International Journal of Learning, Teaching and Educational Research
Vol. 25, No. 7, pp. 200-221, July 2026
https://doi.org/10.26803/ijlter.25.7.10
Received Apr 4, 2026; Revised Jun 16, 2026; Accepted Jun 19, 2026

Needs Assessment and Comparative Analysis of Draft Digital Technology Standards for Learning in Basic Education in Thailand

Narin Nonthamand*
University of Phayao
Phayao, Thailand

Abstract. This study aimed to analyze the priority needs for standards on the use of digital technology for learning in basic education and to compare the four standards by role and school size. A survey research design was employed. The sample consisted of 1,272 participants, including 543 school administrators and 729 teachers. Data was collected using a needs assessment questionnaire for school development based on the draft standards for the use of digital technology for learning in basic education. The data were analyzed using needs assessment techniques and multivariate analysis of variance (MANOVA). The findings showed that the highest priority need was Standard 1: Access and Equity in Digital Technology, followed by Standard 4: Support for Learners, Teachers, School Administrators, and Educational Personnel; Standard 2: Learning Design and Creative Self-Direction; and Standard 3: Assessment and Evaluation for Learning Development. Furthermore, the results of the mean difference tests across the four standards, classified by role and school size and examined through univariate analysis of variance and pairwise comparisons, showed that teachers had significantly higher mean scores than school administrators in three areas: Learning Design and Creative Self-Direction, Assessment and Evaluation for Learning Development, and Support for Learners, Teachers, School Administrators, and Educational Personnel, at the .05 level of statistical significance.

Keywords: Digital Learning Standards; Technology-Enhanced Learning; Needs Assessment; Basic Education; Thailand; MANOVA; Educational Policy; Teacher Readiness

Citation:
Nonthamand, N. (2026). Needs Assessment and Comparative Analysis of Draft Digital Technology Standards for Learning in Basic Education in Thailand. *International Journal of Learning, Teaching and Educational Research*, *25*(7), 200–221. https://doi.org/10.26803/ijlter.25.7.10

*Corresponding author: Narin Nonthamand; *narin.no@up.ac.th*

1. Introduction

The integration of digital technology into basic education has become an increasingly important priority in preparing learners for the demands of the twenty-first century. In the Thai context, "basic education" refers to school-level education prior to higher education, encompassing primary, lower secondary, and upper secondary levels. In this study, the term refers to the educational scope within which the national curriculum, school development policies, and digital learning initiatives are implemented (Office of the Education Council, 2022).

However, schools continue to face multiple challenges and constraints in implementing digital technology effectively in teaching and learning. These challenges include inadequate resources, limited personnel readiness, and the absence of clearly articulated standards for the educational use of digital technology (Mhlongo et al., 2023). The urgency of establishing such standards is further underscored by the diverse conditions under which basic education schools operate. Schools differ substantially in terms of size, geographical location, digital infrastructure, availability of learning technologies, teacher readiness, learner characteristics, administrative capacity, and technical support systems.

Without a clearly articulated standards-based framework, the integration of digital technology for learning may remain fragmented, uneven, and highly dependent on local resources. Such inconsistency may reinforce disparities in students' access to quality digital learning opportunities and limit schools' capacity to plan digital transformation systematically. Therefore, standards for the use of digital technology for learning are urgently needed, not as a uniform prescription for all schools, but as a common yet adaptable framework that enables schools to diagnose their current conditions, identify development gaps, prioritize needs, and design improvement strategies that are responsive to their specific contexts.

Thailand's development of digital technology standards also reflects a broader international shift toward coherent and evidence-informed digital education systems. Globally, educational technology is increasingly framed not merely as the provision of devices or platforms, but as a systemic mechanism for promoting access, equity, quality, governance, teacher preparedness, and sustainable digital transformation (OECD, 2023; UNESCO, 2023). From this perspective, Thailand's draft standards mirror global trends by positioning digital technology use as a standards-based process that connects infrastructure, pedagogical design, assessment for learning, and institutional support. This alignment is particularly important for ensuring that digital transformation in basic education is implemented in an equitable, coherent, and context-responsive manner.

Recent research on technology adoption indicates that effective digital technology integration in education is shaped not only by infrastructural provision, but also by stakeholder acceptance, teacher readiness, and institutional support (Akram et al., 2022; Giac et al., 2025; Granić, 2023). Accordingly, this study conceptualizes the draft standards as a standards-based mechanism for facilitating school-level

technology adoption through four interrelated conditions: equitable access, learning design, assessment for learning, and support systems.

In response to these issues, the Office of the Education Council developed a draft of the standards for the use of digital technology for learning in basic education. The draft standards were developed through a review of key documents and prior research from Thailand and international contexts. The process also drew on schools' perspectives on standards for technology-enhanced learning, consultations with educational technology specialists and technology-integration experts, and an examination of model schools that had implemented technology-based teaching. Following these processes, the draft standards were reviewed, examined, and refined.

Building on these perspectives, this study contributes to the literature by empirically examining Thailand's draft digital technology standards for learning as an emerging standards-based policy framework for basic education. By integrating needs assessment and MANOVA, it provides priority-setting and comparative evidence across professional roles and school-size contexts, thereby informing digital education policy and context-responsive school development.

The study entitled Needs Assessment and Comparative Analysis of Draft Digital Technology Standards for Learning in Basic Education in Thailand had two objectives: (1) to analyze the priority needs associated with the standards for the use of digital technology for learning in basic education by role and school size, and (2) to compare the four standards for the use of digital technology for learning in basic education across role and school-size categories. To address these objectives, the study employed needs assessment, a research process used to examine and analyze the discrepancy between current conditions and desired conditions. Need assessment serves as a tool for identifying problems, diagnosing their causes, and proposing possible solutions. It is commonly used to identify personnel development needs or curriculum improvement priorities, thereby providing an important foundation for strategic decision-making (Garira, 2020; Kanjanawasee, 2016).

In the present study, needs assessment was particularly important for identifying the gap between existing conditions and desired conditions, thereby providing an empirical basis for planning and implementing school development to enable the effective use of digital technology. It also helped identify schools' actual needs in terms of resources, technology, and personnel development, which, in turn, supported the formulation of development directions and strategies aligned with the needs and contexts of individual schools.

In addition, the study employed multivariate analysis of variance (MANOVA), a statistical technique used to compare group differences across multiple dependent variables simultaneously in order to examine multivariate outcome patterns and reduce inflated Type I error associated with multiple univariate tests (Tabachnick & Fidell, 2019). The combined use of needs assessment and MANOVA enabled the study to identify development needs related to the draft

standards for the use of digital technology for learning in basic education across different school contexts and to generate evidence that can inform future school development planning.

2. Literature Review

This review focuses on three key areas: (1) the draft standards for using digital technology in basic education; (2) the pilot implementation of these standards; and (3) related research studies.

2.1 Draft Standards for the Use of Digital Technology for Learning in Basic Education

The Ministry of Education (2025) developed draft standards for the use of digital technology for learning in basic education, recognizing the importance of educational technology as a key driver of learning management that connects experiences both inside and outside the classroom through the use of technology (Thailand Development Research Institute, 2021). The draft standards were developed to provide a common framework for schools across all affiliations to strengthen the effective use of digital technology in education. They are intended to promote equitable and high-quality access to digital learning. In addition, they support learner development by cultivating competencies in digital citizenship, lifelong learning, innovation, and resilience, aligned with the National Education Standards' desired outcomes.

2.1.1 Process of Studying and Developing the Draft Standards for the Use of Digital Technology for Learning in Basic Education

The study and development of the draft standards for the use of digital technology for learning in basic education proceeded through a sequence of interconnected stages. It began with a review and analysis of foundational information derived from document analysis and from perspectives gathered from schools and relevant experts.

Based on this groundwork, the draft standards were formulated through consultative meetings involving representatives from agencies responsible for basic education provision and representatives from schools in both formal and non-formal education. A total of 200 participants from eight affiliations took part in this process, including the Office of the Basic Education Commission, the Office of the Private Education Commission, the Bangkok Metropolitan Administration, local government organizations, the Border Patrol Police Bureau, the Office of Buddhist Scripture Education, the Office of the Vocational Education Commission, and the Department of Learning Encouragement. These consultations were conducted to obtain feedback and recommendations for improving the draft standards.

In the final stage, the draft standards were evaluated by experts in curriculum and learning management, together with experts in educational technology. The revised draft and the complete report on the study and development of the standards were then submitted to the Subcommittee of the Education Council on Educational Standards for consideration. This stage also generated related policy

recommendations. The revised draft standards were subsequently presented to the Education Council for final consideration and approval (Ministry of Education, 2025).

2.1.2 Standards and Indicators

The Ministry of Education (2025) specified the draft standards and indicators for the use of digital technology for learning in basic education as a common framework for all schools at the basic education level, regardless of affiliation, to improve learning through the effective use of digital technology.

The framework initially comprised three main standards. Standard 1: Access and Equity in Digital Technology consisted of three indicators. Standard 2: Learning Design and Creative Self-Direction through Digital Technology consisted of the following sub-standards: the use of digital technology for learning and creative production; the safe and ethical use of digital technology; and assessment and evaluation for monitoring learning progress through digital technology, totalling 12 indicators. Standard 3: Support for Learners, Teachers, and Educational Personnel consisted of the following sub-standards: training and development, support for digital media and digital learning ecosystems, and management, with a total of nine indicators, based on the conceptual framework for developing the draft standards for the use of digital technology for learning in basic education.

The framework was subsequently revised through pilot implementation, resulting in the four-standard structure presented in Figure 1.

2.2 Pilot Implementation of the Standards for the Use of Digital Technology for Learning in Basic Education

The Office of the Education Council (2025) conducted a study and developed draft standards for the use of digital technology for learning in basic education during fiscal year 2024. The process emphasized stakeholder participation across all types and levels of education, including policy and practice levels, central, regional, and school levels, and formal, non-formal, and vocational education sectors. It also involved the participation of qualified experts and digital technology-related agencies. Five pilot areas were selected: Phayao, Khon Kaen, Songkhla, Samut Sakhon, and Bangkok. These pilot areas included 112 pilot schools, encompassing both high-readiness and low-readiness schools, as well as schools in formal, non-formal, and vocational education.

The pilot implementation covered eight affiliations: (1) the Office of the Basic Education Commission, (2) the Office of the Private Education Commission, (3) the Office of the Vocational Education Commission, (4) the Department of Learning Encouragement, (5) the Department of Local Administration Promotion (Provincial Administrative Organizations, City Municipalities, and Metropolitan Municipalities), (6) the Border Patrol Police Bureau, (7) the Education Department of the Bangkok Metropolitan Administration, and (8) the Office of the Permanent Secretary, Ministry of Higher Education, Science, Research and Innovation. This pilot process led to the refinement of the conceptual framework of the draft standards. Specifically, the number of standards was increased from three to four, with the addition of Assessment and Evaluation for Learning Development as a

new standard. In addition, the title of Standard 2 was revised from Learning Design and Creative Self-Direction through Digital Technology to Learning Design and Creative Self-Direction. Furthermore, the former Standard 3: Support for Learners, Teachers, and Educational Personnel was revised to Support for Learners, Teachers, School Administrators, and Educational Personnel, and was repositioned as Standard 4 in the revised conceptual framework of the draft standards, as shown in Figure 1.

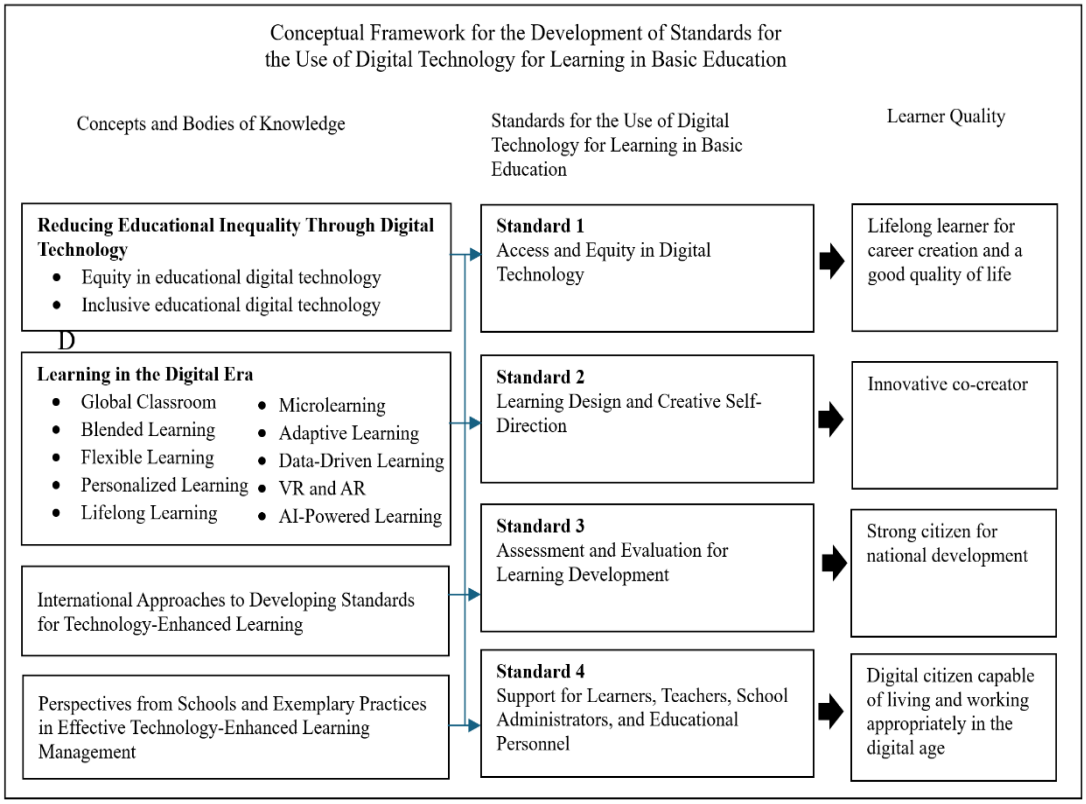

Figure 1: Conceptual Framework of the Standards for the Use of Digital Technology for Learning in Basic Education

The monitoring and evaluation of the pilot implementation involved developing data collection instruments and analyzing both quantitative and qualitative data to assess the appropriateness and feasibility of the standards, as well as guidelines for translating them into practice at both the supervisory-agency and school levels. The evaluation also explored implementation barriers and constraints and

offered recommendations to improve and apply the standards more effectively. The study and analysis of the pilot implementation of the standards for the use of digital technology for learning in basic education yielded the following conclusions. First, the appropriateness and feasibility of the standards for the use of digital technology for learning in basic education were rated at a high level, with a mean appropriateness score of 4.15 and a mean feasibility score for implementation of 4.09. Second, pilot implementation generated practical guidance in six areas: the development of teacher and educational personnel capacity; technology-enhanced learning management; the development of digital

infrastructure and digital resources; supervision, monitoring, and evaluation of implementation; policy and strategic planning; and the development of networks and collaboration with external partners. Third, the pilot revealed several challenges and constraints, including issues related to digital infrastructure, learners, teachers, and educational personnel, as well as budgetary support from the state and affiliated agencies.

In addition, recommendations from the agencies involved in the pilot implementation informed the revision and further development of the standards for the use of digital technology for learning in basic education. The revised standards comprised the following components: objectives, intended users of the standards, expected benefits, relevant definitions, and the substantive content of the standards and indicators. These standards were designed to enhance the quality of education provision in the digital era across schools of all affiliations by addressing multiple dimensions, including the reduction of inequality in access to educational digital technology, the promotion of the appropriate and meaningful application of digital technology and artificial intelligence for learning, the development of awareness regarding safety and ethics in the use of digital technology and artificial intelligence, and the creation of appropriate learning environments across relevant dimensions.

2.3 Related Research

A substantial body of research has examined the use of digital technology for learning in basic education in Thailand. These studies have taken a variety of forms, including investigations into the current conditions of digital technology use for learning at the basic education level. For example, Seedamol (2017) examined problems and approaches related to teachers' use of information technology in schools under the Chonburi Primary Educational Service Area Office 1. The study found that teachers experienced major problems in several areas, including information and communication technology infrastructure, the use of information and communication technology for administration and management, support for e-learning systems, and the enhancement of teachers' capacity to use information and communication technology for educational purposes.

Similarly, the United Nations (ITU/UNESCO/UNICEF). (2021). investigated the digital divide in education in Thailand using data from multiple government agencies, including the National Statistical Office (NSO), the Office of the Basic Education Commission (OBEC), the Ministry of Digital Economy and Society (MDES), and the National Broadcasting and Telecommunications Commission (NBTC). The findings highlighted structural weaknesses, such as insufficient devices, limited teacher and school readiness, and persistent urban-rural disparities. These findings constitute an important evidence base for the formulation of policies supporting online and blended learning.

The present study further underscored the importance of instructional design and professional development for teachers and educational personnel in using digital technology effectively in education. This finding is consistent with recent

systematic reviews showing that effective digital instructional integration requires hands-on digital training, collaborative learning, ongoing mentorship, pedagogical support, and institutional support (Amemasor et al., 2025; Huang et al., 2024). Other studies have focused on the needs and priorities associated with the use of digital technology for learning at the basic education level. For instance, Uppapong (2019) investigated the priority needs for developing a transition system toward digital schools and found that the use of technology to address individual learners' problems, the development of personnel knowledge, skills, and expertise in technology use, the use of open data sources as learning resources, and the integration of distance learning resources into teaching and learning were key factors underlying the need to adopt information and communication technology for education in schools.

Likewise, Pimjai and Traiwichitkhun (2024) examined the needs and priorities for developing an effective learning management system in the digital era through surveys of school administrators and teachers. Their findings indicated a high level of need for developing learning management systems that are supportive of digital environments. Similarly, Thanaittipath and Boonmoh (2024) found that upper secondary school teachers' decisions to use digital literacy tools in the post-COVID-19 period were influenced by the demand for technologies that are user-friendly, accurate, contextually appropriate, and free from operational constraints.

A number of studies have also emphasized the significance of digital technology for learning. Boonmoh et al. (2022) found that digital technology plays an important role in creating learning media and increasing student engagement at the upper secondary level. This is consistent with Timotheou et al. (2022), who found that digital technology promotes lifelong learning skills, increases engagement, and supports more flexible forms of assessment. Similarly, Nguyen et al. (2023) reported that the use of digital technology for learning across various platforms enhances learning experiences and classroom management, increases engagement, supports the monitoring of learner progress, and facilitates the design of learning experiences for individual learners and those with diverse needs. Nevertheless, the use of digital technology requires effective instructional design in order to produce positive effects on learners' deep learning, stimulate critical thinking, and support higher-order activities in active learning environments (Wu et al., 2024).

3. Methodology

This study adopted a quantitative survey design to investigate priority needs and comparative differences related to the draft standards for the use of digital technology for learning in basic education. The study was approved by the Human Research Ethics Committee of the University of Phayao, Thailand (HREC-UP-HSS 2.2/141/68).

3.1 Data Collection and Analysis

The study population comprised school administrators and teachers in the basic education sector. The sample size was estimated using G*Power, based on an

effect size (F) of .25, an alpha level of .05, and a statistical power of .95, yielding a minimum sample size of 252 participants per group. To ensure an adequate final sample and to compensate for incomplete responses, the target sample size was increased to at least 500 respondents per group. Participants were selected using simple random sampling. A total of 1,272 valid responses were obtained, including 543 school administrators and 729 teachers.

Data were collected using a structured questionnaire titled "Needs Assessment Questionnaire for School Development Based on the Draft Standards for the Use of Digital Technology for Learning in Basic Education." The instrument consisted of three sections. The first section gathered demographic and institutional information using a checklist format, including items related to gender, age, role, school size, school location (urban/non-urban), and school region. The second section measured respondents' perceptions of the draft standards using a five-point rating scale in a dual-response format.

For each of the 20 items, respondents rated both the current and desired conditions. The third section assessed respondents' opinions on the draft standards using a five-point rating scale and comprised 12 items. Three experts reviewed the instrument to establish content validity. The IOC values ranged from .67 to 1.00, indicating that all items met the acceptable criterion for content validity. A pilot test was then conducted with 30 school administrators and 30 teachers who had characteristics similar to those of the main sample. Internal consistency reliability was assessed using Cronbach's alpha, with coefficients ranging from .73 to .82, indicating acceptable reliability.

Questionnaire responses were collected from the sample participants and screened for completeness before analysis. Quantitative data were analyzed using descriptive and inferential statistics. To address the first research objective, needs assessment analysis was used to identify priority needs related to the standards for the use of digital technology for learning in basic education by role and school size. Priority needs for each standard and indicator were ranked using the Modified Priority Needs Index ($PNI_{modified}$), a needs assessment technique widely used in Thai educational research, calculated as PNI_modified = (I – D) / D, where I denotes the desired-condition mean, and D denotes the current-condition mean (Wongwanich, 2019). Higher values indicate greater priority for development. To address the second research objective, multivariate analysis of variance (MANOVA) was conducted to compare the four standards across role and school-size categories.

4. Results and Findings

A total of 1,272 respondents participated in the study, including 543 school administrators (43%) and 729 teachers (57%). The sample was predominantly female (60%), with most respondents aged 38–53 years (55%), followed by those aged 21–37 years (32%) and older than 53 years (13%). Most respondents worked in small schools with fewer than 500 students (81%). In terms of location, 64% were from non-urban areas and 36% from urban areas. Respondents were distributed across multiple regions of Thailand, primarily the Central (35%) and

Northeastern (31%) regions, followed by the Southern (15%), Western (8%), Northern (6%), and Eastern (5%) regions. Detailed demographic characteristics are presented in Table 1.

Table 1: Demographic Characteristics of the Respondents (n = 1,272)

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	507	40.00
	Female	765	60.00
Age	21–37 years	407	32.00
	38–53 years	696	55.00
	Over 53 years	169	13.00
Role	School administrators	543	43.00
	Teachers	729	57.00
School size (number of students)	Fewer than 500 students	1026	80.00
	500–1,000 students	121	10.00
	1,000–1,500 students	66	5.00
	More than 1,500 students	59	5.00
School location	Non-urban area	811	64.00
	Urban area	461	36.00
School region	Central	440	35.00
	Northeastern	390	31.00
	Southern	189	15.00
	Western	96	8.00
	Northern	93	6.00
	Eastern	64	5.00
Total		**1,272**	**100.00**

4.1 Priority Needs Analysis of Digital Technology Standards for Learning in Basic Education

The analysis of priority needs using the modified Priority Needs Index ($PNI_{modified}$) showed that Standard 1: Access and Equity in Digital Technology had the highest level of development need ($PNI_{modified}$ = 0.30), followed by Standard 4: Support for Learners, Teachers, School Administrators, and Educational Personnel ($PNI_{modified}$ = 0.26), Standard 2: Learning Design and Creative Self-Direction ($PNI_{modified}$ = 0.24), and Standard 3: Assessment and Evaluation for Learning Development ($PNI_{modified}$ = 0.22).

At the indicator level, the highest $PNI_{modified}$ value within Standard 1 was for the provision of appropriate digital devices and software to support personalized learning and address learners' needs ($PNI_{modified}$ = 0.31), followed by access to high-speed internet and high-quality digital learning resources ($PNI_{modified}$ = 0.26).

For Standard 2, the highest priority need concerned learners' critical thinking and the safe management of digital information ($PNI_{modified}$ = 0.32). Other indicators under this standard, including the appropriate use of digital technology for goal setting, learning design, creative production, evaluation, and continuous improvement, as well as teachers' use of digital technology to support active learning and digital citizenship, showed $PNI_{modified}$ values ranging from 0.29 to 0.17.

For Standard 3, which showed the lowest overall priority need, indicator-level $PNI_{modified}$ values were relatively similar. The higher value was associated with administrators' use of digital technology to supervise, monitor, evaluate, and improve educational quality systematically while enabling parents to track learners' progress conveniently ($PNI_{modified}$ = 0.24). In contrast, teachers' use of digital technology for diverse assessment, constructive feedback, and instructional improvement yielded a slightly lower value ($PNI_{modified}$ = 0.19).

For Standard 4, the most critical indicator—and the highest across all indicators in the analysis—was the provision of personnel for maintenance, technical support, and consultation in digital technology use by supervisory agencies and/or schools ($PNI_{modified}$ = 0.35). Other high-priority indicators under this standard included inter-agency collaboration in platform development and digital media repositories, the establishment of digital learning centers and digital management systems in schools, and the development of digital leadership and digital competencies among administrators, teachers, and educational personnel, with $PNI_{modified}$ values ranging from 0.28 to 0.22. Detailed results are presented in Table 2.

Table 2: Priority Needs Analysis of the Standards for the Use of Digital Technology for Learning in Basic Education

Standard / Indicator	Current Condition			Desired Condition			$PNI_{modified}$	Rank
	M	SD	Level	M	SD	Level		
Standard 1: Access and Equity in Digital Technology	**3.51**	**0.82**	**High**	**4.55**	**0.66**	**Very High**	**0.30**	**1**
1.1 Learners and teachers have access to high-speed internet and high-quality digital learning resources.	3.62	0.87	High	4.57	0.69	Very High	0.26	2
1.2 Learners and teachers are provided with appropriate digital devices and software to support personalized learning and meet learners' needs.	3.48	0.86	High	4.54	0.67	Very High	0.31	1
Standard 2: Learning Design and Creative Self-Direction	**3.67**	**0.74**	**High**	**4.55**	**0.61**	**Very High**	**0.24**	**3**
2.1 Learners use digital technology appropriately for goal setting, learning design, creative production and innovation,	3.51	0.85	High	4.52	0.68	Very High	0.29	2

Standard / Indicator	Current Condition			Desired Condition			$PNI_{modified}$	Rank
	M	SD	Level	M	SD	Level		
evaluation, and continuous improvement of learning.								
2.2 Learners think critically about the safe and ethical use of digital technology and manage their own digital information effectively.	3.39	0.91	Moderate	4.47	0.72	Very High	0.32	1
2.3 Teachers design and manage active learning using media and digital technology to enhance learning effectiveness and respond to learners' diverse needs and potential.	3.73	0.80	High	4.56	0.66	Very High	0.22	3
2.4 Teachers facilitate, guide, and support learners in using digital technology for learning and promote digital citizenship among learners.	3.94	0.77	High	4.62	0.58	Very High	0.17	4
Standard 3: Assessment and Evaluation for Learning Development	**3.71**	**0.78**	**High**	**4.54**	**0.62**	**Very High**	**0.22**	**4**
3.1 Teachers use digital technology to assess learning through a variety of approaches, provide constructive feedback, and use assessment results to improve instruction.	3.84	0.83	High	4.59	0.63	Very High	0.19	2
3.2 School administrators use digital technology to supervise, monitor, evaluate, and systematically improve educational quality while enabling parents to conveniently track learners' academic progress.	3.64	0.82	High	4.51	0.65	Very High	0.24	1
Standard 4: Support for Learners, Teachers, School Administrators, and Educational Personnel	**3.62**	**0.82**	**High**	**4.55**	**0.63**	**Very High**	**0.26**	**2**
4.1 Supervisory agencies and/or schools provide personnel for maintenance, technical support, and consultation regarding the use of digital technology.	3.33	1.10	Moderate	4.48	0.80	Very High	0.35	1
4.2 Supervisory agencies collaborate in developing or sharing cross-agency platforms and in developing high-quality, up-to-date digital media repositories while promoting innovation in digital technology for learning.	3.54	0.93	High	4.53	0.72	Very High	0.28	2

Standard / Indicator	Current Condition			Desired Condition			$PNI_{modified}$	Rank
	M	SD	Level	M	SD	Level		
4.3 Supervisory agencies develop the digital leadership competencies of school administrators and the digital competencies of teachers and educational personnel to respond to future changes.	3.77	0.82	High	4.59	0.62	Very High	0.22	4
4.4 Schools establish digital learning centers and environments that support the use of digital technology for learners, teachers, and educational personnel, and develop digital technology management systems while monitoring technology use for effectiveness, safety, and ethical compliance.	3.64	0.86	High	4.56	0.64	Very High	0.25	3

Note. M = mean; SD = standard deviation; $PNI_{modified}$ = Modified Priority Needs Index.

4.2 Comparative Analysis of the Four Digital Technology Standards for Learning in Basic Education by Role and School Size

The mean differences across the four standards—Standard 1: Access and Equity in Digital Technology, Standard 2: Learning Design and Creative Self-Direction, Standard 3: Assessment and Evaluation for Learning Development, and Standard 4: Support for Learners, Teachers, School Administrators, and Educational Personnel—were examined by role and school size using one-way multivariate analysis of variance (MANOVA). As a preliminary step, the assumptions underlying the analysis were examined. With respect to univariate normality of the dependent variables, the results of the Shapiro–Wilk test and Q–Q plots for the four standards indicated that all four variables significantly deviated from normality at the .05 level (Shapiro-Wilk = 0.96–0.98, $p < .001$). However, visual inspection of the Q–Q plots suggested that the distributions of all four standards were approximately normal.

For the comparison of mean differences across the four standards by respondent role, the assumption checks further indicated that the covariance matrices of the four variables differed significantly at the .05 level (Box's M = 34.58, $F(10, 6{,}420{,}139.56) = 3.45$, $p < .001$). The results of the multivariate analysis showed that the mean vector of the four standards differed significantly by respondent role at the .05 level (Pillai's Trace = .03, $F(4, 1267) = 8.04$, $p < .001$).

Subsequent univariate analyses of variance and pairwise comparisons revealed that teachers had significantly higher mean scores than school administrators in Learning Design and Creative Self-Direction, Assessment and Evaluation for Learning Development, and Support for Learners, Teachers, School Administrators, and Educational Personnel at the .05 level of statistical significance. Further details are presented in Table 3.

Table 3: Multivariate Analysis of Variance Results for the Four Digital Technology Standards by Role

	Value	F	Hypothesis df		Error df	*p*
Pillai's Trace	.03	8.04[b]	4		1267	< .001
Test of Between-Subjects Effects						
Source	**Type III SS**	**df**	**MS**	***F***	***p***	**Comparison**
Role						
Access and Equity in Digital Technology	1.44	1	1.44	2.16	0.14	-
Learning Design and Creative Self-Direction	10.13	1	10.13	18.95	< .001	Teachers > Administrators
Assessment and Evaluation for Learning Development	11.30	1	11.30	18.93	< .001	Teachers > Administrators
Support for Learners, Teachers, School Administrators, and Educational Personnel	8.28	1	8.28	12.48	< .001	Teachers > Administrators

To examine mean differences across the four standards by school size, the assumptions underlying the statistical analysis were first assessed. The results showed that the covariance matrices of the four standards did not differ significantly across school-size groups at the .05 level (Box's M = 42.690, F(30, 147,290.303) = 1.395, p = .074). The multivariate analysis of variance further indicated that the mean vector of the four standards did not differ significantly by school size at the .05 level (Pillai's Trace = .01, F (12, 1267) = 1.18, p = .29). Further details are presented in Table 4.

Table 4: Multivariate Analysis of Variance Results for the Four Digital Technology Standards by School Size

Test	Value	*F*	Hypothesis df	Error df	*p*
Box's M	42.690	1.395	30	147,290.303	.074
Pillai's Trace	.01	1.18	12	1267	.29

5. Discussion

Based on the research findings presented above, several issues merit further discussion. This study aimed to analyze the priority needs for developing draft standards for the use of digital technology for learning by examining the priority order across the four standards. The findings showed that all four standards were identified as high-priority development needs, with Standard 1: Access and Equity in Digital Technology identified as the top priority. These findings suggest that stakeholders regarded equitable access as the foundational condition for the development of all other digital dimensions. This pattern is consistent with studies indicating that, without adequate access to devices, internet connectivity, and basic infrastructure, meaningful digital learning reform cannot be implemented effectively or equitably. Reports from international agencies, such as ITU/UNESCO/UNICEF (United Nations [ITU/UNESCO/UNICEF], 2021), indicate that learners in Thailand continue to face infrastructural inequality, particularly in rural areas and among learners from lower socioeconomic backgrounds. Likewise, Timotheou et al. (2022) and OECD (2025) support the

argument that digital access is a necessary precondition for changes in teaching, learning, and assessment. This interpretation is further reinforced by Wu et al. (2025), who emphasized that ICT infrastructure and access to technological devices are essential components of digital education, and by Kokkonos et al. (2025), who underscored the continuing importance of connectivity and digital inclusion in school transformation.

However, the present finding may also extend prior research by suggesting that access and equity should not be understood solely in technical terms. Consistent with Leon-Díaz et al. (2026), access appears to function as a broader enabling condition that shapes whether learners and teachers can participate meaningfully in digital pedagogy. From this perspective, the high priority assigned to Standard 1 may reflect a continuing concern that uneven readiness across schools could limit the implementation of other digital standards unless equity-related conditions are explicitly addressed in policy and practice.

The findings also underscore the importance of long-term sustainability and equity in implementing digital technology standards. Sustainable implementation requires continuous monitoring, periodic review, stable resource allocation, ongoing technical and pedagogical support, and integration of the standards into school development plans. Without these mechanisms, digital initiatives may remain short-term or project-based rather than becoming part of continuous school improvement.

Equity should also be understood beyond access to devices or connectivity. It includes inclusive learning opportunities, meaningful digital practices, teacher readiness, school leadership, and support for learners with diverse needs (Liu et al., 2024; UNESCO Institute for Information Technologies in Education, 2024). From this perspective, the high priority assigned to Access and Equity in Digital Technology suggests that the standards can help schools identify inequities, prioritize support for under-resourced contexts, and design context-responsive strategies so that digital transformation benefits all learners.

The second-ranked area was Standard 4: Support for Learners, Teachers, School Administrators, and Educational Personnel, which is consistent with a substantial body of research showing that support systems are critical to operationalizing technology use in schools. For example, Huang et al. (2024) showed that structured teacher professional developments such as coaching, professional learning community (PLC) meetings, and continuous professional development—directly enhance teachers' confidence and capacity to use technology. In the Thai context, a Ministry of Education (2025) report found that schools receiving administrative support and having clearly structured digital support teams were more effective in developing technology for learning.

The third-ranked area was Standard 2: Learning Design and Creative Self-Direction. Once infrastructure and support systems are in place, schools and teachers can focus more directly on learning design, enabling digital technology to play a meaningful role in learning. Bahati (2019) found that designing activities

that encourage learner participation, incorporating technology into inquiry-based learning, and promoting reflection on learning significantly influence learners' self-direction. This finding is consistent with Rini et al. (2022), who argued that the effectiveness of digital technology use depends on the quality of learning activity design rather than on the mere availability of technology.

The lowest-ranked area was Standard 3: Assessment and Evaluation for Learning Development. Although assessment is an essential part of learning improvement, the use of technology for assessment often requires prior readiness in other areas. Spector et al. (2016) noted that technology-enhanced assessment requires in-depth knowledge of both technical aspects and assessment principles, which often develops only after teachers have acquired sufficient skills and confidence. Similarly, OECD (2025) reported that, in many education systems worldwide, schools tend to develop assessment practices more slowly than they develop access and learning design. The findings suggest that schools may need to strengthen the use of digital technology in other standards before advancing digital assessment and evaluation.

These findings have practical implications for policy development, teacher professional growth, and resource allocation. The priority ranking suggests that digital education policy should first address enabling conditions, particularly equitable access, connectivity, digital learning resources, and support systems, before expecting schools to implement more advanced forms of digital pedagogy and assessment. Recent international evidence similarly emphasizes that successful digital transformation in school education requires coordinated policy strategies covering governance, funding, infrastructure, teacher capacity, pedagogical adaptation, assessment, and monitoring mechanisms (Boeskens & Meyer, 2025). Therefore, the findings can guide policymakers and educational agencies in allocating resources based on empirically identified priority needs and diverse school contexts.

The findings also indicate that teacher professional development should be role-based, sustained, and aligned with actual implementation needs. Teachers require support in digital pedagogy, learning design, assessment for learning, and classroom-level technology integration, while school administrators need capacity building in strategic planning, resource management, digital leadership, and school-level support systems. Recent studies similarly show that effective professional development for digital integration requires practical training, collaboration, mentoring, institutional support, and sustained follow-up rather than one-time technical training (Amemasor et al., 2025; Huang et al., 2024; OECD, 2025). Accordingly, the draft standards can support differentiated professional development and context-responsive school improvement planning.

The MANOVA results showed no significant differences across school-size groups. However, the pairwise analyses revealed differences between teachers and school administrators across three of the four standards: Standard 2: Learning Design and Creative Self-Direction, Standard 3: Assessment and Evaluation for Learning Development, and Standard 4: Support for Learners, Teachers, School

Administrators, and Educational Personnel. In all of these standards, teachers reported higher mean scores than school administrators. These differences may reflect the distinct implementation responsibilities of teachers and school administrators. Teachers translate digital standards into classroom practice and tend to perceive greater needs in learning design, assessment for learning, and instructional support.

In contrast, school administrators are responsible for institutional planning, resource allocation, policy alignment, digital leadership, and school-wide support systems. Recent studies similarly emphasize that effective digital integration requires both sustained teacher professional development and strong school leadership (Amemasor et al., 2025; Boeskens & Meyer, 2025; McCarthy et al., 2023). These findings suggest that standards implementation should adopt role-based professional development rather than a uniform training model for all stakeholders.

Learning Design and Creative Self-Direction is a key area in contemporary education. Both domestic and international studies indicate that teachers place high importance on developing such capabilities because these capabilities are directly connected to learners' classroom experiences (Boonmoh et al., 2022; Nguyen et al., 2023). A study conducted in Thailand by Boonmoh et al. (2022) found that teachers expressed a greater need than school administrators to develop the ability to design flexible learning activities aligned with learners' contexts. School administrators, by contrast, placed greater emphasis on aligning instructional management with policy and curriculum requirements. This reflects differences in professional roles and responsibilities.

Similarly, the international synthesis by Timotheou et al. (2022) found that teachers perceived a more urgent need for change in classroom-level learning management than school administrators. In contrast, administrators prioritized institutional capacity and the long-term sustainability of the education system. A key explanation is that teachers directly face the challenges of organizing creative learning activities, while administrators focus more on resource management and policy at the school-wide level.

Assessment and Evaluation for Learning Development is another issue that appears consistently in research on teacher professional development. Wongwanich (2019) explained that teachers have a strong need to develop knowledge and skills in assessment for learning because it is an essential tool for improving instruction that responds to learner differences. By contrast, the study by Wongwanich (2019), which compared the perspectives of teachers and administrators, found that teachers placed greater importance on developing practical assessment tools for classroom use. In contrast, administrators emphasized establishing systems and standard indicators to monitor overall educational quality. This difference may be explained by the distinct responsibilities associated with operational-level assessment and policy-level evaluation. At the international level, the OECD (2020) reported that teachers expressed significantly stronger needs for formative assessment than for

summative assessment. In contrast, administrators attached greater importance to assessments that could reflect accountability and school quality. This is consistent with the findings of Admiraal et al. (2021), who identified a gap in assessment literacy needs between teachers and administrators.

Support for learners, teachers, school administrators, and educational personnel should also be understood as a systemic condition that facilitates the development of educational quality. Yimklib et al. (2023) found that teachers reported high needs for support in terms of resources, individualized development, and opportunities to learn through authentic practice. In contrast, administrators focused more on using development outcomes to strengthen organizational quality and overall work effectiveness. International research by Sancar et al. (2021) supports this finding, indicating that teachers require continuous professional empowerment and support. In contrast, administrators require clarity regarding roles, responsibilities, and support structures that can be managed systematically.

6. Conclusion

This study examined the priority needs related to the draft standards for the use of digital technology for learning in basic education in Thailand and compared the four standards by role and school size. The findings indicated that the most urgent area for development was Standard 1: Access and Equity in Digital Technology, followed by Standard 4: Support for Learners, Teachers, School Administrators, and Educational Personnel, Standard 2: Learning Design and Creative Self-Direction, and Standard 3: Assessment and Evaluation for Learning Development.

These results suggest that equitable access to devices, connectivity, and digital learning resources remains the foundational condition for advancing other dimensions of digital learning in schools. The comparative analysis further showed that teachers reported significantly higher mean scores for Learning Design and Creative Self-Direction, Assessment and Evaluation for Learning Development, and Support for Learners, Teachers, School Administrators, and Educational Personnel, while no statistically significant differences were found across school-size groups.

This pattern highlights the importance of recognizing role-based differences in perceptions and development needs when designing school improvement initiatives. In practical terms, the findings imply that policies and interventions should prioritize equitable access, strengthen technical and professional support systems, and promote teacher capacity in digital learning design and assessment. Future research may extend this study by using qualitative or mixed-method approaches to explore contextual factors influencing implementation and by examining how these standards can be translated into sustainable school-level practices across different educational settings.

Conflict of Interest

The author declares that there is no conflict of interest.

7. Acknowledgments

The authors wish to acknowledge the use of ChatGPT, an AI-based language support tool developed by OpenAI, in the preparation of this manuscript. The tool was used to assist with English language refinement, grammar checking, sentence clarity, and readability enhancement. The authors carefully reviewed, revised, and approved all AI-assisted suggestions. The manuscript remains an accurate representation of the authors' work and intellectual contributions, and the authors take full responsibility for its content, data analysis, interpretation, and conclusions.

8. References

Admiraal, W., Schenke, W., de Jong, L., Emmelot, Y., & Sligte, H. (2021). Schools as professional learning communities: What can schools do to support professional development of their teachers? *Professional Development in Education, 47*(4), 684–698. https://doi.org/10.1080/19415257.2019.1665573

Akram, H., Abdelrady, A. H., Al-Adwan, A. S., & Ramzan, M. (2022). Teachers' perceptions of technology integration in teaching-learning practices: A systematic review. *Frontiers in Psychology, 13*, Article 920317. https://doi.org/10.3389/fpsyg.2022.920317

Amemasor, S. K., Oppong, S. O., Ghansah, B., Benuwa, B.-B., & Essel, D. D. (2025). A systematic review on the impact of teacher professional development on digital instructional integration and teaching practices. *Frontiers in Education, 10*, Article 1541031. https://doi.org/10.3389/feduc.2025.1541031

Bahati, B. (2019). Technology-enhanced formative assessment in higher education: An intervention design of scaffolding student self-regulated learning [Doctoral dissertation, Stockholm University]. DiVA. https://www.diva-portal.org/smash/record.jsf?pid=diva2%3A1281224

Boeskens, L., & Meyer, K. (2025). *Policies for the digital transformation of school education: Evidence from the Policy Survey on School Education in the Digital Age* (OECD Education Working Papers No. 328). OECD Publishing. https://doi.org/10.1787/464dab4d-en

Boonmoh, A., Jumpakate, T., & Karpklon, S. (2022). A close look at the use of technology by Thai teachers in secondary EFL classrooms. *Computer-Assisted Language Learning Electronic Journal, 23(1)*, 78–107. https://callej.org/index.php/journal/article/view/372

Garira, E. (2020). Needs assessment for the development of educational interventions to improve quality of education: A case of Zimbabwean primary schools. *Social Sciences & Humanities Open, 2*(1), 100020. https://doi.org/10.1016/j.ssaho.2020.100020

Giac, C. C., Giang, C. T. V., Hoang, L. H., & Ngan, T. T. T. (2025). A study on teachers' acceptance of digital technology in Vietnamese secondary education: An assessment using the technology acceptance model. *International Journal of Learning, Teaching and Educational Research, 24*(2), 38–62. https://doi.org/10.26803/ijlter.24.2.3

Granić, A. (2023). Technology acceptance and adoption in education. In O. Zawacki-Richter & I. Jung (Eds.), *Handbook of open, distance and digital education* (pp. 183–197). Springer. https://doi.org/10.1007/978-981-19-2080-6_11

Huang, L., Liang, M., Xiong, Y., Wu, X., & Lim, C. P. (2024). A systematic review of technology-enabled teacher professional development during the COVID-19

pandemic. *Computers & Education*, 223, Article 105168. https://doi.org/10.1016/j.compedu.2024.105168

Kanjanawasee, S. (2016). การวิจัยและพัฒนาการศึกษาไทย [Research and development for Thai education]. *Silpakorn Educational Research Journal, 8*(2), 1–18. https://so05.tci-thaijo.org/index.php/suedureasearchjournal/article/view/77495

Kokkonos, A., Travlos, A., Antonopoulou, P., Korres, M. P., & Choustoulakis, E. (2025). Digital technologies and leadership practices in Greek elementary schools. *International Journal of Evaluation and Research in Education, 14(3),* 1815–1823. https://doi.org/10.11591/ijere.v14i3.32748

Leon-Díaz, F., Boude, O., & Vargas-Sanchez, A. (2026). Pedagogical mediation with ICT for the development of critical thinking in primary education: A systematic review. *Thinking Skills and Creativity, 60,* 102085. https://doi.org/10.1016/j.tsc.2025.102085

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

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), Article 100479. https://doi.org/10.1016/j.ssaho.2023.100479

Mhlongo, S., Mbatha, K., Ramatsetse, B., & Dlamini, R. (2023). *Challenges, opportunities, and prospects of adopting and using smart digital technologies in learning environments: An iterative review. Heliyon, 9*(6), e16348. https://doi.org/10.1016/j.heliyon.2023.e16348

Ministry of Education. (2025). *Draft standards for the use of digital technology for learning in basic education, B.E. 2568* [Draft]. Ministry of Education.

Nguyen, L. T., Kanjug, I., Lowatcharin, G., Manakul, T., Poonpon, K., Sarakorn, W., Somabut, A., Srisawasdi, N., Traiyarach, S., & Tuamsuk, K. (2023). Digital learning ecosystem for classroom teaching in Thailand high schools. *SAGE Open, 13*(1), 21582440231158303. https://doi.org/10.1177/21582440231158303

Office of the Education Council. (2022). *Education in Thailand 2022*. https://backoffice.onec.go.th/uploads/Book/2057-file.pdf

Office of the Education Council. (2025). *Pilot implementation report of the Digital Technology for Learning Standard in basic education* [Unpublished internal report]. Office of the Education Council.

OECD. (2020). *TALIS 2018 results (Volume II): Teachers and school leaders as valued professionals*. OECD Publishing. https://doi.org/10.1787/19cf08df-en

OECD. (2023). *OECD digital education outlook 2023: Towards an effective digital education ecosystem*. OECD Publishing. https://doi.org/10.1787/c74f03de-en

OECD. (2025). *Preparing teachers for digital education: Continuing professional learning on digital skills and pedagogies* (OECD Education Policy Perspectives No. 122). OECD Publishing. https://doi.org/10.1787/af442d7a-en

Pimjai, K., & Traiwichitkhun, D. (2024). The needs for developing high-efficiency learning management in the digital era. *Journal of Education Studies, Chulalongkorn University, 52(4*), EDUCU5204007. https://doi.org/10.14456/educu.2024.55

Rini, R., Mujiyati, M., Sukamto, I., & Hariri, H. (2022). The effect of self-directed learning on students' digital literacy levels in online learning. *International Journal of Instruction, 15*(3), 329–344. https://doi.org/10.29333/iji.2022.15318a

Sancar, R., Atal, D., & Deryakulu, D. (2021). A new framework for teachers' professional development. *Teaching and Teacher Education*, *101*, Article 103305. https://doi.org/10.1016/j.tate.2021.103305

Seedamol, V. (2017). *ปัญหาและแนวทางการใช้เทคโนโลยีสารสนเทศของครูในโรงเรียนสังกัดสำนักงานเขตพื้นที่การศึกษาประถมศึกษาชลบุรี เขต 1* [Problems and guidelines for the use of information technology by teachers in schools under Chonburi Primary Educational Service Area Office 1] [Master's thesis, Burapha University]. Burapha University Digital Collection. https://digital_collect.lib.buu.ac.th/dcms/files/58990084.pdf

Spector, J. M., Ifenthaler, D., Sampson, D., Yang, L., Mukama, E., Warusavitarana, A., Lokuge Dona, K., Eichhorn, K., Fluck, A., Huang, R., Bridges, S., Lu, J., Ren, Y., Gui, X., Deneen, C. C., San Diego, J., & Gibson, D. C. (2016). Technology enhanced formative assessment for 21st century learning. Educational Technology & Society, 19(3), 58–71. https://eric.ed.gov/?id=EJ1107417

Tabachnick, B. G., & Fidell, L. S. (2019). *Using multivariate statistics* (7th ed.). Pearson.

Thailand Development Research Institute. (2021). *ประเทศไทยในอนาคต: มิติที่ 3 การศึกษา* [Future Thailand: Dimension 3: Education]. https://tdri.or.th/wp-content/uploads/2023/11/2021_08_ประเทศไทยในอนาคต-Future-Thailand-มิติที่-3.pdf

Thanaittipath, N., & Boonmoh, A. (2024). Thai secondary EFL teachers' use of digital literacy tools in post-COVID-19 teaching. *International Journal of Education and Literacy Studies, 12*(3), 197–207. https://doi.org/10.7575/aiac.ijels.v.12n.3p.197

Timotheou, S., Miliou, O., Dimitriadis, Y., Sobrino-Villagrá, S., Giannoutsou, N., Cachia, R., Monés, A. M., & Ioannou, A. (2022). Impacts of digital technologies on education and factors influencing schools' digital capacity and transformation: A literature review. *Education and Information Technologies*, 28, 6695–6726. https://doi.org/10.1007/s10639-022-11431-8

United Nations (ITU/UNESCO/UNICEF). (2021). *E-learning in Thailand: Mapping the digital divide*. United Nations. https://thailand.un.org/sites/default/files/2021-12/eBAT-ebat_21-00630_E-learning-Thailand-Mapping-digital-divide%5B95%5D%5B83%5D%5B100%5D.pdf

UNESCO. (2023). Global education monitoring report 2023: Technology in education: A tool on whose terms? UNESCO. https://unesdoc.unesco.org/ark:/48223/pf0000385723

UNESCO Institute for Information Technologies in Education. (2024). *Digital technologies for inclusive education: Recommendations for promoting an ICT-based learning environment for resource centres and schools*. UNESCO IITE. https://iite.unesco.org/publications/digital-technologies-for-inclusive-education-recommendations/

Uppapong, S. (2019). *การพัฒนาระบบการเปลี่ยนผ่านสู่โรงเรียนดิจิทัลสำหรับโรงเรียนประถมศึกษาเอกชนในภาคตะวันออกเฉียงเหนือตอนบนของไทย* [Development of a digital school transformation system for private elementary schools in upper Northeastern Thailand] [Doctoral dissertation, Chulalongkorn University]. Chulalongkorn University Theses and Dissertations. https://doi.org/10.58837/CHULA.THE.2019.610

Wongwanich, S. (2019). *การวิจัยประเมินความต้องการจำเป็น* [Needs assessment research] (4th ed.). Chulalongkorn University Press. [In Thai]

Wu, X., Chen, X., Li, W., & Hu, Y. (2024). Exploring the effects of digital technology on deep learning: A meta-analysis. *Education and Information Technologies*, 29, 1231–1256. https://doi.org/10.1007/s10639-023-12307-1

Wu, Y., Nagy, A., Rajnai, Z., & Fregan, B. (2025). Advanced digital education: Technologies, opportunities, challenges, and future directions. *Acta Polytechnica Hungarica, 22(12*), 365–380. https://doi.org/10.12700/APH.22.12.2025.12.23

Yimklib, W., Poovatanakul, V., Whattananarong, A., & Nirunthawee, S. (2023). สมรรถนะการวิจัย: การวิจัยจากงานประจำ (Routine to Research: R2R) [Research competency: Routine to Research (R2R)]. *Lawarath Social E-Journal, 5*(1), 175–192. https://so04.tci-thaijo.org/index.php/lawarathjo/article/view/260393