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# Metaverse Integration in Enhancing Administrative Quality Assurance in a Primary School in China

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**Abstract:** This study explores the integration of metaverse technology in enhancing educational quality assurance at a primary school in China and its impact on quality assurance effectiveness. A total of 120 teachers participated in a survey assessing six domains of metaverse integration—pedagogical design, technological infrastructure, teacher competence, student engagement, school leadership, and psychosocial impact—and their relationship with nine domains of educational quality assurance. Correlation analysis revealed significant associations between pedagogical design, technological infrastructure, teacher competence, and school leadership with key quality assurance areas such as professional development, resource optimization, policy alignment, and data-driven decision-making. Overall, the degree of metaverse integration ( $r = 0.34$ ) showed a positive correlation with improved educational quality assurance delivery, suggesting that as metaverse technology is further integrated, educational quality assurance is perceived to improve. This study fills a research gap by linking metaverse integration with educational quality assurance and offers actionable recommendations for school administrators, teachers, and technology developers to foster the digital transformation of quality assurance systems in primary education.

**Keywords:** metaverse integration; administrative quality assurance; immersive learning; teacher competence; technological infrastructure; institutional leadership

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## 1. Introduction

The transformative trajectory of education in China is increasingly shaped by rapid advancements in digital technologies. As primary schools strive to modernize their operations, enhance educational effectiveness, and meet national educational standards, educational quality assurance (QA) emerges as a critical mechanism for sustaining academic credibility, operational efficiency, and stakeholder trust. Educational quality assurance refers to the systematic processes, standards, and evaluations that ensure accountability and continuous improvement in school governance, resource management, and educational services [1,2]. It involves planning, implementation, monitoring, and feedback mechanisms that align internal operations with national education policies and regulatory requirements [3].

However, despite policy-driven reforms and strategic frameworks such as Education Informatization 2.0, many Chinese primary schools still rely on fragmented, paper-based, or semi-digitized systems for educational QA. These approaches are often burdened by procedural redundancies, limited real-time tracking, and poor data integration across departments [4]. In recent studies, challenges such as lack of internal coordination,

overreliance on manual reporting, and high administrative workload have been identified as major barriers to effective quality assurance [5,6].

Notably, burnout and inefficiency among teaching and administrative staff persist due to excessive documentation and accountability pressures. This situation calls for a paradigm shift toward more intelligent, responsive, and immersive digital solutions.

### *1.1. Background of the Study*

In the era of educational modernization, educational quality assurance (QA) has become an essential pillar in enhancing institutional accountability, transparency, and strategic development across primary schools. In the Chinese education sector, there is a strong push to align educational systems with national education reforms aimed at improving academic outcomes and operational effectiveness. However, while traditional internal quality assurance (IQA) mechanisms have facilitated structured evaluations, compliance monitoring, and documentation processes, their current limitations—manual operations, rigid workflows, and slow responsiveness—have proven insufficient in meeting the increasingly complex demands of 21st-century education [1,4].

Evidence from international and regional studies suggests that educational inefficiencies such as audit delays, fragmented documentation, and weak monitoring mechanisms are prevalent and persistent. For instance, while educational quality assurance has been found to enhance student engagement and teacher feedback loops, it can also significantly increase administrative burdens that lead to teacher fatigue. Similarly, in other regional contexts, educational quality assurance is often undermined by insufficient supervision, lack of infrastructure, and inconsistent appraisal mechanisms, thereby affecting its effectiveness [7]. These findings resonate with ongoing challenges in Chinese primary schools, where administrators often struggle with high-volume reporting requirements and decentralized data systems. Previous research reveals that accreditation ratings are directly linked to how well educational quality assurance systems are implemented and sustained, yet inconsistencies in execution remain a barrier.

The research gap lies in the limited empirical studies that specifically investigate the intersection between metaverse integration and administrative quality assurance in education settings. While prior studies have assessed internal quality assurance systems, e-learning quality assurance tools, and school-level implementation challenges, none have systematically explored how immersive digital environments can be leveraged to address the operational, structural, and cultural challenges within administrative quality assurance systems. Cultural challenges within administrative QA systems [8]. This study, therefore, aims to fill that void and offer a context-specific framework for integrating metaverse applications to enhance administrative quality assurance in Chinese schools.

### *1.2. Theoretical Framework*

This study on metaverse integration in enhancing educational quality assurance in China is guided by two major theoretical perspectives corresponding to its key constructs: metaverse integration and educational quality assurance (QA). Together, these frameworks provide a coherent basis for understanding the technological adoption and quality management processes within the educational context.

To understand the dynamics of metaverse integration, the study adopts the Technology Acceptance Model (TAM) by Davis, which posits that individuals' acceptance and use of technology are primarily influenced by two factors: perceived usefulness and perceived ease of use [9]. In the context of primary school administration, TAM explains how school administrators evaluate the value and efficiency of metaverse tools before integrating them into educational quality assurance functions. This is particularly relevant in light of Trazona et al., whose findings revealed that digital tools for educational quality assurance were more effective when users found them intuitive, accessible, and aligned with institutional goals. Thus, TAM provides the foundational lens through which this

study analyzes the readiness and attitudes of primary school stakeholders toward immersive educational technologies [10].

Together, these theories offer a multidimensional understanding of how immersive technologies such as the metaverse can be accepted, implemented, and aligned with institutional quality assurance frameworks to support administrative modernization in Chinese schools. By converging principles of usability, simulation, participatory engagement, and continuous improvement, the theoretical foundation of this study bridges digital innovation with quality governance imperatives in education.

### *1.3. Statement of the Problem*

This study aimed to examine the extent to which metaverse integration enhances educational quality assurance delivery in a primary school in China. It sought to assess both technological and administrative dimensions through respondent assessments and determine the relationship between digital innovation and educational quality assurance practices.

- 1) Is there a significant difference in the assessment of the respondents on the metaverse integration of the school when their profile variables are used as test factors?
- 2) Is there a significant difference in the assessment of the respondents on the administrative quality assurance delivery of the school when their profile variables are used as test factors?

### *1.4. Hypothesis*

Hypothesis 1: After grouping the respondents based on their personal characteristic variables (age, highest education level, department, and job title), there were no significant differences in their assessments of the integration of the metaverse in a primary school.

Hypothesis 2: When grouped according to the personal characteristic variables of the respondents, there is no significant difference in their assessments of the implementation of educational quality assurance in a primary school.

Hypothesis 3: There is no significant relationship between the degree of integration of the metaverse and the implementation of educational quality assurance in primary schools.

### *1.5. Significance of the Study*

This study is significant in light of the increasing demand for innovation and technological advancement in the governance of educational institutions in China. As primary schools aim to maintain competitiveness and meet evolving quality standards, the integration of emerging technologies—particularly the metaverse—offers promising potential to enhance educational quality assurance systems. The findings of this research will be beneficial to multiple stakeholders:

For School Administrators, the study provides empirical insights into how metaverse integration can be strategically employed to support internal and external quality assurance mechanisms. It will guide institutional leaders in optimizing administrative processes, stakeholder engagement, and data-informed decision-making through immersive digital environments [11].

For Teachers, the study will inform capacity-building initiatives aimed at equipping educators with the necessary technological competencies to participate in metaverse-supported environments that promote transparency, collaboration, and performance accountability.

For Students, the research underscores the role of immersive technologies in fostering engagement, psychosocial well-being, and participatory governance—ultimately enhancing their educational experience and institutional trust.

For Educational Technology Developers, the findings will contribute to the design and refinement of metaverse-based platforms tailored to the needs of education institutions seeking quality assurance enhancement through digital ecosystems.

## 2. Research Methodology

This study employs a quantitative comparative-correlation research design to investigate the relationship between the integration of the metaverse and the implementation of educational quality assurance in a selected primary school in China. The design aims to determine whether there are significant differences in respondents' assessments based on their demographic characteristics. Practice has proven that this method is suitable for quantifying perceptions, identifying patterns, and conducting statistical tests on hypotheses regarding differences and relationships between variables.

This study employs a comparative design to investigate whether there are significant differences in teachers' assessments of metaverse integration and educational quality assurance when grouped according to age, education level, school grade level, and job title. This enables researchers to identify differences based on individual characteristics, which influence schools' perspectives on technology adoption and quality assurance.

This study incorporates a correlation analysis section to determine the strength and direction of the relationship between the degree of metaverse integration and the quality of educational assurance delivery. By adopting this method, this study evaluates whether a degree of metaverse integration is associated with improvements in the implementation of internal quality assurance processes in primary schools.

## 3. Results and Discussion

Through research and analysis, it is found that the team is both diverse and hierarchical in terms of age, qualifications, and professional titles. The group of teachers with advanced degrees can be considered as the backbone of policy interpretation, quality assurance, and institutional leadership. Meanwhile, the younger and less experienced teachers may hold a more open attitude towards digital experimentation, including metaverse-based learning environments. Data does not merely view these differences as sources of change, but may suggest an opportunity: targeted professional development programs can intentionally leverage the experience of older and more experienced teachers, while supporting younger and less experienced teachers in building confidence in administrative quality assurance processes and technology-enhanced teaching.

Secondly, teachers generally believe that metaverse technology is a part of the teaching process, but the scope of its practical application remains uneven. User-friendly applications (such as avatar-based scenarios) have the highest participation rate, while the use of resources with technical requirements (3D content, fully virtual simulations, and advanced interactive environments) seems to be unstable. This pattern may indicate that although the institution has made significant strides in the transformation towards virtual teaching, teachers still require more in-depth training and structured support to maximize the educational value of the metaverse.

In the context of primary education, the term "psychosocial impact" refers to how metaverse integration can positively influence students' emotional well-being, social interactions, and engagement with learning. Technologies like the metaverse provide opportunities for students to develop emotional and social skills, which are essential components of their overall development. By fostering a supportive learning environment, digital tools can enhance students' emotional support and social interactions, which are critical for their academic success and personal growth.

## 4. Output of the Study

Research findings indicate that the primary school has made steady progress in integrating metaverse technology into teaching, learning, and administrative processes.

However, the assessment results reveal uneven development across various areas, necessitating the development of a structured improvement plan. While teachers demonstrate the strongest capabilities in metaverse integration, scores for technical infrastructure and instructional design are relatively low. This suggests that teachers' efforts may exceed the school's hardware capabilities and instructional framework. This mismatch appears to limit the widespread application of immersive tools in classroom routines. Strengthening these areas could create a more favorable environment, enabling teachers' skills to be more directly translated into student learning enhancement [12].

Institutional leadership has also received positive evaluations, but some indicators, especially those related to policy clarity and strategic direction, suggest that units may not always feel supported by the leadership. Given the significant correlation between leadership and multiple administrative quality assurance areas, it is particularly important to strengthen governance structures and decision-making mechanisms. A more prudent leadership attitude can align policies, resources, and training programs, thereby reducing inconsistencies in implementation.

In terms of quality assurance, the survey results indicate that administrative mechanisms related to technology-enabled quality assurance, professional development, and external quality assurance are generally prevalent. However, areas such as teaching leadership, supervision, and internal quality assurance systems have significantly lower scores. This pattern may suggest that we are in a transitional phase, where traditional supervision and audit models have not yet fully adapted to the digital and immersive environment. Updating quality assurance tools, digitizing audit tools, and equipping supervisors with virtual monitoring capabilities may help bridge this gap. Interestingly, there are significant differences in stakeholder participation and inclusive governance across different age groups, suggesting that different intergenerational groups have varying views on transparency and participation. This nuanced difference underscores the necessity of strengthening communication channels and ensuring that governance structures are easily comprehensible for both younger and older employees.

Taken together, these insights suggest the need for a comprehensive approach that addresses not only teaching issues but also administrative, technical, and governance aspects. By incorporating key result areas (KRAs) into a unified enhancement plan, primary schools can move towards a more stable and strategically aligned system where immersive technology enhances teaching, enriches student engagement, and strengthens a responsive, evidence-driven educational quality assurance framework.

## 5. Recommendations

Enhance institutional support for metaverse integration by strengthening technological infrastructure. Although teacher competence received the highest ratings, several indicators—particularly those related to connectivity, device availability, and system reliability—suggest that the primary school may benefit from targeted investments in hardware, bandwidth stability, and platform optimization. Prioritizing infrastructure upgrades will help ensure that immersive learning functions consistently and equitably across classrooms.

Develop clearer pedagogical guidelines to ensure meaningful metaverse-based instruction. Since pedagogical design ranked lower than other domains, the primary school may consider crafting structured instructional models that integrate 3D content, scenario-based learning, and virtual simulations. Training modules and exemplar lesson templates can help teachers align immersive tools with course outcomes rather than relying on ad hoc or experimental usage [13].

Promote generational inclusivity and transparent governance in digital transformation initiatives. Since age influenced perceptions of stakeholder engagement, the primary school may explore ways to make decision-making processes more participatory across age groups. Mixed-age committees, open consultations, and

accessible communication channels may help reduce gaps in how staff perceive inclusiveness in governance, particularly as metaverse-related policies evolve.

Continue to develop culturally responsive digital policies that support equitable and inclusive metaverse use. Since some elements of cultural responsiveness scored lower, particularly in access and policy accommodation, additional consultations with minority groups and marginalized stakeholders may help refine guidelines. Aligning metaverse initiatives with diverse learning preferences could reduce barriers and foster greater participation across the primary school.

## 6. Conclusion

The demographic profile of teachers appears diverse in terms of age, job title, and educational attainment, yet these characteristics generally did not shape major differences in how respondents evaluated metaverse integration or educational quality assurance delivery. This suggests that perceptions of digital transformation within the primary school may be influenced more by institutional conditions than by personal attributes.

The primary school's extent of metaverse integration may be described as moderately established, with teachers demonstrating the strongest competence in using immersive tools. Despite this promising capacity, areas such as interactive whiteboards, projectors, and basic network infrastructure remain in need of further strengthening, particularly in ensuring reliable connectivity, updated equipment, and more intentional alignment between immersive strategies and instructional goals.

Differences in the assessment of metaverse integration were minimal across demographic groups. The few significant variations—particularly in psychosocial impact, school leadership, and student engagement—point to pockets of differing experiences that may stem from varying comfort levels, expectations, or exposure to immersive technologies across generations and professional positions.

Demographic variables showed almost no significant influence on how respondents viewed the primary school's quality assurance delivery, except in stakeholder engagement and inclusive governance, where age emerged as a differentiating factor. This may indicate that generational cohorts vary in how they perceive participation, inclusivity, and transparency within digital governance structures.

## References

1. Y. Li, "Quality assurance in Chinese higher education," *Research in Comparative and International Education*, vol. 5, no. 1, pp. 58–76, 2010. doi: 10.2304/rcie.2010.5.1.58.
2. E. Rashidi and R. M. Jingura, "Performance management and quality assurance in higher education," *International Journal of African Higher Education*, vol. 10, no. 2, pp. 83–112, 2024. doi: 10.6017/ijahe.v10i2.17615.
3. M. K. Mukhlisin, N. Ulfatin, and M. Muyassaroh, "An Implementation of an Internal Quality Assurance System in Improving the Quality of Senior High School Education: A Systematic Literature Review," *English Language Teaching Journal*, vol. 4, no. 1, pp. 1–12, 2024.
4. A. Idris, S. Trisnamansyah, and I. Wasliman, "Implementation of the internal quality assurance system in improving school quality," *Munaddhomah: Jurnal Manajemen Pendidikan Islam*, vol. 3, no. 1, pp. 27–34, 2022. doi: 10.31538/munaddhomah.v3i1.96.
5. B. D. Simbeye, "The contributions of school quality assurance practices on pupils' achievement in Kibaha's public primary schools," Ph.D. dissertation, The Open University of Tanzania, 2025.
6. T. T. Tran, T. T. Pham, and T. T. Le, "Balancing quality and well-being: A study on the impact of quality assurance measures on burnout among EFL teachers in Vietnam," *Frontiers in Education*, vol. 9, p. 1403755, Dec. 2024, Frontiers Media SA. doi: 10.3389/educ.2024.1403755.
7. U. Momoh and E. O. Osagiobare, "Implementation of quality assurance standards and principals' administrative effectiveness in public secondary schools in Edo and Delta States," *World Journal of Education*, vol. 5, no. 3, pp. 107–114, 2015. doi: 10.5430/wje.v5n3p107.
8. M. Assemi, M. V. DiVall, K. Lee, E. Sy, and T. O'Sullivan, "Quality assurance and improvement practices of experiential education programs in schools of pharmacy," *American Journal of Pharmaceutical Education*, vol. 83, no. 3, p. 6582, 2019. doi: 10.5688/ajpe6582.
9. F. D. Davis, "Perceived usefulness, perceived ease of use, and user acceptance of information technology," *MIS Quarterly*, vol. 13, no. 3, pp. 319–340, Sep. 1989. doi: 10.2307/249008.

10. J. A. R. Trazona, L. P. Lapie, C. S. Tan, L. P. Buenvenida, and M. M. Bandoy, "Enhancing E-Learning Material Creation: Exploring the Practices, Challenges, and Opportunities of the School Learning Resource Quality Assurance Team (SLRQAT) towards TIMER's Information Manuel of Educational Resources Project," *International Journal of Theory and Application in Elementary and Secondary School Education*, vol. 5, no. 1, pp. 108–129, 2023. doi: 10.31098/ijtaese.v5i1.1085.
11. G. C. Osegbue, and I. N. Ohamobi, "The Administrative Strategies of Principals for Achieving Quality Assurance in Anambra State's Public Secondary Schools," *Int. J. Manag. Bus. Intell*, vol. 3, no. 1, pp. 15-26, 2025.
12. E. Tsappi, I. Deliyannis, and G. N. Papageorgiou, "Developing a performance evaluation framework structural model for educational metaverse," *Technologies*, vol. 12, no. 4, p. 53, 2024. doi: 10.3390/technologies12040053
13. Y. Yusnadi, "Manajemen Rekrutmen Guru Dayah Berbasis Tradisi Keilmuan Salafiyah di Aceh," *Jurnal Seumubeuet*, vol. 4, no. 2, pp. 90-100, 2025.

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