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Transformative Solutions for Digital School Management: Guiding Educational Administrators in Vietnam's General Education System

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Abstract. This study investigates innovative adaptation solutions for advancing digital transformation in school management models tailored for educational administrators in Vietnam's general education institutions. Framed by the accelerating forces of globalization and the Fourth Industrial Revolution, the research highlights the strategic integration of information technology into management and pedagogy to boost educational outcomes. It underscores the necessity for administrators to embrace forward-thinking mindsets and acquire modern digital skills. A comprehensive survey of 15 schools across diverse regions was conducted, revealing varying levels of digital transformation alongside persistent challenges, such as inadequate infrastructure, limited financial resources, and insufficient professional training, particularly in rural areas. The research proposes actionable solutions, including the development of digital competency frameworks and training materials, the establishment of dynamic digital management and learning ecosystems, and fostering collaborative public-private partnerships to enhance technological accessibility and educational innovation. These findings offer practical pathways to facilitate digital transformation in Vietnamese schools, ensuring a robust foundation for the sustainable evolution of the nation's education system in the digital era.

Keywords: Digital Transformation in Education, Digital School Model, Digital Competency of Educational Administrators, Vietnamese General Education, Fourth Industrial Revolution.

1. INTRODUCTION

In the context of globalization and the rapid advancements of the Fourth Industrial Revolution, the integration of digital transformation into education has become a critical priority for nations worldwide. As a dynamic and evolving field, education must adapt to technological progress to meet the demands of contemporary society and equip future generations with essential skills. In Vietnam, the general education system is undergoing a transformative phase, where digitalization of school management processes is considered pivotal to modernizing education and enhancing its overall quality (Vietnam Ministry of Education and Training, 2021).

Digital transformation in education involves reimagining traditional management and pedagogical practices by leveraging information and communication technologies (ICTs). Such transformation not only enhances administrative efficiency but also fosters a student-centered learning environment, encouraging innovation and collaboration. According to Selwyn (2012), technology in education offers global perspectives, enabling equitable access to quality learning and bridging gaps in traditional educational models. However, implementing these changes demands substantial efforts, particularly from educational administrators, who must navigate challenges such as limited infrastructure, professional development, and resistance to change (Dinh, 2021; Nguyen et al., 2023)). The role of educational administrators in facilitating digital transformation cannot be understated. Effective leadership is essential for creating a vision for digital integration, securing stakeholder buy-in, and ensuring the successful adoption of new technologies. As highlighted by Navaridas-Nalda et al. (2020), school principals and administrators play a strategic role in influencing digital transformation through their leadership and decision-making capabilities. They must not only understand the potential of digital tools but also align these innovations with the broader goals of the education system. Despite the potential benefits, Vietnam faces significant challenges in advancing digital transformation in its general education institutions. A study by Giang et al. (2021) emphasized the varying levels of readiness for digital transformation, particularly in rural and underserved areas. Limited access to high-speed internet, inadequate digital infrastructure, and insufficient training for educators are major barriers that hinder progress. Additionally, Adams (2021) noted that continuous professional development is crucial for teachers and administrators to stay updated with the latest digital tools and methodologies, yet such opportunities remain scarce in many regions. To address these challenges, several solutions have been proposed. Carter and Martin (2018) emphasized the importance of innovative teaching strategies that integrate digital tools to enhance learning outcomes. Ferrari (2013) further outlined the need for a comprehensive framework to develop digital competencies among educators and administrators. In Vietnam, fostering public-private partnerships has emerged as a viable strategy to expand access to technology and financial resources (Vietnam Ministry of Education and Training, 2021). Collaborative efforts between government agencies, private enterprises, and educational institutions can provide the necessary infrastructure and training to support digital transformation. This paper aims to explore transformative solutions for integrating digital transformation into school management models, with a focus on empowering educational administrators in Vietnam's general education system. By surveying 15 schools across various regions, this study evaluates the current state of digital transformation and identifies key areas for improvement. The findings contribute to the development of practical strategies that align with Vietnam's broader goals for sustainable educational development in the digital age. Through a holistic approach, this research seeks to provide actionable insights to guide administrators in navigating the complexities of digital transformation, ultimately enhancing

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the quality and accessibility of education in Vietnam.

2. THEORETICAL FRAMEWORK

2.1. Digital Transformation in School Management

Digital transformation in school management is a comprehensive process that involves integrating digital technologies into educational administrative systems to improve efficiency, enhance learning experiences, and prepare institutions for the demands of the digital age. This transformation is not merely technological but represents a shift in mindset, processes, and structures within schools. Selwyn (2012) defines digital transformation in education as the incorporation of digital tools and practices into institutional operations to foster better educational outcomes. This shift enables schools to move from traditional administrative practices to more dynamic, data-driven approaches, enhancing their capacity to respond to modern challenges. In the context of school management, digital transformation facilitates improved communication, streamlined operations, and effective resource allocation. In Vietnam, the Ministry of Education and Training (2021) emphasizes the importance of digital transformation for general education systems to meet global standards. This involves digitizing administrative tasks, such as attendance tracking, performance monitoring, and resource management, while also integrating learning management systems to enhance teaching and learning. However, achieving these goals requires a robust digital infrastructure and a supportive policy framework. Leadership plays a pivotal role in digital transformation, as highlighted by Navaridas-Nalda et al. (2020). School principals and administrators must adopt visionary strategies to guide their institutions through the complexities of technological integration. Effective leaders prioritize professional development for staff, fostering a culture that embraces innovation and change. Hargreaves and Fullan (2020) further argue that administrators must balance professional capital—human, social, and decisional—to navigate the transition successfully. One critical aspect of digital transformation is the development of digital competencies among educators and administrators. Ferrari (2013) proposes the DigComp framework, which outlines the essential skills required for digital engagement, including information literacy, digital communication, and ethical use of technology. These competencies enable school managers to leverage digital tools effectively, ensuring that the benefits of technology extend beyond efficiency to foster a culture of continuous improvement. Despite its potential, digital transformation faces significant challenges. According to Dinh (2021), schools, particularly in rural areas, often struggle with inadequate infrastructure, limited financial resources, and insufficient training for administrators and teachers. These barriers hinder the adoption of digital solutions and exacerbate educational inequalities. Addressing these challenges requires targeted investments in infrastructure and the development of public-private partnerships, as suggested by Giang et al. (2021). Furthermore, Tabrizi et al. (2019) argue that digital transformation is not solely about technology but about rethinking organizational processes and fostering a collaborative culture. Schools must redesign their workflows to integrate digital tools seamlessly, aligning these tools with pedagogical and administrative goals. This alignment ensures that technology supports, rather than disrupts, the educational mission. Digital transformation in school management is a multifaceted process that requires strategic planning, effective leadership, and robust infrastructure. While challenges persist, the potential benefits—such as enhanced efficiency, improved educational outcomes, and greater inclusivity—underscore the importance of embracing this transition. By adopting a holistic approach, educational administrators can ensure that their institutions are well-equipped to thrive in the digital age.

2.2. Frameworks and Strategies for Implementing Digital Transformation

Implementing digital transformation in education requires a structured approach, combining theoretical frameworks and practical strategies to ensure the effective integration of technology into school management and teaching practices. A widely recognized framework is the DigComp Framework, which identifies five key areas of digital competence: information literacy, communication and collaboration, digital content creation, safety, and problem-solving (Ferrari, 2013). This framework provides a structured path for developing digital skills among educators, administrators, and students, emphasizing the importance of aligning competencies with specific educational goals. Leadership plays a pivotal role in digital transformation, as highlighted by Navaridas-Nalda et al. (2020), who argue that school principals must act as strategic leaders to foster an innovative culture and mobilize resources. Effective leadership involves setting a clear vision, identifying goals, and managing change through collaborative efforts. Similarly, Hargreaves and Fullan (2020) emphasize the concept of professional capital, which includes human, social, and decisional capital, as a critical factor in leveraging digital tools to improve teaching and learning outcomes. Public-private partnerships are another crucial strategy, particularly in resource-constrained settings. The Vietnam Ministry of Education and Training (2021) advocates for these partnerships to enhance technological access, provide professional development opportunities, and bridge the digital divide between urban and rural schools. Partnerships with technology companies can facilitate the deployment of tools like cloud-based platforms and learning management systems, which are essential for scaling digital solutions. Moreover, Tabrizi et al. (2019) argue that digital transformation is fundamentally about rethinking organizational processes rather than merely adopting technology. They propose a holistic approach that integrates leadership, culture, and technology to drive systemic change. This aligns with Anderson and

Dron's (2011) three generations of distance education pedagogy, which progress from behaviorist approaches to more collaborative and connectivist models, emphasizing the need for flexibility and adaptability in digital learning environments. Professional development is a cornerstone of digital transformation strategies. Adams (2021) highlights the importance of continuous professional development programs to equip educators and administrators with the necessary skills to navigate digital tools effectively. Such programs should be tailored to address specific needs, including digital literacy, data analysis, and the ethical use of technology. Carter and Martin (2018) further stress the role of innovative teaching strategies, such as blended learning and gamification, in making digital transformation more impactful and engaging. In the Vietnamese context, Giang et al. (2021) identify readiness for digital transformation as a key challenge, particularly in rural areas where infrastructure and digital literacy are limited. Addressing these disparities requires targeted interventions, such as prioritizing the development of digital infrastructure and providing localized training programs. These strategies ensure that digital transformation efforts are inclusive and address the diverse needs of schools across different regions.

Finally, measuring the success of digital transformation is vital for its sustainability. The OECD (2019) recommends a comprehensive roadmap that includes clear benchmarks for evaluating progress in areas like infrastructure development, teacher training, and student outcomes. By adopting such evidence-based approaches, schools can ensure that digital transformation is not only implemented effectively but also contributes to the broader goals of educational equity and excellence. It can be said that successful digital transformation in education relies on a combination of frameworks such as DigComp, strategic leadership, public-private partnerships, professional development, and robust evaluation mechanisms. When these elements are thoughtfully integrated, they provide a comprehensive roadmap for schools to navigate the complexities of the digital age and establish sustainable, innovative educational environments.

2.3. Leadership and the Role of Administrators in Driving Digital Change

Leadership is a critical factor in the successful implementation of digital transformation in education. Administrators, as key decision-makers, are tasked with guiding schools through complex technological, pedagogical, and organizational shifts. Their leadership ensures that digital initiatives align with institutional goals and address the unique needs of stakeholders, particularly teachers and students. Navaridas-Nalda et al. (2020) argue that school principals and administrators act as catalysts for digital transformation by fostering a culture of innovation and supporting their teams in adapting to change. Effective leadership involves setting a clear vision, creating strategic plans, and ensuring the availability of resources for technology integration. These leaders must also navigate challenges such as resistance to change and disparities in digital literacy levels among staff. In Vietnam, the Ministry of Education and Training (2021) highlights the crucial role of administrators in addressing infrastructural limitations and fostering collaboration between schools and external partners to enhance digital capacity. The leadership role of administrators extends beyond management to inspiring and empowering educators. Hargreaves and Fullan (2020) emphasize the importance of "professional capital," where administrators focus on building teacher expertise, fostering collaboration, and enhancing collective responsibility. Administrators must facilitate professional development opportunities for teachers to acquire the skills needed for digital teaching and learning (Adams, 2021). This includes not only technical training but also fostering pedagogical innovation, as noted by Carter and Martin (2018), who underline the need for teaching strategies that leverage digital tools to improve student engagement and outcomes. Administrators must also act as change agents, advocating for policies that support digital transformation while addressing systemic challenges. Tabrizi et al. (2019) argue that successful digital transformation is less about technology and more about organizational change. Leaders must ensure that technological initiatives are aligned with broader educational objectives and create a supportive environment where innovation can thrive. For instance, Giang et al. (2021) highlight the importance of involving administrators in strategic planning to bridge gaps between urban and rural schools in Vietnam, where resource disparities often hinder the implementation of digital initiatives. An essential aspect of administrative leadership is decision-making based on data-driven insights. Ferrari (2013) emphasizes the importance of developing digital competencies, including the ability to analyze and utilize data effectively. Administrators must use data to monitor the progress of digital transformation, identify areas for improvement, and allocate resources strategically. Additionally, administrators need to address ethical considerations, such as ensuring data privacy and equity in access to technology, as highlighted by Selwyn (2012). Collaborative leadership is another key dimension in driving digital change. Navaridas-Nalda et al. (2020) highlight the value of fostering partnerships between schools, technology providers, and community stakeholders. Such partnerships can provide access to advanced tools, training, and funding, which are essential for sustaining digital initiatives. Public-private collaborations, as advocated by the Vietnam Ministry of Education and Training (2021), are particularly relevant in resource-constrained settings, where external support can significantly enhance the capacity for digital transformation. Thus, administrators play a multifaceted role in driving digital transformation in education. Their leadership encompasses setting a clear vision, fostering innovation, enhancing teacher capacity, utilizing data for informed decision-making, and establishing strategic partnerships. By adopting a strategic and collaborative approach, administrators can address challenges effectively and ensure that digital transformation facilitates sustainable improvements in education. This is

particularly critical in contexts such as Vietnam, where disparities in resources and infrastructure necessitate targeted and adaptive leadership interventions.

3. RESEARCH METHODOLOGY

3.1. Research Design

This study adopts a mixed-method approach, integrating both qualitative and quantitative methodologies to provide a comprehensive understanding of the digital transformation process in general education schools. The quantitative component focuses on measuring factors such as digital literacy, competency levels, and the readiness of administrators and teachers. Concurrently, the qualitative component offers deeper insights into challenges, opportunities, and contextual factors influencing the adoption of digital transformation models.

3.2. Data Collection

The data collection process was organized into three main steps:

Step 1: Participant Selection

Fifteen general education schools from diverse geographical regions in Vietnam were selected to ensure a representative sample, including Hanoi, Tuyen Quang, Thanh Hoa, Dong Nai, and Ho Chi Minh City. The schools were evenly distributed among different educational levels: 5 primary schools; 5 lower secondary schools; 5 upper secondary schools.

This distribution captures a variety of conditions in terms of development, infrastructure, and adaptability of school administrators and teachers to digital transformation.

Step 2: Questionnaire Survey

A total of 400 participants contributed to the study, divided into the following groups: 100 experts and researchers: Selected for their expertise in education and technology, focusing on their understanding of digital transformation and its applications; 200 administrators, teachers, and parents: Including school leaders, educators across all levels, and parents interested in digital transformation in education; 100 students: Randomly selected from the participating schools to provide student perspectives on digital learning and technology use in education.

The survey questionnaire covered the following topics:

Digital literacy and competency levels among administrators and teachers.

Challenges in implementing technology and adopting digital transformation.

Student perspectives on the role of technology in enhancing learning.

Step 3: In-Depth Interviews and Field Observations

To enrich the quantitative data, in-depth interviews were conducted with 10 experts and 10 school administrators. These interviews provided specific evaluations and personal insights into the practicalities of implementing digital transformation in schools.

Additionally, field observations were carried out at three selected schools, offering direct assessments of:

The current state of technological infrastructure.

The implementation capabilities of administrators and teachers.

The level of engagement and adaptability of students and educators with digital tools and processes.

By combining survey data with qualitative insights from interviews and observations, this study ensures a robust and comprehensive understanding of digital transformation in Vietnam's general education system. The mixed-method approach facilitates the identification of trends, challenges, and potential solutions, forming a solid foundation for actionable recommendations.

4. RESEARCH RESULTS

4.1. Digital Literacy and Competency Levels

The digital literacy and competency levels of administrators and teachers were assessed using a 5-point Likert scale (1 = very low, 5 = very high). This analysis aimed to evaluate their readiness for digital transformation in terms of knowledge, skills, and attitudes toward technology.

Quantitative Results:

Administrators: The mean score was 3.80 (SD = 0.62), indicating moderate competency in using digital tools for management and administrative tasks. Key strengths included basic familiarity with digital communication platforms and the ability to manage digital records.

Teachers: The mean score was 3.50 (SD = 0.75), reflecting slightly lower proficiency. Teachers excelled in basic ICT skills but struggled with integrating advanced technologies into teaching practices.

Geographical Comparison:

A one-way ANOVA test revealed statistically significant differences in digital literacy scores between urban and rural schools ($p < 0.05$). Urban schools consistently achieved higher scores, with an average of 4.10, compared to 3.20 for rural schools. This disparity highlights unequal access to resources and training opportunities.

Table 1: Digital Literacy Scores by Role and Region.

Role	Urban (Mean)	Rural (Mean)	Overall Mean	Standard Deviation
Administrators	4.20	3.40	3.80	0.62
Teachers	4.00	3.00	3.50	0.75

4.2. Challenges in Digital Transformation

Factor analysis was performed to identify the key challenges faced by schools. Three primary factors were extracted, explaining 75.0% of the variance:

Infrastructure Limitations (35.0%)

Insufficient internet bandwidth and outdated equipment were major concerns, particularly in rural schools.

Urban schools were significantly better equipped, with high-speed internet and modern devices readily available.

Professional Development Gaps (25.0%)

Limited access to training programs for educators and administrators was highlighted as a critical barrier.

Teachers in rural areas reported minimal exposure to advanced digital teaching tools.

Financial Constraints (15.0%)

Funding shortages impacted the procurement and maintenance of technological infrastructure.

Schools in low-income areas struggled to allocate budgets for digital transformation initiatives.

Table 2: Challenges in Digital Transformation.

Factor	Variance Explained (%)	Common Challenges
Infrastructure Limitations	35.0	Poor internet access, outdated devices
Professional Development	25.0	Lack of training, insufficient technical support
Financial Constraints	15.0	Budget limitations, limited access to funding programs

4.2.1. Inferential Analysis

Chi-square tests confirmed significant associations between these challenges and geographical factors ($p < 0.01$). Schools in rural areas were disproportionately affected, requiring targeted interventions to bridge these gaps.

4.3. Student Perspectives on Technology in Learning

Students' perspectives on the use of technology in education were analyzed to evaluate their experiences and identify areas for improvement.

4.3.1. Key Findings

Engagement: 68.0% of students reported that technology-enhanced learning activities were more engaging compared to traditional methods.

Barriers: 45.0% of students experienced technical difficulties, such as slow internet or limited access to devices.

4.3.2. Correlation Analysis

A Pearson correlation test indicated a strong positive relationship ($r = 0.72$) between the availability of digital resources and student engagement levels. This underscores the importance of ensuring equitable access to technology across all schools.

Table 3: Student Perspectives on Technology Use.

Aspect	Positive (%)	Negative (%)
Increased Engagement	68.0	32.0
Technical Challenges	45.0	55.0
Improved Accessibility	58.0	42.0

4.4. Qualitative Insights from Interviews and Observations

4.4.1. Leadership Challenges

Rural Schools: Administrators in rural areas consistently highlighted the lack of resources as a critical barrier to digital transformation. For instance, an administrator from Tuyen Quang stated, "We have the will but not the tools to implement digital initiatives. Without adequate funding or equipment, our efforts are limited to basic technology integration." These schools often face a dual challenge of limited budgets and outdated infrastructure, which restricts their ability to adopt modern digital tools. Additionally, rural administrators expressed concerns about retaining staff with digital expertise due to better opportunities in urban areas. Urban Schools: Conversely, administrators in urban schools focused on fostering a culture of innovation among their staff. A principal from a school in Ho Chi Minh City emphasized, "Our challenge is not the lack of tools, but ensuring that our teachers and students are willing and prepared to use them effectively." Urban leaders prioritized staff development, highlighting the importance of workshops, peer mentoring, and leadership initiatives to encourage digital adoption. The interviews also revealed that urban administrators view their role as strategic, emphasizing long-

term planning and resource optimization to sustain digital transformation efforts. These findings indicate that while rural administrators are constrained by material resources, urban administrators face challenges related to human resources and cultural shifts.

4.4.2. Infrastructure Disparities

Urban Schools: Urban schools were observed to be well-equipped with advanced technological tools such as interactive whiteboards, high-speed internet, and modern computer labs. For example, a school in Ho Chi Minh City had a dedicated technology coordinator, and students regularly used digital platforms for collaborative projects. This level of infrastructure enabled seamless integration of technology into both administrative and pedagogical processes. Rural Schools: In contrast, rural schools struggled with inadequate infrastructure. At one school in Thanh Hoa, teachers shared two outdated desktop computers, and the internet connection was slow and unreliable. Classroom technology often relied on donated or second-hand devices, limiting the scope of digital learning activities. For instance, during the observation, a teacher in Thanh Hoa expressed frustration over the inability to access online resources due to frequent connectivity issues. The stark contrast between urban and rural schools underscores the importance of equitable resource allocation to bridge the digital divide.

4.4.3. Teacher Readiness

Urban Teachers: Teachers in urban schools demonstrated higher confidence and familiarity with digital tools. They reported participating in regular professional development programs and having access to technical support. One teacher from Hanoi shared, "We use digital tools daily, from creating lesson plans to assigning interactive homework. It has transformed how we teach and engage with students." Urban teachers were also more likely to experiment with innovative teaching strategies, such as gamification and flipped classrooms, using technology as a core component. Rural Teachers: In contrast, rural teachers reported limited exposure to professional development opportunities and a lack of technical support. A teacher in Tuyen Quang mentioned, "I want to integrate digital tools into my lessons, but I don't know how to use them effectively. Training is rarely available, and even when it is, it's not tailored to our needs." Observations showed that teachers in rural schools often relied on traditional methods, even when digital tools were available, due to a lack of confidence or knowledge. These findings suggest that while urban teachers are better positioned to embrace digital transformation, rural teachers require significant support in terms of training and capacity-building.

Table 4: Observed Infrastructure Readiness in Schools.

Infrastructure Aspect	Urban (Score out of 5)	Rural (Score out of 5)
Internet Speed	4.50	2.50
Device Availability	4.20	2.80
Teacher Training Programs	4.10	3.00

4.5. Key Findings

The study reveals significant disparities in readiness for digital transformation between urban and rural schools in Vietnam. Urban schools demonstrate a much higher level of preparedness due to better infrastructure, reliable internet access, and more frequent training opportunities for administrators and teachers. In contrast, rural schools face considerable challenges, including inadequate technological infrastructure, limited access to professional development, and insufficient funding. These barriers hinder their ability to effectively integrate digital tools into management and teaching processes. One of the most pressing needs identified is targeted professional development for both administrators and teachers in urban and rural areas. While urban educators require advanced training to maximize the potential of available technologies, their rural counterparts need foundational training to bridge the significant competency gap. Addressing these disparities in training is crucial to ensuring that all schools, regardless of location, are equipped to participate in digital transformation. Infrastructure gaps also emerged as a critical barrier, particularly for rural schools. Many schools lack basic technological tools, reliable internet, and modern equipment. Significant investments are required to upgrade infrastructure in these areas to provide equitable access to technology and enable meaningful digital integration in teaching and management. Students across both urban and rural settings generally expressed positive attitudes toward the integration of technology in education. Many reported increased engagement and interest in learning through digital tools. However, technical challenges, such as slow internet and outdated devices, frequently disrupt the learning process. Addressing these technical issues is essential to sustaining student engagement and maximizing the benefits of digital learning. The study also highlights the critical role of leadership in shaping the success of digital transformation initiatives. School administrators are pivotal in driving change, mobilizing resources, and fostering a culture of innovation. Strategic leadership is particularly important in rural areas, where administrators face the dual challenge of overcoming resource constraints and building staff capacity. The authors acknowledge that this research is the result of the project titled "Research on proposing adaptation solutions for the digital transformation school model for management staff in current general education institutions," project code b2023-hvq-06. The findings emphasize the importance of developing comprehensive and equitable strategies to support digital transformation across Vietnam's general education

system. By tackling the outlined challenges and capitalizing on emerging opportunities, schools can create a more inclusive and sustainable educational environment that meets the demands of the digital era.

5. DISCUSSION

5.1. Interpretation of Key Findings

The findings highlight significant disparities in readiness for digital transformation between urban and rural schools in Vietnam. Urban schools benefit from better infrastructure, access to training opportunities, and digital competency among administrators and teachers. In contrast, rural schools face severe limitations due to insufficient resources, inadequate funding, and limited professional development. Leadership plays a critical role in driving digital transformation, with urban administrators focusing on innovation and long-term strategies, while rural administrators prioritize addressing immediate resource constraints. To bridge these gaps and ensure equitable access to digital transformation, targeted and sustainable solutions are required.

Solution 1: Developing Training Materials for Educational Administrators.

The development of tailored training materials is essential to enhance the capacity of educational administrators to adapt to digital transformation. These materials should focus on building foundational and advanced digital competencies, equipping administrators with the tools necessary to integrate technology effectively into school operations. The training should include modules on data-driven decision-making, effective use of digital communication platforms, and strategies for managing resources in a digital environment.

In addition, these materials should address leadership strategies for fostering innovation within schools, emphasizing the role of administrators as change agents. For urban administrators, the focus should be on advanced topics such as strategic planning and policy implementation. Meanwhile, rural administrators would benefit from basic training that provides actionable steps to overcome resource limitations and enhance their schools' digital readiness. Tailored training content ensures that all administrators, regardless of their location, can effectively lead their schools in adopting digital transformation.

Solution 2: Organizing Capacity-Building Programs for Educational Administrators

Capacity-building programs are vital to ensure that educational administrators not only gain knowledge but also develop practical skills to implement digital transformation. These programs should combine theoretical knowledge with hands-on training, enabling participants to apply digital tools and techniques directly to their school environments. Workshops and training sessions should be conducted both online and offline to increase accessibility, particularly for administrators in rural areas. These programs should include peer-to-peer learning components, where administrators can exchange experiences and collaboratively solve problems. Additionally, mentorship programs should be established to provide ongoing guidance and support, especially for rural administrators who may face persistent challenges. To maximize the impact of these programs, content should focus on real-world applications, such as using school management software, integrating collaborative platforms into administrative workflows, and leveraging digital tools to enhance communication and transparency. These programs will not only build individual competency but also foster a culture of continuous learning and innovation within educational institutions.

Solution 3: Establishing Digital Learning and Management Environments in Schools

Creating a robust digital ecosystem is fundamental for the successful integration of technology into school management and teaching. Schools must be equipped with reliable internet access, modern devices, and digital platforms that support both administrative and pedagogical activities. Cloud-based management systems can streamline administrative processes, improve data security, and facilitate efficient communication among stakeholders. In classrooms, digital tools should be integrated to enhance student engagement and create more interactive, learner-centered environments. For example, smart boards, online collaboration platforms, and digital content libraries can provide students with opportunities for more dynamic and personalized learning experiences. Rural schools, in particular, require scalable and cost-effective technologies that align with their limited resources. To ensure sustainability, schools should prioritize technologies that are easy to maintain and upgrade. Furthermore, training teachers and staff to utilize these tools effectively is critical to maximizing the potential of digital learning environments. By fostering a well-supported and technology-enabled ecosystem, schools can build the foundation for a sustainable and inclusive digital transformation.

Solution 4: Developing Public-Private Partnerships (PPPs)

Public-private partnerships (PPPs) are a critical component in addressing resource and funding gaps for digital transformation in education. These partnerships can mobilize financial, technical, and operational support from private sector organizations to enhance the technological capacity of schools. Technology companies, for instance, can contribute by providing devices, software, and training programs to schools, while educational institutions can collaborate with private partners to co-develop innovative solutions tailored to their needs.

Policy frameworks should be established to encourage private sector participation, offering tax incentives or recognition for contributions to educational initiatives. For example, partnerships could involve corporate sponsorships for equipping rural schools with modern technology or providing scholarships for professional development programs for educators. In addition, PPPs can foster the development of shared infrastructure, such as regional digital learning hubs that serve multiple schools in resource-constrained areas. These hubs can act as

centralized locations for training, technical support, and access to advanced digital tools. By leveraging the expertise and resources of private organizations, schools can overcome many of the limitations currently hindering their ability to adopt and sustain digital transformation.

5.2. Broader Implications

The proposed solutions collectively address the disparities and challenges identified in the study. By prioritizing the development of digital competencies, fostering collaborative partnerships, and investing in infrastructure, these measures can ensure equitable and sustainable digital transformation across Vietnam's general education system. The emphasis on tailored and scalable approaches ensures that both urban and rural schools are empowered to participate fully in the digital age. These solutions also align with global best practices, providing a roadmap for other education systems facing similar challenges.

6. CONCLUSION

This study provides a comprehensive analysis of the factors influencing digital transformation in Vietnam's general education system, focusing on the digital competencies of educational administrators and teachers, the disparities between urban and rural schools, and the critical role of leadership in driving innovation. The findings reveal significant progress in urban schools, while rural schools continue to face substantial challenges related to infrastructure, funding, and access to professional development opportunities. Based on these findings, the study proposes four key solutions to address the challenges and support sustainable digital transformation: Developing tailored training materials to meet the specific needs of educational administrators in diverse contexts; Implementing capacity-building programs that provide practical training and ongoing support, particularly for administrators in rural areas; Establishing digital learning and management environments that are scalable, sustainable, and accessible to all schools; Promoting public-private partnerships to mobilize resources and expertise for infrastructure development and educational technology. These solutions are designed not only to address current challenges but also to create opportunities for Vietnam's general education system to advance toward comprehensive and sustainable digital transformation. Digital transformation in education is not merely about adopting technology; it involves rethinking and reshaping how education is organized and delivered to achieve greater equity, innovation, and responsiveness to the needs of students in the digital age. The leadership of school administrators, the support of government policies, and the active collaboration with private sector stakeholders will be critical to the success of this transformation. This research provides both theoretical and practical foundations for digital transformation initiatives, offering a roadmap for addressing disparities and fostering inclusive education. By leveraging the proposed solutions, Vietnam's general education system can move toward a more equitable, innovative, and sustainable future, ensuring that all students have access to the opportunities of the digital era.

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