ISSN 2964-3902 (Online)
**SUJANA: Journal of Education and Learning Review**
https://journal.jfpublisher.com/index.php/sujana
Vol. 5, Issue. 1, (2026)
doi.org/10.56943/sujana.v5i1.941

# Exploring Digital Leadership Effectiveness: A Mixed Methods Comparative Study of Cambodian Secondary Schools

**Por Vutha[1]***
[1]vuthabeltei2023@gmail.com
Faculty of Education, Arts, and Humanities, BELTEI International University

*Corresponding Author: Por Vutha
Email: vuthabeltei2023@gmail.com

## ABSTRACT

*This mixed methods study examined digital leadership effectiveness among secondary school principals in Phnom Penh, Kampong Cham, and Kandal provinces, Cambodia. Using an explanatory sequential design, quantitative data were collected from 385 participants including principals, vice principals, teachers, students, parents, educational administrators, policymakers, and private sector representatives through structured questionnaires employing five-point Likert scales. Qualitative data comprised semi-structured interviews exploring digital leadership practices across New Generation Schools and private secondary schools. Results revealed predominantly positive perceptions of digital leadership (M = 3.90, SD = 1.15), with highest consensus on digital collaboration and communication (M = 4.58, SD = 0.49). Reliability analysis demonstrated exceptional internal consistency for knowledge (α = 0.918), skills (α = 0.984), and attitudes (α = 1.000) constructs. However, substantial disparities emerged across school types. New Generation Schools and private institutions demonstrated advanced digital integration through systematic use of Learning Management Systems, Google Classroom, and digital communication platforms, whilst traditional public schools relied predominantly on paper-based administration due to infrastructure deficits and limited professional development access. Hypothesis testing confirmed that leadership dimensions positively influenced principals' knowledge, skills, and attitudes, which subsequently affected teacher performance and student achievement. Teacher readiness, student competence, and school culture moderated these relationships. Findings indicate that 42.1 per cent of principals lacked digital technology training, representing a critical professional development gap. The study concludes that bridging Cambodia's digital divide requires comprehensive interventions addressing infrastructure investment, mandatory digital leadership competencies in preparation programmes, sustained professional development, and supportive policy frameworks to ensure equitable educational quality across all secondary schools.*

**Keywords:** *Digital Leadership, Educational Technology, School Principals, Secondary Education, Teacher Performance*

## INTRODUCTION

The effectiveness of school principals in the digital era has emerged as a critical area of research as educational systems worldwide adapt to rapid technological advancement (Anawati et al., 2025). The integration of digital technologies into education, accelerated by global events such as the COVID-19 pandemic, has fundamentally transformed the roles and responsibilities of school principals, particularly in developing nations such as Cambodia (Berkovich & Hassan, 2024; Karakose et al., 2024). Contemporary educational leadership demands that principals cultivate digital literacy, manage technological infrastructure effectively, and champion innovative pedagogical practices to enhance student learning outcomes (Anwar et al., 2025; Mailizar et al., 2024). Digital leadership extends beyond merely providing technological infrastructure; it encompasses the integration of technology into school management processes and the learning environment, requiring principals to function as visionary, adaptive, and transformative leaders (Hidayat & Patras, 2024; Ridho et al., 2024).

Cambodia's secondary education sector presents a distinctive context for examining digital leadership effectiveness. Since 2015, the Ministry of Education, Youth and Sports (MoEYS) has implemented the New Generation Schools (NGS) initiative as a pioneering reform to transform public secondary education by prioritising 21st-century competencies, particularly in science, technology, engineering, and mathematics (STEM), information and communication technology (ICT), and critical thinking skills (Boravin, 2025; KAPE, 2024). By 2023, the initiative had expanded to eight secondary schools, serving approximately 7,820 students and achieving a 95 per cent pass rate in national examinations (KAPE, 2024). These schools operate with substantial autonomy over curriculum, instruction, and resource allocation, functioning similarly to charter schools in developed contexts (Bredenberg, 2022). Concurrently, private secondary schools in Cambodia have demonstrated innovation through student-initiated projects in robotics and software engineering, reflecting their adoption of digital technologies (Heng & Sol, 2023). However, significant disparities persist between these progressive institutions and traditional public schools, where written administration and conventional teaching methods predominate due to inadequate infrastructure, insufficient professional development, and resource constraints (UNESCO, 2024).

Previous research has established that systematic professional development strengthens the capacity of school leaders and teachers to adopt technological tools, thereby improving teaching methodologies, student achievement, job satisfaction, and reducing attrition rates (Hamzah et al., 2021; Xu et al., 2025). Digital leadership competencies encompass visionary leadership, the cultivation of digital learning cultures, professional development facilitation, systemic improvement initiatives, and digital citizenship promotion (Affan, 2024). Moreover, principals' digital instructional leadership has been found to positively influence teachers' intrinsic

motivation and perceived student learning in online environments, particularly following the pandemic-induced transition to remote schooling (Berkovich & Hassan, 2024). Recent studies have emphasised the integration of artificial intelligence in school leadership, demonstrating that AI assists principals in automating routine tasks, utilising data-driven decision-making, supporting teachers, and creating personalised learning environments (Prasad & Sahu, 2025; Ridho et al., 2024). Nevertheless, research indicates that effective digital transformation in education necessitates comprehensive changes in management processes, decision-making approaches, and the development of digital leadership capabilities across the entire school management team (Taşdan et al., 2024; Zhu et al., 2025).

Despite these advances, the rapid pace of digital transformation presents considerable challenges for secondary school principals, particularly in resource-constrained settings such as Cambodia, where technological infrastructure and teacher professional development remain inadequate (MoEYS, 2024; Velde et al., 2020). Cambodia's education expenditure constitutes only 2.7 per cent of GDP, with merely 22 per cent of schools possessing functional computers and only 55.6 per cent of students and educators having internet access (Chin et al., 2023; MoEYS, 2025a). Furthermore, research has revealed significant disparities in digital learning availability and usage across regions and socioeconomic groups in Cambodia, with financial, connectivity, and skills constraints preventing equitable access to digital education (Sam, 2023). The Ministry has responded by developing the Digital Education Strategy for Schools and the Strategic Plan for Teacher Education Reform 2024-2030, both emphasising ICT integration and digital transformation with support from international partners including UNESCO and the Global Partnership for Education (MoEYS, 2025b; UNESCO, 2025). Additionally, Cambodia launched its first Digital, Media, and Information Literacy Competency Framework in 2024, providing a foundation for integrating digital literacy into formal and non-formal education (UNESCO, 2024).

This study addresses critical gaps in the existing literature by examining how secondary school principals in Phnom Penh, Cambodia, leverage digital technologies to improve teaching, learning, and school management across both New Generation Schools and private secondary schools. Whilst previous research has explored digital leadership in developed contexts and during the pandemic period, limited empirical evidence exists regarding digital leadership effectiveness in low- and middle-income countries, particularly in Southeast Asian contexts where resource constraints, infrastructure deficits, and varied institutional autonomy create unique challenges (Liu et al., 2024; Wollscheid et al., 2025). Furthermore, comparative analyses between autonomous public schools and private institutions within the same developing nation context remain scarce. This research contributes novel insights by identifying the fundamental competencies—knowledge, skills, and attitudes—required for effective digital leadership in

resource-limited settings, examining the differential impact of digital technology adoption on teacher performance and student achievement across school types, and elucidating the mediating and moderating mechanisms through which digital leadership influences educational outcomes.

The study addresses three principal research questions: (1) How effectively do secondary school principals utilise digital technologies to enhance teaching, learning, and school management practices? (2) What fundamental knowledge, skills, and attitudes do secondary school principals require to lead effectively in the digital era? (3) What is the impact of digital technology adoption on teacher performance development and student academic achievement in secondary schools? By answering these questions, this research aims to inform policy development, professional development programmes, and infrastructure investment strategies that can bridge the digital divide and ensure sustainable advancement in educational leadership and quality within the Cambodian secondary education system. The research questions examining the effectiveness of secondary school principals in the digital era to improve management and leadership in public secondary schools (New Generation Schools) and private secondary schools correspond to the following research hypotheses:

1. **H1**: Leadership and vision are positively associated with higher levels of secondary school leaders' Knowledge, Skills, and Attitudes (KSA).
2. **H2**: Teaching and learning supported by secondary school principals are positively related to secondary school principals' KSA for digital integration.
3. **H3**: School management and administration using digital technologies positively influences secondary school principals' KSA.
4. **H4**: Infrastructure and resources are positively related to secondary school principals' KSA.
5. **H5**: Monitoring, evaluation, and development are positively associated with secondary school principals' KSA.
6. **H6**: Higher levels of secondary school principals' knowledge positively affect teacher performance development.
7. **H7**: Higher levels of secondary school principals' skills positively affect teacher performance development.
8. **H8**: Positive attitudes toward innovation and technology among secondary school principals positively affect teacher performance development.
9. **H9**: Higher levels of secondary school principals' KSA positively influence students' academic achievement.
10. **H10**: Secondary school principals' KSA mediate the relationship between leadership dimensions (vision, management, resources) and the teacher performance development.

11. **H11**: Secondary school principals' KSA mediate the relationship between leadership dimensions and students' academic achievement.
12. **H12**: Teacher readiness moderates the relationship between secondary school principals' KSA and teacher performance development; the relationship is stronger when teacher readiness is high.
13. **H13**: Student competence moderates the relationship between secondary school principals' KSA and students' academic achievement, with stronger effects when competence is high.
14. **H14**: School culture moderates the relationship between secondary school principals' KSA and both teacher performance and students' academic achievement, with stronger effects in more innovation-friendly cultures.

## LITERATURE REVIEW

### Cambodian Secondary Education: Context, Challenges, and Curriculum Reform

Cambodia's secondary education system has experienced substantial transformation since reconstruction began following the devastation of the Khmer Rouge regime in the 1970s. Lower secondary enrollment reached 75.2 per cent in 2023-2024, whilst upper secondary enrollment stood at 44.3 per cent, representing considerable improvement from 26 per cent in 2013-2014 (MoEYS, 2025; Prasad, 2025). However, disparities persist across socioeconomic and geographic dimensions. Children from the poorest quintile experience enrollment rates of only 37 per cent compared to 46 per cent from wealthier households (David, 2024). Geographic inequalities remain stark, with merely 2 per cent of villages possessing upper secondary schools compared to 5.4 per cent with lower secondary facilities. Economic constraints constitute the primary barrier, as 59 per cent of upper secondary dropouts cite financial hardship as the principal reason for discontinuing education. Gender disparities affect girls disproportionately, particularly through inadequate sanitation facilities that compromise attendance during menstruation.

The Cambodian government has implemented comprehensive curriculum reforms aligned with national development objectives, including achieving upper-middle-income status by 2030. The Education Strategic Plan 2024-2028 promotes 21st-century competencies such as critical thinking, problem-solving, and digital literacy whilst aligning curricula with labour market demands. The Ministry introduced three educational pathways (science, social science, and vocational tracks) in schools near special economic zones to reduce dropout rates (Vibol, 2025). The New Generation Schools initiative, launched in 2015, grants participating schools autonomy over curriculum, instruction, and resources whilst emphasising STEM education and ICT integration (Heng & Sol, 2023). By 2023, eight New Generation Schools served approximately 7,820 students, achieving a 95 per cent pass rate in national examinations (KAPE, 2024). The Strategic Plan for

Teacher Education Reform 2024-2030 addresses teacher shortages by mandating Bachelor-level qualifications and establishing Centres of Excellence for inclusive education and digital learning.

**Theoretical Framewotk: Digital Leadership and The KSA Model**

Digital leadership represents a social influence process mediated by information technology that produces changes in attitudes, behaviours, and performance within educational organisations (Avolio et al., 2000). This form of leadership encompasses technical proficiency, strategic vision, and interpersonal capabilities that enable leaders to drive digital transformation (Müller et al., 2023; Nguyen et al., 2025). Research demonstrates that digital leadership extends beyond technology provision to include cultivation of digital learning cultures, facilitation of professional development, and promotion of digital citizenship (Al-Hadrawi & Reniati, 2023; S. Anwar & Saraih, 2024). The COVID-19 pandemic accelerated recognition of digital leadership importance, with studies revealing that principals' digital instructional leadership positively influences teachers' intrinsic motivation and student learning in virtual environments (Berkovich & Hassan, 2024). Emerging research highlights artificial intelligence integration in school leadership, demonstrating that AI assists principals in automating routine tasks and employing data-driven decision-making (Prasad & Sahu, 2025).

The Knowledge, Skills, and Attitudes (KSA) framework provides a lens for analysing digital leadership competencies required for effective school administration. Knowledge represents theoretical understanding of digital technologies, pedagogical approaches, and educational management principles (Tongprasong, 2024). Skills constitute practical abilities to apply knowledge, encompassing technical competencies in leveraging digital tools and strategic competencies in aligning digital initiatives with organisational goals (Bouttell, 2025). Attitudes encompass mindsets and dispositions that enable effective application of knowledge and skills, including resilience, adaptability, and openness to innovation (Gilbert et al., 2024). These three components function together, with knowledge informing skills, skills validating knowledge, and attitudes enabling application (Bouttell, 2025). In educational contexts, principals' KSA for digital leadership influences organisational outcomes through direct effects on teacher performance and student achievement, as well as indirect effects mediated by digital culture (Nguyen et al., 2025). In Cambodia, research demonstrates that secondary school principals' leadership enhances management effectiveness and student academic achievement through curriculum monitoring and teacher support (Soeurn, 2025). Figure 1 illustrates the relationships amongst leadership dimensions, principals' KSA, moderating factors, and educational outcomes.

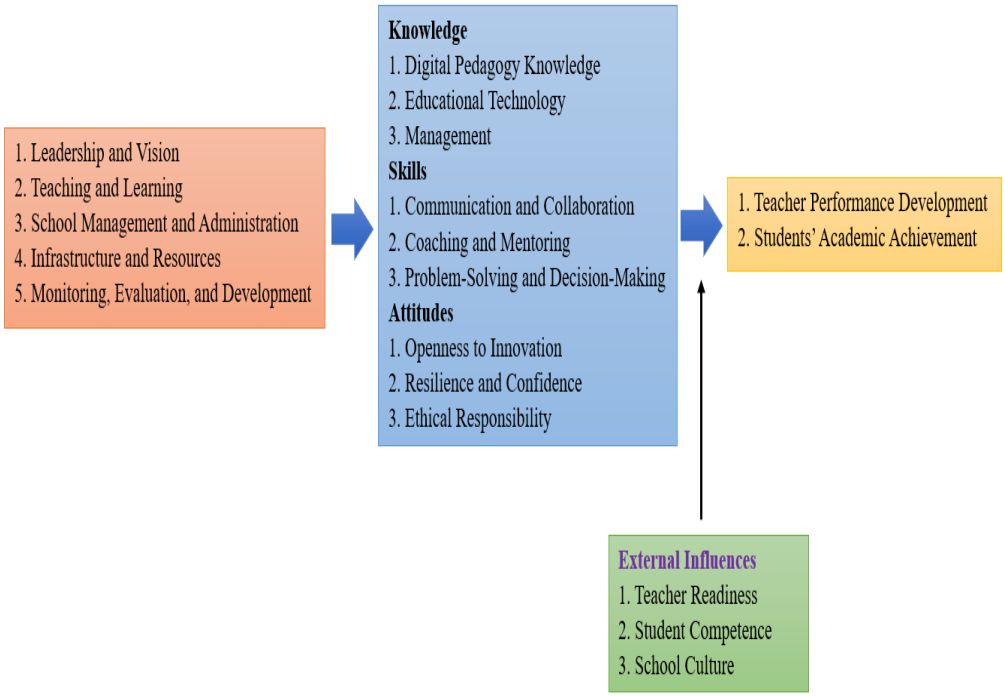


**Figure 1** Theoretical Framework
**Source:** Author's Datbase (2025)

## RESEARCH METHODOLOGY

This study employed a mixed methods research design integrating quantitative and qualitative approaches to examine the effectiveness of secondary school principals in the digital era within New Generation Schools and private secondary schools in Cambodia. Mixed methods research combines numerical data with experiential perspectives, offering a comprehensive understanding of complex educational phenomena (Creswell & Clark, 2025; Zhou et al., 2024). The explanatory sequential design was adopted, wherein quantitative data collection and analysis preceded qualitative inquiry to explain and contextualize statistical findings (Gierus et al., 2025; Zhao & Xu, 2024). This design proved particularly suitable for investigating digital leadership in resource-constrained settings where contextual factors significantly influence implementation outcomes. The study utilised a descriptive correlational approach to analyse relationships amongst leadership dimensions, principals' knowledge, skills, and attitudes (KSA), and educational outcomes including teacher performance development and student academic achievement. This methodology enabled examination of both the current state of digital leadership practices and the associations between variables within the specific contexts of New Generation Schools and private secondary schools.

The study was conducted across ten secondary schools (5 public shool and 5 private school) in Phnom Penh, Kampong Cham Province, and Kandal Province,

comprising five New Generation Schools and five private secondary schools (Tables 1 and 5). Additional participants included heads of education district offices (Table 3), educational policymakers, and private sector representatives (Table 4).

**Table 1** Name Lists of New Generation Schools in Phnom Penh, Kampong Cham, Kandal

| No. | Name of Public Secondary School | Location | City / Province |
|---|---|---|---|
| 1. | New Generation School 1 | Daun Penh District | Phnom Penh |
| 2. | New Generation School 2 | Chroy Changvar District | Phnom Penh |
| 3. | New Generation School 3 | Chamkar Morn District | Phnom Penh |
| 4. | New Generation School 4 | Kampong Cham City | Kampong Cham |
| 5. | New Generation School 5 | Mok Kampoul District | Kandal |

**Source:** Adapted from MoEYS (2024) and Bredenberg (2022)

**Table 2** Name Lists of Traditional Public Secondary Schools in Phnom Penh, Kampong Cham, Kandal

| No. | Name of Public Secondary School | Location | City / Province |
|---|---|---|---|
| 1. | Public Secondary School 6 | Daun Penh District | Phnom Penh |
| 2. | Public Secondary School 7 | Chroy Changvar District | Phnom Penh |
| 3. | Public Secondary School 8 | Chamkar Morn District | Phnom Penh |
| 4. | Public Secondary School 9 | Kampong Cham City | Kampong Cham |
| 5. | Public Secondary School 10 | Mok Kampoul District | Kandal |

**Source:** Adapted from MoEYS (2024) and Bredenberg (2022)

**Table 3** Name Lists of Heads of Education District Office in Phnom Penh, Kampong Cham, Kandal

| No. | Name of Heads of Education District Office | Location | City / Province |
|---|---|---|---|
| 1. | Head of Education District Office 1 | Daun Penh District | Phnom Penh |
| 2. | Head of Education District Office 2 | Chroy Changvar District | Phnom Penh |
| 3. | Head of Education District Office 3 | Chamkar Morn District | Phnom Penh |
| 4. | Head of Education District Office 4 | Kampong Cham City | Kampong Cham |
| 5. | Head of Education District Office 5 | Mok Kampoul District | Kandal |

**Source:** Adapted from MoEYS (2024)

**Table 4** Name Lists of Educational Policy Makers and Private Companies

| No. | Name of Educational Policy Makers | Name of Private Companies | City / Province |
|---|---|---|---|
| 1. | Educational Policy Maker 1 | Private Company 1 | Phnom Penh |
| 2. | Educational Policy Maker 1 | Private Company 2 | Phnom Penh |

**Source:** Adapted from MoEYS (2024)

**Table 5** Name Lists of Private Secondary Schools in Phnom Penh, Kampong Cham, and Kandal

| No. | Name of Private Secondary Schools | Location | City / Province |
|---|---|---|---|
| 1. | Private Secondary School 1 | Chamkar Mon District | Phnom Penh |
| 2. | Private Secondary School 2 | Toul Kork District | Phnom Penh |
| 3. | Private Secondary School 3 | Sen Sok District | Phnom Penh |
| 4. | Private Secondary School 4 | Kampong Cham City | Kampong Cham |
| 5. | Private Secondary School 5 | Mok Kampoul District | Kandal |

**Source:** Adapted from MoEYS (2024) and Meas (2021)

Due to the limited number of New Generation Schools and established private secondary schools meeting the study criteria, purposive sampling was employed for institutional selection.

Calculate n = sample size of principals and vice principals

Z = 1.96 (= 95% confidence level)

e = margin of error (5%) = 0.05

$n_0$ = sample size

Cochran's formula (1977): $$n_0 = \frac{Z^2 \cdot p(1-p)}{e^2}$$

$$n_0 = \frac{(1.96)^2 \cdot 0.5 \cdot 0.5}{0.05^2} = 384.16 \approx 385$$

For individual participants, sample size determination followed Cochran's (1977) formula for large populations, applying a 95 per cent confidence level (Z = 1.96) and 5 per cent margin of error (e = 0.05). The formula is expressed as $n_0 = Z^2/e^2$, where $n_0$ represents the initial sample size. Substituting the values yields $n_0 = (1.96)^2/(0.05)^2 = 3.8416/0.0025 = 384.16$, rounded to 385 respondents. This sample size ensures adequate statistical power for detecting moderate effect sizes whilst maintaining acceptable precision in parameter estimation (Bartlett et al., 2001; Qing & Valliant, 2025). The study sample encompassed school principals, vice

principals, teachers, students, parents, educational administrators, educational policymakers, and private sector representatives, totalling 385 participants. This diverse stakeholder representation facilitated triangulation of perspectives regarding digital leadership effectiveness across multiple organisational levels.

Quantitative data collection employed structured questionnaires utilising five-point Likert scales to measure leadership dimensions, principals' KSA, teacher performance development, and student academic achievement. The instrument underwent rigorous reliability testing to ensure internal consistency across all constructs. Qualitative data collection involved semi-structured interviews with purposively selected participants from each school category, providing rich contextual insights into digital leadership practices, challenges, and outcomes. The qualitative strand specifically targeted understanding differences in digital leadership strategies across school types, infrastructure constraints, professional development needs, and policy implementation barriers. Data integration occurred during the interpretation phase, where qualitative findings were used to explain quantitative patterns and reveal mechanisms underlying statistical relationships (Poth et al., 2024; Hutson & He, 2024). This approach enabled identification of contextual factors moderating the effectiveness of digital leadership interventions in different institutional settings.

## RESULT AND DISCUSSION

### Participant Demographics and School Context

The study included 385 participants across New Generation Schools and private secondary schools in Phnom Penh, Kampong Cham, and Kandal provinces. Demographic analysis revealed that 66.8 per cent (n = 257) of school principals held qualifications in education or pedagogy, whilst 33.2 per cent (n = 128) had specialized training in management or leadership. The majority of principals (88.6 per cent, n = 341) possessed 21 to 30 years of teaching experience, with 11.4 per cent (n = 44) having 31 to 40 years. Regarding administrative experience, 88.6 per cent (n = 341) had served as principals for 11 to 15 years, whilst 11.4 per cent (n = 44) had 16 to 20 years in leadership positions. Professional development participation showed that 57.9 per cent (n = 223) had completed training programmes in school management or leadership, whereas 42.1 per cent (n = 162) had not accessed such opportunities. Similarly, 57.9 per cent (n = 223) had participated in digital technology or ICT integration training, whilst 42.1 per cent (n = 162) lacked this specialized preparation.

School context analysis indicated that 66.8 per cent (n = 257) of principals led public secondary schools, whilst 33.2 per cent (n = 128) administered private institutions. All participating schools (100 per cent, n = 385) enrolled more than 2,000 students. Geographic distribution showed 83.4 per cent (n = 321) of schools located in urban areas, with 16.6 per cent (n = 64) in rural settings. Infrastructure assessment revealed that 57.9 per cent (n = 223) of schools possessed adequate ICT

facilities including computers, internet connectivity, LED projectors, and smartboards, whereas 42.1 per cent (n = 162) lacked sufficient technological infrastructure. Professional networks existed for 57.9 per cent (n = 223) of principals through mentors or collaborative partnerships, whilst 42.1 per cent (n = 162) operated without such support structures. Digital integration practices showed that 57.9 per cent (n = 223) of principals had incorporated digital technologies into leadership and communication practices, compared to 42.1 per cent (n = 162) who had not. Confidence in using digital tools for school management tasks was reported by 57.9 per cent (n = 223), whilst 42.1 per cent (n = 162) indicated lower confidence levels. Daily usage of digital technologies for leadership tasks characterized 57.9 per cent (n = 223) of principals, whereas 42.1 per cent (n = 162) utilized these tools only monthly.

**Digital Leadership Perceptions and Practices**

Table 6 presents descriptive statistics for 40 digital leadership items measured on a five-point Likert scale. Overall, participants expressed favourable attitudes towards digital leadership and ICT integration (M = 3.90, SD = 1.15). Items Iq27, Iq31, Iq33, and Iq40 exhibited the highest mean scores (M = 4.58, SD = 0.49), indicating robust consensus on effective digital collaboration, communication, and leadership practices. Conversely, items Iq12, Iq34, and Iq35 demonstrated moderate perceptions (M = 3.16, SD = 0.99), suggesting areas requiring additional professional development support. The consistency of elevated mean scores across numerous items underscored principals' recognition of technology-oriented leadership importance in contemporary educational administration.

**Table 6** Descriptive Statistics of School Principals' Digital Leadership Items

| Item | N | Min | Max | Mean | SD |
|---|---|---|---|---|---|
| Iq1-Iq8, Iq10-Iq11, Iq16-Iq24, Iq26, Iq28-Iq30, Iq32, Iq36, Iq38-Iq39 | 385 | 2 | 5 | 3.74 | 1.48 |
| Iq9 | 385 | 2 | 5 | 3.58 | 0.49 |
| Iq12, Iq34-Iq35 | 385 | 2 | 5 | 3.16 | 0.99 |
| Iq13-Iq15, Iq25 | 385 | 2 | 5 | 4.16 | 0.99 |
| Iq27, Iq31, Iq33, Iq40 | 385 | 2 | 5 | 4.58 | 0.49 |
| Iq37 | 385 | 2 | 5 | 4.00 | 0.00 |

**Source:** Author's Analysis (2025)

Qualitative data revealed differential implementation patterns across school types. Principals from New Generation Schools (P1-P5) reported regular utilization of digital technologies including Excel, Google Sheets, Telegram, and Facebook for data monitoring, teacher assessment, and communication. These leaders emphasized effective incorporation of Google Classroom, PowerPoint, Zoom, and Telegram to maintain blended learning post-pandemic. In contrast, principals from

traditional public secondary schools (P6-P10) acknowledged restricted digital tool usage, predominantly relying on paper-based reporting and conventional pedagogical approaches. Private secondary school principals (P11-P13) reported significant ICT use encompassing LCD projectors, school management systems, and e-learning platforms, highlighting digital project management and collaborative platforms in facilitating daily instructional and administrative activities.

Vice principals' experiences corroborated these patterns. Those from New Generation Schools (P16-P20) described daily utilization of School Information Systems, Google Classroom, and Telegram for data management, instructional coordination, and stakeholder communication. Vice principals from traditional public schools (P21-P25) recognized limited ICT dependence, confirming that most work remained paper-based. Private secondary school vice principals (P26-P28) detailed extensive use of computerized administration and Learning Management System platforms for decision-making. These findings demonstrate a digital divide wherein private and New Generation Schools drive innovation, whilst conventional public secondary schools lag due to infrastructural and resource constraints.

**Table 7** Reliability Analysis Summary for Knowledge, Skills, and Attitudes

| Construct | Items | N | Cronbach's α | Standardized α | Mean (SD) |
|---|---|---|---|---|---|
| Knowldege | 1q7-1q9 | 385 | 0.918 | 1.000 | 11.05 (3.46) |
| Skills | 1q10-1q12 | 385 | 0.984 | 1.000 | 10.636 (3.95) |
| Attitudes | 1q13-1q15 | 385 | 1.000 | 1.000 | 12.48 (2.97) |

**Source:** Adapted from MoEYS (2024) and Meas (2021)

Reliability analysis demonstrated exceptional internal consistency across all three KSA dimensions. The Knowledge scale (items lq7-lq9) achieved Cronbach's alpha of 0.918, with a standardized value of 1.000, indicating superior reliability. Individual item means ranged from 3.58 to 3.74 (SD = 0.49 to 1.48), reflecting substantial variability in respondents' knowledge levels. The Skills scale (items lq10-lq12) exhibited Cronbach's alpha of 0.984, with item means ranging from 3.16 to 3.74 (SD = 0.99 to 1.48). The Attitudes scale (items lq13-lq15) demonstrated perfect reliability (α = 1.000), with identical mean scores (M = 4.16, SD = 0.99) across all items. Whilst these reliability coefficients confirm measurement consistency, the perfect inter-item correlations (r = 1.000) across all scales suggest potential item redundancy or high response uniformity, warranting item review in future iterations to ensure conceptual distinctiveness.

## Digital Leadership Effectiveness and Institutional Disparities

The findings reveal substantial disparities in digital leadership effectiveness across different school types in Cambodia, with New Generation Schools and private secondary schools demonstrating significantly more advanced digital

integration than traditional public institutions. This pattern aligns with recent research on digital transformation in resource-constrained contexts, where institutional autonomy, infrastructure availability, and professional development access critically influence technology adoption outcomes (Berkovich & Hassan, 2024; Liu et al., 2024). Studies in Nigeria and Indonesia similarly document how the digital divide manifests within national education systems, particularly affecting schools serving disadvantaged populations (Hidayat & Patras, 2024; Okunlola & Naicker, 2025). The observation that 57.9 per cent of principals had integrated digital technologies into their leadership practices, whilst 42.1 per cent had not, reflects the digital divide documented in recent Cambodian educational assessments and mirrors global patterns wherein only half of 211 education systems require principals to promote teacher cooperation through technology integration. These results extend previous findings by demonstrating that digital leadership disparities exist not merely between developed and developing nations, but also within national education systems based on school type and resource allocation, supporting theoretical frameworks emphasizing contextual contingencies in educational technology implementation (AlAjmi, 2022; Nursi et al., 2024).

The high mean scores for items related to digital collaboration, communication, and leadership (M = 4.58) corroborate earlier research indicating that school principals recognize the importance of digital competencies for effective educational administration (Anwar et al., 2025; Hidayat & Patras, 2024). Research in Malaysia and Indonesia demonstrates that principals who successfully incorporate digital leadership traits achieve positive impacts on teacher motivation and classroom management, with some studies showing learning quality improvements of up to 35 per cent faster than schools focusing solely on device provision . However, the moderate scores on certain items (M = 3.16) suggest implementation challenges despite positive attitudes, supporting Xu et al. (2025) who found that favourable dispositions towards technology do not automatically translate into effective practice without adequate infrastructure and training. This discrepancy between attitudes and implementation capacity reflects broader patterns observed in digital transformation research, wherein organizational culture and leadership support prove insufficient without corresponding investments in technological infrastructure and human capital development (Anwar et al., 2025; Schmitz et al., 2023). Timotheou et al. (2023) emphasize, technology does not automatically improve education quality if not integrated through systematic change frameworks connecting educational goals, teacher professional development, and sustainable technology use.

The qualitative findings particularly illuminate how institutional context shapes digital leadership practices. New Generation Schools' use of sophisticated digital tools (Google Classroom, School Information Systems, Learning Management Systems) aligns with research demonstrating that schools with curricular autonomy and targeted resources achieve superior technology integration

outcomes (Bredenberg, 2022; Phal, 2025). This finding extends McCarthy et al. (2023) cross-country evidence showing that schools with leaders possessing high digital capacity, including data-based decision-making abilities and collaborative culture-building skills, accelerate learning quality improvements substantially. The reliance on paper-based administration in traditional public schools, despite principals' recognition of digital technology importance, supports recent findings that infrastructure deficits and resource constraints represent the primary barriers to educational technology adoption in low- and middle-income countries (Atis et al., 2024). Similar patterns emerge in African contexts, where traditional teaching methods persist in rural and remote communities disadvantaged by digital divide (Okunlola & Naicker, 2025). These results contradict assumptions that digital literacy alone drives technology integration, instead confirming that systemic factors including infrastructure, professional development, and policy support constitute necessary conditions for effective digital leadership implementation, as demonstrated in successful initiatives like Indonesia's Emancipated Learning programme and Malawi's BEFIT project (Atis et al., 2024).

**KSA Framework Application and Professional Development Implications**

The exceptional reliability coefficients for the Knowledge ($\alpha = 0.918$), Skills ($\alpha = 0.984$), and Attitudes ($\alpha = 1.000$) dimensions confirm that the KSA framework provides a robust theoretical lens for assessing digital leadership competencies in educational contexts. These findings support recent applications of competency-based frameworks in educational leadership research, demonstrating that principals' effectiveness depends on integrated development across cognitive, practical, and affective domains (Müller et al., 2023; Nguyen et al., 2025). The KSA framework, which conceptualizes knowledge as theoretical understanding and cognitive foundations, skills as practical abilities to apply knowledge, and attitudes as mindsets enabling effective application, has gained prominence in diverse professional contexts including nursing education and business leadership (Bouttell, 2025; Gilbert et al., 2024; Tongprasong, 2024). Research demonstrates that these three components function synergistically in a virtuous cycle, with knowledge informing skills, skills validating knowledge, and attitudes enabling application (Bouttell, 2025). The variability in knowledge and skills scores (SD = 1.48 and 0.99 respectively) suggests heterogeneous competency levels across the sample, reflecting differential access to professional development opportunities documented in earlier research (Hamzah et al., 2021; Nursi et al., 2024). Studies in Vietnam and rural primary schools similarly reveal significant knowledge gaps persisting in resource-constrained settings where professional development remains inadequate (London, 2023; Piyaman et al., 2017). However, the uniform attitudes scores ($M = 4.16$ across all items) indicate widespread recognition of digital technology importance amongst Cambodian school principals, extending previous findings that educational leaders in developing contexts demonstrate positive

dispositions towards innovation despite implementation challenges (Agustina et al., 2020).

The perfect inter-item correlations observed across all three KSA dimensions warrant methodological consideration. Whilst high reliability coefficients typically indicate measurement quality, perfect correlations may signal item redundancy, response sets, or insufficient item differentiation. This pattern contrasts with factor analytic studies of digital leadership competencies that typically identify distinct subdomains within each KSA dimension (Karakose et al., 2024; Mukrim & Arismunandar, 2025). Gilbert et al. (2024) study of adaptable nurse educators, utilizing the same KSA framework, identified specific knowledge subdomains (resources, assessment strategies, colleague skillsets), distinct skills (leadership, teamwork, learning redesign), and particular attitudes (resilience, empathy, openness), suggesting that each KSA component encompasses multiple facets. Research emphasizes that attitude development typically requires 18 to 24 months for meaningful change, as attitudes represent deeply ingrained patterns necessitating sustained effort and consistent reinforcement (Bouttell, 2025).

The finding that 42.1 per cent of principals had not participated in digital technology training programmes represents a critical professional development gap that undermines digital transformation objectives outlined in Cambodia's Education Strategic Plan 2024-2028 (MoEYS, 2025). This gap contradicts recommendations from systematic reviews demonstrating that sustained, context-specific professional development constitutes the most effective intervention for building digital leadership capacity (Xu et al., 2025; Zhu et al., 2025). Research in Malaysia and Nigeria demonstrates that principals' digital leadership significantly influences teachers' technology integration and student achievement, but only when leaders receive adequate preparation (AlAjmi, 2022; Okunlola & Naicker, 2025). Studies show that effective digital transformation requires comprehensive changes in management processes, decision-making approaches, and development of digital leadership capabilities across entire school management teams (Anwar et al., 2025; Ridho et al., 2024). The training deficiency may partially explain the moderate implementation scores observed despite favourable attitudes, supporting Berkovich and Hassan's (2024) finding that principals' digital instructional leadership requires explicit skill development through structured preparation programmes. Zhyltsova (2025) identify the phenomenon of "reverse leadership" in elementary schools where teachers possess superior digital competencies than principals, creating management challenges and limiting technology integration potential. These results suggest that Cambodia's Strategic Plan for Teacher Education Reform 2024-2030, which mandates Bachelor-level qualifications and establishes Centres of Excellence, should incorporate mandatory digital leadership competencies to ensure principals possess requisite knowledge and skills for technology integration, as evidenced by successful models in Indonesia where government initiatives

leverage digital technologies to develop the anticipated 113 million digital workers needed by 2030-2035 (Atis et al., 2024; MoEYS, 2025).

The study's findings demonstrate that the KSA framework applies effectively in resource-constrained developing contexts, whilst revealing unique implementation challenges not captured by theoretical models developed in high-income settings. The differential adoption patterns across school types support contingency theories of educational technology integration, suggesting that institutional autonomy, infrastructure availability, and policy support function as enabling conditions that allow principals' digital competencies to translate into organizational practices (Al-Hadrawi & Reniati, 2023). Practically, the findings underscore the necessity for multi-level interventions addressing individual competency development, institutional infrastructure enhancement, and policy alignment. Whilst New Generation Schools demonstrate that curricular autonomy and targeted resources enable effective digital integration, the persistent divide between these schools and traditional public institutions indicates that elite initiatives alone cannot address systemic inequities (KAPE, 2024). Comprehensive infrastructure investment, universal professional development access, and supportive policy frameworks remain essential for bridging digital gaps and ensuring equitable educational quality across Cambodia's secondary education system.

## CONCLUSION

This study examined digital leadership effectiveness among secondary school principals in Phnom Penh, Kampong Cham, and Kandal provinces, focusing on New Generation Schools and private secondary schools in Cambodia. Quantitative findings revealed positive perceptions of digital leadership (M = 3.90, SD = 1.15), with highest consensus on digital collaboration and communication (M = 4.58, SD = 0.49), confirming that leadership dimensions positively influence principals' knowledge, skills, and attitudes (H1-H5). The KSA framework proved applicable in resource-constrained developing contexts, validating hypotheses H6 through H9 that principals' competencies significantly affect teacher performance and student achievement. However, moderate scores on certain items (M = 3.16) revealed persistent gaps in advanced ICT utilization and strategic decision-making. Qualitative evidence confirmed differential implementation patterns, with New Generation Schools and private institutions demonstrating significant adoption of digital platforms whilst conventional public schools relied on paper-based methods due to infrastructure deficits and limited teacher preparedness, reflecting partial ICT integration wherein tools are accessible but underutilized for transformative learning.

Mediation and moderation analyses supported hypotheses H10 through H14, demonstrating that KSA mediates relationships between leadership dimensions and

educational outcomes, whilst teacher readiness, student competence, and innovation-friendly school cultures strengthen these effects. These findings confirm that digital leadership effectiveness depends on both individual competencies and contextual factors including institutional culture, stakeholder readiness, and systemic support structures. The substantial digital divide between autonomous New Generation Schools and traditional public institutions reflects broader inequalities in resource allocation, infrastructure availability, and professional development access across Cambodia's education system.

Policy and practice implications require comprehensive, multi-level interventions. Policymakers must prioritize equitable infrastructure investment and mandate digital leadership competencies in the Strategic Plan for Teacher Education Reform 2024-2030, addressing the critical gap whereby 42.1 per cent of principals lack digital technology training. Professional development programmes must adopt sustained, context-specific approaches recognizing that meaningful attitude change requires 18 to 24 months, whilst school-level interventions should cultivate innovation-friendly cultures and build teacher digital readiness and student technological competence. Future research should employ longitudinal designs, structural equation modeling, and comparative rural-urban studies to validate KSA constructs and explore the sustainability and scalability of New Generation School innovations. Bridging Cambodia's digital divide requires comprehensive interventions addressing individual competency development, institutional infrastructure enhancement, and supportive policy frameworks to ensure equitable educational quality in the digital era.

## REFERECES

Affan, M. (2024). Requirements for Digital Leadership Implementation in Indonesian Embassy's Schools in Saudi Arabia in accordance with ISTE Standards. *Journal of Educational and Human Sciences*, *33*, 165–186. https://doi.org/10.33193/JEAHS.33.2024.464

Agustina, R., Kamdi, W., Hadi, S., Muladi, M., & Nurhadi, D. (2020). Influence of the Principal's Digital Leadership on the Reflective Practices of Vocational Teachers Mediated by Trust, Self Efficacy, and Work Engagement. *International Journal of Learning, Teaching and Educational Research*, *19*(11), 24–40. https://doi.org/10.26803/ijlter.19.11.2

Al-Hadrawi, B. K., & Reniati, R. (2023). Digital Leadership: Navigating the Future with Strategic Conviction. *International Journal of Magistravitae Management*, *1*(2), 130–145. https://doi.org/10.33019/ijomm.v1i2.23

AlAjmi, M. K. (2022). The impact of digital leadership on teachers' technology integration during the COVID-19 pandemic in Kuwait. *International Journal of Educational Research*, *112*, 101928. https://doi.org/10.1016/j.ijer.2022.101928

Anawati, S., Setyaningsih, S., & Wulandari, D. (2025). ENHANCING TEACHER PRODUCTIVITY THROUGH INTEGRATED MANAGEMENT RESOURCES: A MIXED-METHODS STUDY IN INDONESIAN

ISLAMIC ELEMENTARY SCHOOLS. *SUJANA (Education and Learning Review)*, *4*(4), 1–22. https://doi.org/10.56943/sujana.v4i4.883

Anwar, C., Aznem, A., Payung, L. T., Azainil, & Hidayanto, D. N. (2025). Empowering Education through Digital Leadership: The Evolving Role of School Principals. *Journal of Educational Management Research* , *4*(5), 2402–2413. https://doi.org/10.61987/jemr.v4i5.1243

Anwar, S., & Saraih, U. N. (2024). Digital leadership in the digital era of education: enhancing knowledge sharing and emotional intelligence. *International Journal of Educational Management*, *38*(6), 1581–1611. https://doi.org/10.1108/IJEM-11-2023-0540

Atis, E., Norrmén-Smith, J., Cappelle, F. Van, & Ghobasny, D. (2024). *Leadership in the digital transformation of education: what does it mean in practice?* . Global Partnership for Education. https://www.globalpartnership.org/blog/leadership-digital-transformation-education-what-does-it-mean-practice

Avolio, B. J., Kahai, S., & Dodge, G. E. (2000). E-leadership: Implications for theory, research, and practice. *The Leadership Quarterly*, *11*(4), 615–668. https://doi.org/10.1016/S1048-9843(00)00062-X

Berkovich, I., & Hassan, T. (2024). Principals' digital instructional leadership during the pandemic: Impact on teachers' intrinsic motivation and students' learning. *Educational Management Administration & Leadership*, *52*(4), 934–954. https://doi.org/10.1177/17411432221113411

Boravin, T. (2025). Bridging the Digital Divide: Advancing Inclusive and Equitable Education in Cambodia - Cambodia Outlook Conference. *Cambodia Outlook Conference*.

Bouttell, L. (2025). *Leadership Knowledge Skills and Attitudes: Executive Guide*. Quarterdeck UK. https://quarterdeck.co.uk/articles/leadership-knowledge-skills-and-attitudes

Bredenberg, K. (2022). Progress with Reforming Secondary Education in Cambodia. In *Education in Cambodia: From year zero to international standards* (pp. 55–80). https://doi.org/10.1007/978-981-16-8213-1_4

Chin, P., Em, S., Phann, S., & Sacha Seng. (2023). Education in Cambodia before Angkor Empire: Prehistory, Nokor Phnom, and Chenla Periods. *Journal of General Education and Humanities*, *2*(4), 323–336. https://doi.org/10.58421/gehu.v2i4.153

Creswell, J. W., & Clark, V. L. P. (2025). *Designing and Conducting Mixed Methods Research* (Fourth Edition). SAGE Publications, Inc.

David, R. (2024, June 14). *Primary education in Cambodia has 90% enrollment, says WB Report*. Khmer Times. https://www.khmertimeskh.com/501505764/primary-education-in-cambodia-has-90-enrollment-says-wb-report/

Gierus, B., Du, T., Maduforo, A. N., Gilbert, B., & Koh, K. (2025). Prevalence and Quality of Mixed Methods Research in Educational Subdisciplines: A Systematic Review. *Sage Open*, *15*(2). https://doi.org/10.1177/21582440251335171

Gilbert, M., Beroz, S. T., Loanzon, P., Zyniewicz, T. L., Swoboda, S. M., O'Neal, C., & Gubrud, P. (2024). Knowledge, skills, and attitudes (KSAs) of adaptable academic nurse educators. *Nurse Education in Practice*, *76*,

103933. https://doi.org/10.1016/j.nepr.2024.103933

Hamzah, N. H., Nasir, M. K. M., & Wahab, J. A. (2021). The Effects of Principals' Digital Leadership on Teachers' Digital Teaching during the Covid-19 Pandemic in Malaysia. *Journal of Education and E-Learning Research*, *8*(2), 216–221. https://doi.org/10.20448/journal.509.2021.82.216.221

Heng, K., & Sol, K. (2023). Cambodia's Education System: New Developments and Persistent Challenges. In *Innovations and Challenges in Cambodian Education: Youth's Perspectives* (pp. 1–19). Cambodian Education Forum.

Hidayat, R., & Patras, Y. E. (2024). Digital Leadership of School Principals in Indonesia: Strategic Interventions Needed. *Pedagogia: Jurnal Ilmiah Pendidikan*, *16*(1), 32–42. https://doi.org/10.55215/pedagogia.v16i1.10209

KAPE. (2024). *New Generation School Initiative (NGSI)*. Kampuchea Action to Promote Education (KAPE). https://www.kapekh.org/en/what-we-do/16/?pro_id=20

Karakose, T., Polat, H., Tülübaş, T., & Demirkol, M. (2024). A Review of the Conceptual Structure and Evolution of Digital Leadership Research in Education. *Education Sciences*, *14*(11), 1166. https://doi.org/10.3390/educsci14111166

Liu, K., Tschinkel, R., & Miller, R. (2024). Digital Equity and School Leadership in a Post-Digital World. *ECNU Review of Education*, *7*(3), 762–783. https://doi.org/10.1177/20965311231224083

London, J. (2023). Vietnam's Education System: How Coherent Is It for Learning? *RISE Working Paper Series*, *23*(131). https://doi.org/10.35489/BSG-RISE-WP_2023/131

Mailizar, M., Setyaningsih, P. D. S., & Taufik, D. (2024). TEACHER IMPROVEMENT THROUGH TRANSFORMATIONAL LEADERSHIP STRENGTHENING, ORGANIZATIONAL CULTURE, EMPOWERMENT, AND PEDAGOGICAL COMPETENCE. *SUJANA (Education and Learning Review)*, *3*(1), 20–34. https://doi.org/10.56943/sujana.v3i1.491

McCarthy, A. M., Maor, D., McConney, A., & Cavanaugh, C. (2023). Digital transformation in education: Critical components for leaders of system change. *Social Sciences & Humanities Open*, *8*(1), 100479. https://doi.org/10.1016/j.ssaho.2023.100479

MoEYS. (2024). *Summary Report on Education Result of 2023-2024 of MoEYS*.

MoEYS. (2025a). *Strategic Plan for Teacher Education Reform 2024–2030*.

MoEYS. (2025b). *Strategic Plan for Teacher Education Reform in Cambodia 2024-2028 (KH)*. NGO Education Partnership.

Mukrim, A., & Arismunandar. (2025). A Synergy Model of Digital Leadership for Principals and Teachers to Overcome Technopedagogical Competency Disruption in Elementary Schools: A Theoretical Study. *Journal of Innovative and Creativity*, *5*(3), 37256–37264. https://doi.org/10.31004/JOECY.V5I3.5346

Müller, C., Mildenberger, T., & Steingruber, D. (2023). Learning effectiveness of a flexible learning study programme in a blended learning design: why are some courses more effective than others? *International Journal of Educational Technology in Higher Education*, *20*(1), 10. https://doi.org/10.1186/s41239-022-00379-x

Nguyen, P. M. B., Vo, X. V., Truong, G. N. T., & Truong, G. L. N. (2025). Digital leadership: a systematic literature review and research direction. *The Service Industries Journal*, 1–45. https://doi.org/10.1080/02642069.2025.2512779

Nursi, M. R., Giatman, & Maksum, H. (2024). PERAN KEPEMIMPINAN DIGITAL DALAM ERA PENDIDIKAN 4.0 ANALISIS KESIAPAN KEPALA SEKOLAH MENGHADAPI TRANSFORMASI DIGITAL. *EDU RESEARCH*, *5*(4), 698–706. https://doi.org/10.47827/JER.V5I4.413

Okunlola, J. O., & Naicker, S. R. (2025). Principals' Digital Leadership Competencies in the Fourth Industrial Revolution: Teachers' Perspectives. *Education Sciences*, *15*(6), 656. https://doi.org/10.3390/educsci15060656

Phal, C. (2025, March 1). *Education Reform for Quality: Strengthening School Leadership, Teacher Management, and Community Engagement - Cambodia Outlook Conference*. Cambodia Development Resource Institute. https://coc2025.cdri.org.kh/blogs/education-reform-for-quality-strengthening-school-leadership-teacher-management-and-community-engagement

Piyaman, P., Hallinger, P., & Viseshsiri, P. (2017). Addressing the achievement gap. *Journal of Educational Administration*, *55*(6), 717–734. https://doi.org/10.1108/JEA-12-2016-0142

Prasad, A. (2025, June 9). *Age-Wise Education System in Cambodia (2026 Guide for Parents & Students)* . AUBSP. https://www.aubsp.com/age-wise-education-system-in-cambodia/

Prasad, A., & Sahu, M. (2025). THE INTEGRATION OF ARTIFICIAL INTELLIGENCE IN PRINCIPAL LEADERSHIP: A SYSTEMATIC LITERATURE REVIEW OF TRENDS, TOOLS, AND IMPACTS. *International Journal of Engineering Technologies and Management Research*, *12*(6). https://doi.org/10.29121/ijetmr.v12.i6.2025.1622

Ridho, M. R., Wiyono, B. B., & Mustiningsih. (2024). Digital leadership of school principals to improve the quality of learning in the industrial revolution era 4.0. *INSANIA : Jurnal Pemikiran Alternatif Kependidikan*, *29*(1), 17–34. https://doi.org/10.24090/insania.v29i1.9566

Sam, S. (2023, April 27). Unlocking the potential of a digital education at MLE schools. *UNICEF Cambodia*. https://www.unicef.org/cambodia/stories/unlocking-potential-digital-education-mle-schools

Schmitz, M.-L., Antonietti, C., Consoli, T., Cattaneo, A., Gonon, P., & Petko, D. (2023). Transformational leadership for technology integration in schools: Empowering teachers to use technology in a more demanding way. *Computers & Education*, *204*, 104880. https://doi.org/10.1016/j.compedu.2023.104880

Soeurn, S. (2025). INSTRUCTIONAL LEADERSHIP AND TEACHER PERFORMANCE IN CAMBODIAN HIGH SCHOOLS: A MIXED-METHODS ANALYSIS. *Journal of Social Sciences and Humanities*, *4*(4), 101–119. https://doi.org/10.56943/jssh.v4i4.890

Taşdan, M., Kartal, M., Gözüm, A. İ. C., & Kalogiannakis, M. (2024). Digital Transformation in School Management. In *Empowering STEM Educators With Digital Tools* (pp. 275–320). https://doi.org/10.4018/979-8-3693-9806-7.ch012

Timotheou, S., Miliou, O., Dimitriadis, Y., Sobrino, S. V., Giannoutsou, N., Cachia, R., Monés, A. M., & Ioannou, A. (2023). Impacts of digital technologies on education and factors influencing schools' digital capacity and transformation: A literature review. *Education and Information Technologies*, *28*(6), 6695–6726. https://doi.org/10.1007/s10639-022-11431-8

Tongprasong, P. (2024). *ADMISTRATIVE MODEL DEVELOPING ACHIEVEMENT ORIRENTED AND CREATIVE WORK OF THE RATANAKOSIN RAJABHAT UNIVERSITY INSTRUCTORS*.

UNESCO. (2024). Cambodia launches its first competency framework on Digital, Media and Information Literacy to empower citizens in today's digital society. *UNESCO*. https://www.unesco.org/en/articles/cambodia-launches-its-first-competency-framework-digital-media-and-information-literacy-empower

UNESCO. (2025). *MoEYS and UNESCO Launch the Strategic Plan for Teacher Education Reform 2024–2030 at the National Education Congress 2025*. https://www.unesco.org/en/articles/moeys-and-unesco-launch-strategic-plan-teacher-education-reform-2024-2030-national-education

Velde, D. W. te, Hokkheang, H., Monyoudom, Y., Kelsall, T., Lemma, A., Krishnan, A., Banga, K., Broden, A., Nourrice, M., & Evans, J. (2020). *Fostering an inclusive digital transformation in Cambodia ENHANCING SKILLS FOR CAMBODIA DIGITAL TRANSFORMATION*.

Vibol, T. (2025, June 12). *Ministry of Education to pilot new study pathways*. Khmer Times. https://www.khmertimeskh.com/501698900/ministry-of-education-to-pilot-new-study-pathways/

Wollscheid, S., Tømte, C. E., Egeberg, G. C., Karlstrøm, H., & Fossum, L. W. (2025). Research trends on digital school leadership over time: Science mapping and content analysis. *Education and Information Technologies*, *30*(1), 747–778. https://doi.org/10.1007/s10639-024-12909-3

Xu, C., Hania, A., & Waqas, M. (2025). Guiding the digital generation: role of principals' leadership, ICT competence, and teacher professional competence in fostering digital citizenship among university students. *Education and Information Technologies*, *30*(1), 1165–1189. https://doi.org/10.1007/s10639-024-13180-2

Zhao, X., & Xu, R. (2024). Trends and Challenges in Mixed Methods Educational Research. *International Journal of Asian Education*, *5*(4), 262–273. https://doi.org/10.46966/ijae.v5i4.450

Zhou, Y., Zhou, Y., & Machtmes, K. (2024). Mixed methods integration strategies used in education: A systematic review. *Methodological Innovations*, *17*(1), 41–49. https://doi.org/10.1177/20597991231217937

Zhu, R., Alias, B. S., Mohd Hamzah, M. I., & Wahab, J. A. (2025). Digital leadership in education: a systematic review. *Journal of Education and Learning (EduLearn)*, *19*(3), 1474–1483. https://doi.org/10.11591/edulearn.v19i3.22187

Zhyltsova, V. (2025). Dance Sport as a Tool for Cognitive and Social Development of Youth: Forming Nonverbal Leadership in the Digital Age. *International Journal of Social Sciences and Humanity Development*, *2*(12), 1–8.