies, such as AI, blockchain, and learning analytics to build personalized, adaptive, and intelligent learning environments, while assessing their ethical and equity implications.
- Conduct longitudinal, cross-regional studies examining not only academic performance but also students' mental health, digital wellbeing, and social adaptation in digitally mediated environments.
- Strengthen interdisciplinary and cross-sector collaboration across educational researchers, platform developers, policy makers, and practitioners, aiming to build sustainable, inclusive, and innovation-driven governance systems.

In summary, the research landscape on online education in China is shifting from reactive adaptation toward strategic innovation and systemic transformation. Achieving long-term sustainability and educational equity requires not only technological and policy improvements but also methodological pluralism, interdisciplinary dialogue, and multi-stakeholder co-governance. A future-oriented research agenda must be bold, inclusive, and attuned to the complexities of digital education in a globalized, post-pandemic world.

5.0 CONCLUSION

This review systematically examined the evolution, challenges, and innovations in the quality assurance of online education in Chinese universities during the post-pandemic era. In response to the initial research questions, the study found that while Chinese universities have made substantial progress in developing hybrid learning models and platform-based governance, they continue to face persistent issues, including fragmented QA mechanisms, regional disparities, and limited integration of student-centered evaluation tools.

From a cross-national perspective, Chinese practices rooted in administrative coordination and platform centralization contrast with Western systems that emphasize stakeholder participation, institutional autonomy, and continuous learner feedback. These comparisons suggest that China's future digital transformation would benefit from hybrid governance models that integrate global benchmarks with localized execution strategies.

Moreover, this review contributes theoretically by aligning international QA models with China's institutional realities and practically by offering an adaptable framework for integrating technological innovation, equity-driven support, and governance reform. The proposed QA reform directions, including multidimensional indicators, equity-centered analytics, and longitudinal data systems, can guide both national policy design and institutional implementation.

Looking forward, future research and policy development should strengthen cross-sector collaboration, emphasize student wellbeing and inclusivity, and invest in dynamic QA tools powered by AI and data analytics. Only through an integrative, student-centered, and ethically grounded approach can China achieve a truly sustainable and high-quality future in online higher education.

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