Human Behavior, Development and Society
E-ISSN 2651-1762, Vol 27 No 1, 282943

The Digital Competence of Nakhon Ratchasima Primary School Administrators and its Effect on School Management

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Date Received: 15 August 2025 Revised: 22 November 2025 Accepted: 27 November 2025

Paper Type: Original Research

Abstract

Aim/Purpose: This study examined how the digital competence of school administrators is affecting the effectiveness of school management in schools under the Nakhon Ratchasima Primary Educational Service Area Office 1. In today's fast-changing digital era, education systems worldwide face mounting pressure to adapt to technological advancements. In Thailand, national and local educational policies place strong emphasis on developing digital competence among educators, particularly school administrators. However, schools differ considerably in their readiness to adopt and integrate digital practices. These disparities raise important questions about the extent to which administrators' digital competence can enhance, or potentially limit, the overall effectiveness of school management.

Introduction/Background: As Thailand advances its digital transformation in education through initiatives like "Transforming Education to Fit in the Digital Era," school administrators must lead with strong digital competence. International research shows that the rapid growth of digital technologies has reshaped societal structures and widened the gap between those with strong digital skills and those without. Studies across global educational systems emphasize that integrating digital resources, such as e-learning platforms and open educational resources, requires educational leaders to develop advanced competencies to manage technological change. Additionally, global assessments have highlighted that many individuals lack even basic computer skills, underscoring the need to enhance digital competence within education. In this context, the present study explored which aspects of digital competence most effectively influence school management, providing valuable insights into how administrators' digital skills impact school outcomes.

Methodology: This study used a quantitative research design. The sample consisted of 327 participants, including 24 school administrators and 303 teachers from across the Nakhon Ratchasima Primary Educational Service Area Office 1, selected using stratified random sampling to reflect the diversity of schools in the region. Data were collected using a structured questionnaire divided into two sections. The first section had 22 items focused on school management effectiveness, while the second included 20 items measuring digital competence among administrators. All items used a five-point Likert scale. The instrument was validated by experts using the Item-Objective Congruence method, and only items scoring above .50 were retained. Reliability was confirmed through Cronbach's alpha. The four components of school management effectiveness: a) goal attainment, b) problem-solving ability, c) students' positive attitudes, and d) adaptability, had reliability scores of .804, .865, .872, and .882, respectively. For digital competence, overall reliability was .936, with subscales: a) digital literacy, b) digital content creation, c) digital technology use, and d) safety, ranging from .823, .818, .881, and .878. Data analysis was conducted using IBM SPSS Statistics Version 22.0. Descriptive statistics were used to describe the sample, followed by Pearson's correlation and stepwise multiple regression to determine which aspects of digital competence had a significant effect on school management effectiveness.

Findings: Descriptive results showed that both school management effectiveness and administrators' digital competence were rated at high levels. Within management effectiveness, problem-solving ability had the highest mean score, followed by goal attainment, whereas students' positive attitudes had the lowest. For digital competence, digital literacy had the highest mean, followed by critical thinking in technology use, while digital content creation had the lowest mean score. Inferential analysis further revealed that digital competence plays a significant role in predicting the effectiveness of school management. Three components: digital technology use (X_3), safety (X_4), and digital content creation (X_2), had a statistically significant influence on school management effectiveness at the .01 level. Among these, digital technology use was the strongest predictor, followed closely by safety and digital content creation. Together, these three variables accounted for 55.1% of the variance in effectiveness of school management, with a multiple correlation coefficient (*r*) of .754, indicating a strong relationship. The predictive equations derived from the data were as follows:

Raw score model: $\hat{Y} = 1.957 + .231X_3 + .170X_4 + .164X_2$

Standardized score model: $\hat{Z} = .325X_3 + .244X_4 + .244X_2$

Contribution/Impact on Society: The findings support ongoing efforts by educational policymakers to prioritize digital competence as part of national education reform. Schools, training institutes, and educational offices can use these insights to design more focused professional development programs that support administrators in becoming digital leaders.

Recommendations: Based on the findings, it is recommended that digital competence be made a core element in the professional development of school administrators. Training should go beyond basic digital literacy and include more advanced skills such as digital content creation and safety in digital contexts. Educational authorities should also invest in improving infrastructure and support systems to reduce gaps in digital readiness among schools. Moreover, digital competence should be considered a key criterion in leadership evaluations and promotions.

Research Limitation: This study was limited to one educational service area and relied on self-reported data, which may be subject to bias. The non-experimental nature of the study also limited the ability to infer direct causality. Additionally, the specific local context may mean that findings are not fully generalizable to other regions with different challenges or resources.

Future Research: Further research should expand to include different regions or educational levels, using a mixed-methods approach to gain deeper insights into how digital competence is developed and applied in school settings. Longitudinal studies could also help track the long-term effects of digital competence on school improvement. Future work may also explore how teacher digital readiness, school culture, or student engagement intersect with digital competence practices.

Keywords: *Digital competence, school management effectiveness, educational administrators*

Introduction

Thailand's national policy and strategic plan for digital development (2018–2037) sets a clear direction for the country to enhance its economic competitiveness through innovation and digital technology. At the same time, the policy highlights the importance of ensuring equal access to information and digital services to improve the quality of life for all citizens. A key focus is preparing people across all sectors with digital competence to live and work effectively in today's technology-driven world. It also calls for a transformation in the way government operates, one that embraces transparency, efficiency, and effectiveness with digital technology and data (Office of the National Digital Economy and Society Commission, 2018).

In line with this vision, the Ministry of Education has recognized the urgent need to reform the educational system so that it aligns with the demands of the digital era. Through its guiding principle, "Transforming Education to Fit in the Digital Era," the Ministry aims to modernize education for the benefit of students and the broader public. A central part of this plan involves building digital

competencies among teachers and educational personnel at both basic and vocational levels, ensuring that their skills keep pace with changes in society and global trends (Office of the Basic Education Commission, 2023).

To move in this direction, schools must play an active role in developing students' digital abilities. In today's world, digital competence is no longer optional; it is a vital skill for learning, self-development, and future careers (Aguirre et al., 2014; Ocaña-Fernández et al., 2019; Wongyai & Patphol, 2021). This means schools must be ready in every aspect, from curriculum and teaching methods to management systems, to raise the overall quality of education and equip students to succeed in a digitally connected society (Galindo et al., 2017). These efforts are also key to supporting long-term national development.

At the target level, the Nakhon Ratchasima Primary Educational Service Area Office 1 has aligned itself with this national agenda. It has committed to improving its management systems based on principles of good governance and encouraging collaboration among stakeholders by integrating digital technology into school operations. The office's current focus, "Creating innovation in the new normal with 21st-century skills," reflects its commitment to building digital capacity among school administrators, teachers, and staff. This includes encouraging lifelong learning through various platforms, modernizing management systems, and using technology to boost access to information, communication, and learning resources. Notably, the integration of digital technology into both administrative and instructional practices is seen to raise educational quality overall (Nakhon Ratchasima Primary Educational Service Area Office 1, 2024).

However, for these policies to succeed, school administrators must possess a strong foundation in digital competence. This ability is essential for effective leadership in today's educational landscape (Surakitbowon, 2010). Administrators are expected to apply digital competence across several domains such as academic leadership, personnel management, student services, facility management, and community engagement (Rimini & Spiezia, 2016). Each of these plays a role in how efficiently and effectively a school operates (Yana et al., 2023).

Despite this, schools under the Nakhon Ratchasima Primary Educational Service Area Office 1 face a variety of contextual challenges, especially differences in infrastructure and the digital competence of their personnel. These factors could influence how well school administrators are able to develop and apply digital competence, ultimately affecting the success of school management in this digital age (Nakhon Ratchasima Primary Educational Service Area Office 1, 2024).

With these challenges, this study sought to examine how digital competence among school administrators impacts the effectiveness of school management in the Nakhon Ratchasima Primary Educational Service Area Office 1. The aim was to provide insights that will help educators and policymakers identify gaps, make informed decisions, and strengthen school leadership practices for long-term success in the digital era.

Objectives

In the context of rapid digital transformation, school administrators play a pivotal role in ensuring that educational institutions remain adaptive, efficient, and aligned with national digital development strategies. Although Thailand has prioritized digital capacity-building across the education sector, disparities in administrators' digital competence and variations in school readiness continue to challenge effective policy implementation. Understanding how digital competence shapes managerial effectiveness is, therefore, essential for advancing evidence-based leadership practices and guiding strategic investment in capacity development. Against this backdrop, the present study aimed to empirically examine the relationship between administrators' digital competence and the effectiveness of school management within the Nakhon Ratchasima Primary Educational Service Area Office 1.

The objectives of this study were to:

1. Study the level of effectiveness of school management under the Nakhon Ratchasima Primary Educational Service Area Office 1.

2. Study the level of digital competence of school administrators under the Nakhon Ratchasima Primary Educational Service Area Office 1.
3. Create a predictive equation of the digital competence of school administrators that affects the effectiveness of school management.

Literature Review

Digital Competence of School Administrators

In the context of rapid technological change, digital competence has become an essential skill set for school administrators to lead effectively in the digital era. Researchers and institutions such as the Office of the National Digital Economy and Society Commission (2018) and Ferrari (2013) have emphasized that digital competence involves not only technical skills, but also the ability to communicate, solve problems, manage data, and create digital content responsibly. For school administrators, these skills are crucial in planning, managing change, and fostering innovation in their organizations. This study focused on the digital competence of school administrators by adopting four key components frequently highlighted in the literature: a) digital literacy, b) digital content creation, c) digital technology use, and d) safety. These components were synthesized from a review of relevant literature and frameworks proposed by both Thai and international scholars. Together, they form the conceptual framework guiding this study, which aimed to examine how digital competence affects the effectiveness of school management in today's educational context.

Effectiveness of School Management

The effectiveness of school management has long been viewed as a key indicator of educational quality and institutional success. Scholars such as Sa-nguannam (2010) and Ngamlamom (2015) have defined it as the ability of schools to utilize limited resources to achieve their goals, particularly those related to student learning outcomes, problem-solving, and adaptability. International perspectives, such as those of Hoy and Miskel (2008) and Javornik and Mirazchiyski (2023), emphasize student achievement, teacher motivation, leadership, and stakeholder engagement as critical components. The importance of school effectiveness lies not only in goal attainment, but also in ensuring the school's long-term viability, measured across multiple dimensions such as organizational processes, personnel performance, and responsiveness to change (Hoy & Miskel, 2008). Drawing from a synthesis of both Thai and international academic literature and research, this study identified four key components of school management effectiveness: a) goal attainment, b) problem-solving ability, c) students' positive attitudes, and d) adaptability. These indicators reflect current educational priorities in Thailand.

Digital Competence of School Administrators Affecting the Effectiveness of School Management

In today's technology-driven world, digital competence is no longer optional for school administrators; it is a fundamental requirement for effective school leadership. Many scholars and researchers agree that administrators with strong digital competence are better equipped to lead schools in times of rapid change and complexity. Mukkrathok and Nakrot (2023) identified four critical dimensions of digital competence for administrators: a) the ability to evaluate and apply digital tools for school improvement, b) digital literacy and access, c) safe and appropriate media creation, and d) using digital technology to support teaching and learning. These competencies directly impact academic leadership tasks such as curriculum planning, instructional supervision, and innovation.

Similarly, Chaleekarn and Piampeuchana (2024) outlined key digital leadership skills, including digital collaboration, problem-solving with technology, and digital ethics and safety, which are essential for managing schools effectively in the digital era. Administrators who possess these competencies can select and implement technology appropriately, manage resources efficiently, and lead their organizations toward meaningful innovation.

Other researchers, such as Sriwicha et al. (2024), emphasized that effective digital leadership is a combination of professional teaching knowledge, technological ability, and external networking. They

found that such competence not only supports administrative effectiveness, but it also positively impacts student learning outcomes, one of the core indicators of school success.

Levano-Francia et al. (2019) suggested that school administrators must develop digital competencies to improve the effectiveness of school management. Their analysis highlighted the importance of digital technology use, safety protocols, and the creation of digital content as crucial components in strengthening school administration, leading to more effective management practices. By integrating these competencies, administrators can enhance their ability to lead, innovate, and improve school performance and student outcomes. In alignment with this, the DigCompEdu framework has been developed to assess and improve the digital competence of educators, closely linking these competencies to school management effectiveness. Fostering digital competence is not only essential for adapting to modern technological changes, but it also directly influences administrators' ability to manage schools effectively, ensuring that institutions meet contemporary educational standards (Pettersson, 2018).

In Thailand, the increasing adoption of digital technologies in education reinforces the significance of these global frameworks. Klochko and Prokopenko (2023) stated that digitally competent administrators can better manage the integration of new technologies in educational environments, ensure the safety and security of digital resources, and guide both faculty and students through the digital challenges of modern education. This connection between global frameworks and the growing importance of digital leadership in Thai schools underscores the need for school administrators to continuously develop their digital skills to navigate the complexities of modern school management and support long-term educational success.

Synthesizing insights from both Thai and international literature, it is evident that digital competence influences several dimensions of school management effectiveness. These include a) goal attainment, b) problem-solving ability, c) students' positive attitudes, and d) adaptability. In this study, digital competence is conceptualized through four key components based on prior research: a) digital literacy, b) digital content creation, c) digital technology use, and d) safety. These components are illustrated in the conceptual framework of this study and are used as core variables to examine their effects on the effectiveness of school management. This framework supports the study's aim of understanding how digital competence empowers school administrators to manage schools effectively in the digital age.

Figure 1 *Conceptual Framework*

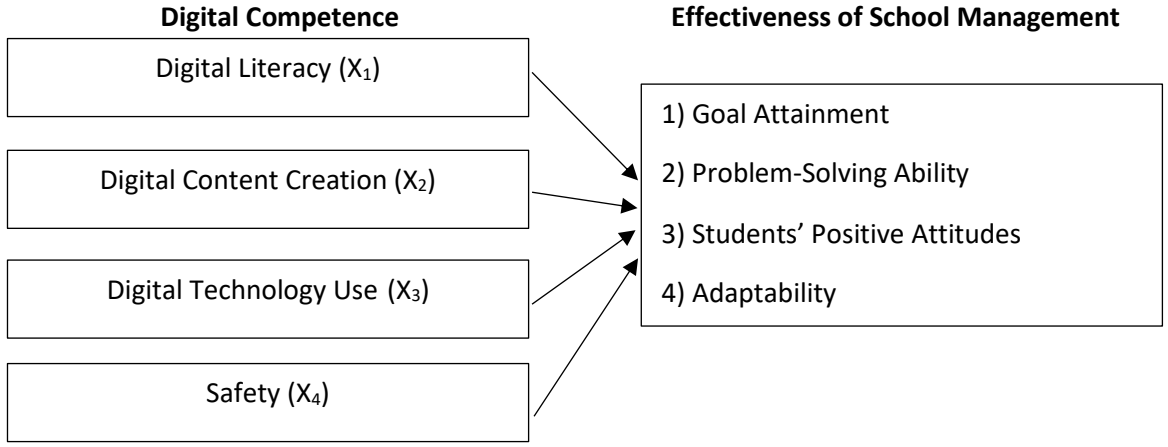

Figure 1 illustrates the proposed conceptual framework linking school administrators' digital competence to the effectiveness of school management. The model comprises four components of digital competence: digital literacy (X_1), digital content creation (X_2), digital technology use (X_3), and safety (X_4), which are hypothesized to exert direct positive influences on four dimensions of school management effectiveness: a) goal attainment, b) problem-solving ability, c) students' positive

attitudes, and d) adaptability. This framework integrates theoretical insights and empirical evidence to explain how administrators' digital capabilities contribute to overall management performance within the Nakhon Ratchasima Primary Educational Service Area Office 1.

Methodology

In this study, a quantitative research design was employed to examine the effect of school administrators' digital competence on the effectiveness of school management. The target population consisted of school administrators and teachers under the Nakhon Ratchasima Primary Educational Service Area Office 1. A total of 327 participants were selected using stratified random sampling to ensure representation across diverse school contexts within the area. The sample included 24 school administrators (7.34% of the total sample) and 303 teachers (92.66% of the total sample). These figures are presented in Table 1, which categorizes the sample by school size.

Table 1 *Population and Sample*

School Size	Population			Sample		
	Administrators	Teachers	Total	Administrators	Teachers	Total
Small	44	353	397	7	56	63
Medium	77	172	249	12	28	40
Large	15	432	447	2	70	72
Extra-large	17	932	949	3	149	152
Total	**153**	**1,889**	**2,042**	**24**	**303**	**327**

The sampling procedure involved the categorization of schools into four strata based on their size: Small, Medium, Large, and Extra-large. This stratification method was used to ensure that each school size group was proportionally represented in the sample. The selection process was as follows:

1) Small Schools (44 schools): A total of 63 participants were selected, consisting of 7 administrators and 56 teachers.
2) Medium Schools (77 schools): A total of 40 participants were selected, consisting of 12 administrators and 28 teachers.
3) Large Schools (15 schools): A total of 72 participants were selected, consisting of 2 administrators and 70 teachers.
4) Extra-large Schools (17 schools): A total of 152 participants were selected, consisting of 3 administrators and 149 teachers.

This stratified approach was used to ensure that each school size group was represented in accordance with its proportion within the population, preventing any one group from being over- or under-represented. Within each school size group, administrators and teachers were selected randomly. The proportion of administrators and teachers in each category was maintained to ensure that their relative numbers in the sample accurately reflected the population. This process ensured that the sample was not biased toward any specific school size or role, thus enhancing the generalizability of the findings.

Administrators were included in the study to provide insights into their self-evaluation of digital competence and its perceived influence on school management effectiveness. As school leaders, administrators are responsible for implementing educational policies and overseeing daily operations, roles that require strong digital competencies, especially in the context of technological advancement. Their self-assessments of digital competence provide valuable data on how they perceive their ability to lead digital transformations in their schools. However, it is acknowledged that self-evaluations by administrators may be subject to inflation, as administrators may overestimate their competencies compared to the evaluations provided by teachers.

Although stratified random sampling was used to ensure proportional representation across school sizes, the sample was heavily dominated by teachers, 92.66% of the sample, with only 7.34% of administrators. This imbalance presents a potential limitation, as the results may be skewed toward teachers' perceptions rather than reflecting the actual competencies of administrators. Additionally,

administrators' self-assessments may be biased, which could affect the accuracy of the findings regarding their digital competence and management effectiveness. These factors should be considered when interpreting the results, as they may influence the objectivity and generalizability of conclusions drawn from the data.

Data were collected through a structured questionnaire comprising two main sections. The first section included 22 items assessing the effectiveness of school management, while the second section contained 20 items measuring the digital competence of school administrators. Each item was rated on a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree).

To ensure content validity, the questionnaire was reviewed by a panel of experts using the Item-Objective Congruence Index (IOC). Items with an IOC value above .50 were deemed acceptable and retained in the final instrument. Reliability was assessed using Cronbach's alpha coefficient. The four components of school management effectiveness: a) goal attainment, b) problem-solving ability, c) students' positive attitudes, and d) adaptability, yielded reliability coefficients of .80, .87, .87, and .88, respectively. For digital competence, the overall reliability coefficient was .94. Its four components demonstrated high internal consistency: a) digital literacy (.82), b) digital content creation (.82), c) digital technology use (.88), and d) critical thinking in technology use (.88).

Descriptive statistics, including frequency, percentage, mean, and standard deviation, were used to summarize the data. Pearson correlation analysis was then performed to examine the relationships between digital competence and school management effectiveness. According to Bryman and Cramer (1997), when the correlation coefficient (*r*) between predictor variables is less than .80, multicollinearity is not considered a concern. In this study, correlation values among the predictor variables ranged from .71 to .77, indicating acceptable inter-variable association. As a result, there was no need to assess the Variance Inflation Factors or Tolerance values.

Lastly, stepwise multiple regression analysis was conducted to identify which components of digital competence significantly influenced the effectiveness of school management.

Findings

The analysis of how the digital competence of school administrators affects the effectiveness of school management is presented in Tables 2 to 5. The overall effectiveness of school management in schools under the Nakhon Ratchasima Primary Educational Service Area Office 1 was assessed at a high level across all dimensions (*M* = 4.40, *SD* = .40). When examined by individual dimensions, each was likewise rated at a high level. The highest mean score was observed in problem-solving ability (*M* = 4.45, *SD* = .47), followed by goal attainment (*M* = 4.43, *SD* = .48). The lowest mean score, while still within the high range, was recorded for students' positive attitudes (*M* = 4.30, *SD* = .52), as presented in Table 2.

Table 2 *Mean and Standard Deviation of Effectiveness of School Management*

Effectiveness of School Management	*M*	*SD*	Interpretation
Goal Attainment	4.43	.48	High
Problem-Solving Ability	4.45	.47	High
Students' Positive Attitudes	4.30	.52	High
Adaptability	4.42	.51	High
Average	4.40	.40	High

Table 3 shows that the overall digital competence of school administrators under the Nakhon Ratchasima Primary Educational Service Area Office 1 was at a high level (*M* = 4.34, *SD* = .53). When examined by individual components, all aspects were also rated at a high level. The highest mean score was found in digital literature (*M* = 4.45, *SD* = .47), followed by safety (*M* = 4.36, *SD* = .58). The lowest mean score, though still at a high level, was in digital content creation (*M* = 4.26, *SD* = .60).

Table 3 *Mean and Standard Deviation of Digital Competence of School Administrators*

Digital Competence of School Administrators	*M*	*S.D.*	Interpretation
Digital Literacy (X_1)	4.39	.60	High
Digital Content Creation (X_2)	4.26	.60	High
Digital Technology Use (X_3)	4.34	.57	High
Safety (X_4)	4.36	.58	High
Average	4.34	.53	High

Table 4 shows that the digital competence of school administrators and the effectiveness of school management had a statistically significant, relatively high positive correlation at the .001 level, with a correlation coefficient of .74. When examining the specific components of digital competence (X_1, X_2, X_3, and X_4) that influence the effectiveness of school management in schools under the Nakhon Ratchasima Primary Educational Service Area Office 1, the results revealed statistically significant, relatively high positive correlations at the .01 level, with correlation coefficients ranging from .71 to .77.

Table 4 *Correlation Coefficient between Digital Competence of School Administrators and Effectiveness of School Management*

Variables	X_1	X_2	X_3	X_4	Y
X_1	-	.74**	.71**	.77**	.62**
X_2		-	.77**	.75**	.68**
X_3			-	.75**	.70**
X_4				-	.67**
Y					.74**

***p*-value < .001

The multiple regression analysis is presented in Table 5. It shows that the digital technology use (X_3), safety (X_4), and digital content creation (X_2) were found to jointly have a statistically significant effect at the .01 level on the effectiveness of school management in schools under the Nakhon Ratchasima Primary Educational Service Area Office 1. Among these, the competence with the greatest influence was digital technology use, followed by safety and digital content creation, respectively. The multiple correlation coefficient among these digital competences and the effectiveness of school management was .75, and together they explained 55.1% of the variance in the effectiveness of school management in schools under the Nakhon Ratchasima Primary Educational Service Area Office 1.

Table 5 *Stepwise Multiple Regression Analysis on the Effectiveness of School Management*

Model	Unstandardized Coefficients (*b*)	Standardized Coefficients (β)	*t*	*p*
Constant	1.96		15.91	< .001
Digital Technology Use (X_3)	.23	.33	5.03	< .001
Safety (X_4)	.17	.24	3.98	< .001
Digital Content Creation (X_2)	.16	.24	3.84	< .001

R = .75, R^2 = .55, Adjusted R^2 = .55, p =.000; ***p*-value < .001

Discussion

The findings show that both the effectiveness of school management and the digital competence of school administrators in schools under the Nakhon Ratchasima Primary Educational Service Area Office 1 were rated at high levels. This indicates that administrators in the region have successfully integrated digital skills into their leadership and management practices, enabling them to meet organizational goals, solve problems efficiently, cultivate positive student attitudes, and adapt to

changes in the educational environment. The statistically significant, relatively high correlation (r = .74, p < .001) between digital competence and school management effectiveness further confirms the role of digital skills as a key driver of management success, consistent with the observations of Namkhoa et al. (2024), who noted that digital competence is indispensable for effective leadership in the digital era.

School Management Effectiveness

Problem-Solving Ability was the highest-rated component, reflecting administrators' strong capacity to address challenges and operational issues within the school. Hoy and Miskel (2008) argued that effective problem-solving enables organizations to maintain stability and performance in the face of internal and external challenges. In this study, the high rating suggests that administrators were adept at identifying issues, mobilizing resources, and implementing practical solutions, skills that may be supported by their effective use of technology in decision-making.

Goal Attainment, in the context of schools, refers to students' achievement. The high rating in this area indicates that schools were successful in meeting learning outcome targets, aligning with Sanguannam's (2010) assertion that the primary purpose of educational management is to enhance student achievement. This success is likely the result of strategic planning, curriculum alignment, and effective supervision, which ensure that teaching and learning are consistently directed toward clearly defined goals.

Adaptability is critical for responding to the rapidly changing educational landscape, including policy reforms, technological innovations, and social expectations. According to Parsons' framework (Hoy & Miskel, 2008), adaptability is a hallmark of sustainable organizations. The high score here reflects the administrators' readiness to embrace change, adopt new teaching methods, and integrate emerging technologies to improve school operations.

Students' Positive Attitudes, also referred to as Moral and Ethical Development, although receiving the lowest mean score among the four components, still reached a high level. This finding aligns with the Thai national education framework's emphasis on cultivating learners' desirable characteristics and ethical values. The comparatively lower score, relative to other components, may indicate that fostering values and attitudes is inherently more challenging to assess and often requires long-term, continuous initiatives involving collaboration among teachers, parents, and the wider community.

Digital Competence of School Administrators

Digital Technology Use (X_3) was the highest-rated component, reflecting school administrators' ability to apply technology to enhance organizational efficiency and effectiveness. Ferrari (2013) emphasized that the strategic use of technology can drive innovation, improve decision-making, and optimize resource management. The high rating in this study suggested that administrators are confident in utilizing a variety of digital tools for communication, data management, and instructional support, thereby contributing to more effective school management practices.

Safety (X_4) showed a high level of performance, indicating that school administrators possess the ability to evaluate the relevance, credibility, and potential risks of digital tools prior to their adoption. The Office of the National Digital Economy and Society Commission (2018) identified safety as a crucial competency for ensuring the safe and effective integration of technology, thereby promoting ethical and strategic use of digital resources in school management.

Digital Literacy (X_1) demonstrated a high level of performance, reflecting administrators' strong foundational understanding of digital media, systems, and platforms. Those with high proficiency in this area are well prepared to engage effectively in digital environments and to facilitate their schools' transition toward technology-enhanced practices. As a core element of digital competence, digital literacy provides the basis for informed decision-making, effective communication, and the development of high-quality digital content. This aligned with Ferrari's (2013) definition of digital literacy as not only the technical ability to use digital tools, but also the capacity to access, evaluate, and apply digital resources effectively and responsibly in various contexts.

Digital Content Creation (X_2), while still rated at a high level, was the lowest among the four components, indicating an area for further development. Mukkrathok and Nakrot (2023) and Chaleekarn and Piampeuchana (2024) emphasized that the ability to produce engaging, accurate, and pedagogically sound digital materials is essential for effective communication and teaching. The slightly lower rating in this area may reflect challenges such as limited training in design software, concerns over copyright compliance, or the significant time investment required to develop original materials.

Predictive Power of Key Competences

Regression analysis revealed that three components: Digital Technology Use (X_3), Safety (X_4), and Digital Content Creation (X_2), significantly predicted the effectiveness of school management, collectively accounting for 55.1% of the variance (R = .75). This finding underscored the reality that technological proficiency, while important, is not sufficient in isolation. For school administrators to maximize the impact of digital tools on school management, they must also possess the ability to critically assess the relevance, credibility, and potential risks of such tools before adoption. Equally essential is the capability to design and develop digital content that is accurate, engaging, and pedagogically sound, thereby supporting effective teaching, communication, and organizational operations. These results align with Ferrari's (2013) framework, which emphasizes that effective digital competence requires a balance between technical skills, critical evaluation, and creative content production. Together, these competencies enable administrators to lead schools more strategically, adapt to technological change, and foster innovation in educational management.

Conclusion

This study demonstrated that the digital competence of school administrators is a key factor in strengthening the effectiveness of school management in schools under the Nakhon Ratchasima Primary Educational Service Area Office 1. The analysis showed that three components: Digital Technology Use (X_3), Safety (X_4), and Digital Content Creation (X_2) were significant predictors, together explaining 55.1% of the variance in school management effectiveness. Of these, Digital Technology Use emerged as the most influential, highlighting the value of applying digital tools strategically to improve communication, decision-making, and overall organizational performance.

Although Digital Literacy (X_1) was not a significant predictor in the regression model, it was still rated at a high level and remains the foundation for all other aspects of digital competence. Strong digital literacy enables administrators to navigate digital environments effectively, make informed decisions, and support the creation of quality digital content.

The findings suggest that possessing technical skills alone is not enough. Effective leadership in the digital era also requires the ability to critically evaluate digital tools and to create content that is both engaging and pedagogically sound. These competencies align with Thailand's educational policy priorities, which call for building digital leadership capacity to meet the challenges of a rapidly changing technological landscape.

To move forward, professional development programs should place greater emphasis on enhancing skills in digital content creation and critical evaluation of technology. Strengthening these competencies will help school administrators lead digital transformation more effectively, ultimately contributing to improved teaching, learning, and sustainable school development.

Recommendations

Based on the findings of this study, several recommendations can be made to enhance the effectiveness of school management through the development of digital competence among school administrators. Policymakers are encouraged to incorporate digital leadership competencies into national training frameworks for both teachers and administrators. It is essential to prioritize critical thinking, digital content creation, and digital safety alongside basic digital literacy in professional development programs. Policymakers should also allocate resources to support ongoing professional

development programs that provide administrators with the tools to manage change and foster innovation effectively within schools.

For educators, there is a need to integrate digital skills training for administrators and teachers, focusing on both the technical aspects of digital tools and the ability to critically assess their effectiveness. A culture of continuous learning should be encouraged, allowing educators to experiment with new digital technologies and share successful practices with their peers.

For future researchers, there is a significant opportunity to explore the impact of digital leadership on various student outcomes, such as engagement, achievement, and overall school improvement. Further research could also examine the role of digital competence in promoting school sustainability and resilience, particularly how leaders can leverage digital tools for resource management and eco-friendly initiatives. Finally, long-term studies assessing the effects of digital competence training programs on administrative leadership effectiveness and school performance would provide valuable insights into the sustainability of digital transformation in education.

Author Contributions

Supitchaya Nimkrathok: Conceptualization, methodology, investigation, resources, data curation, writing—original draft, writing—review & editing, visualization; ***Banjob Boonchan:*** Formal analysis, validation, supervision.

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