Online-Journals.org

iJIM International Journal of Interactive Mobile Technologies

iJIM | eISSN: 1865-7923 | Vol. 19 No. 20 (2025) | OPEN ACCESS

https://doi.org/10.3991/ijim.v19i20.56333

PAPER

Reframing Digital Literacy in ELT: Integrating SAMR, AI-TPACK, and Connectivism in the Global South

Benjapon Nualprasert[1], Wunwisa Punkhoom[1], Hambalee Jehma[2] (✉)

[1]Thepsatri Rajabhat University, Lopburi, Thailand

[2]Prince of Songkla University, Songkla, Thailand

hambalee.j@psu.ac.th

ABSTRACT

This study investigates digital literacy integration within English Language Teaching (ELT) curricula across Thai local government universities through documentary analysis of 108 courses. Employing frameworks including Technological Pedagogical Content Knowledge (TPACK), Substitution, Augmentation, Modification, Redefinition (SAMR), European Digital Competence Framework (DIGCOMP), and Connectivism, we identify a hierarchical readiness gap: near-universal adoption of foundational skills (DIGCOMP: 93% strong alignment) and technological-pedagogical integration (TPACK: 84%) contrasts sharply with lagging transformative (SAMR: 64%) and networked practices (Connectivism: 50%). Crucially, socio-cultural barriers, teacher-centered traditions, rigid assessment systems, and Western-centric assumptions of learner autonomy explain persistent Connectivism underperformance, particularly in humanities disciplines. Regional disparities (e.g., 20% vs. 68% connectivism alignment across provinces) further reflect infrastructural inequities and pedagogical conservatism. Mirroring Global South trajectories, Thailand's foundations-first approach prioritizes technical literacy over pedagogical reimagination, leaving graduates ill-equipped for AI-disrupted classrooms. This study proposes three imperatives, including an expanded AI-TPACK model integrating ethical AI governance, hybrid frameworks (e.g., SAMR + HeDiCom) for low-resource contexts, and decolonized digital integration centering cultural responsiveness. These innovations offer replicable pathways for teacher education in resource-constrained ecosystems globally.

KEYWORDS

digital literacy, English Language Teaching (ELT), Technological Pedagogical Content Knowledge (TPACK), Substitution, Augmentation, Modification, Redefinition (SAMR) model, Thailand higher education

1 INTRODUCTION

The rapid change and evolution of digital technologies have fundamentally transformed educational paradigms, necessitating a critical re-examination of how digital literacies are embedded within teacher education curricula [1]. In Thailand,

Nualprasert, B., Punkhoom, W., Jehma, H. (2025). Reframing Digital Literacy in ELT: Integrating SAMR, AI-TPACK, and Connectivism in the Global South. *International Journal of Interactive Mobile Technologies (iJIM)*, 19(20), pp. 55–68. https://doi.org/10.3991/ijim.v19i20.56333

Article submitted 2025-04-30. Revision uploaded 2025-08-17. Final acceptance 2025-08-17.

where English Language Teaching (ELT) plays a pivotal role in global competitiveness, local government universities face mounting pressure to align their curricula with 21st-century demands [2]. However, despite nationwide reforms such as the 2019 shift from a five- to four-year teacher education program, the integration of digital pedagogies remains uneven and understudied [3]. This study employs documentary research to analyze how Thai universities incorporate frameworks such as Technological Pedagogical Content Knowledge (TPACK), the SAMR (Substitution, Augmentation, Modification, Redefinition) model, the European Digital Competence Framework (DIGCOMP), and Connectivism into ELT curricula. Therefore, it addresses a critical gap of the disconnect between policy-driven digital education initiatives and their practical implementation in pre-service teacher training. The 21st century has ushered in an era where digital literacy is no longer optional but a core competency for educators [4]. Teachers are expected to foster skills like critical thinking, creativity, and collaboration while navigating an increasingly digitalized learning environment [5]. In Thailand, this shift is compounded by the need to prepare graduates for a workforce where English proficiency and technological adaptability are intertwined [6]. The theoretical frameworks such as TPACK and SAMR provide structured approaches to technology integration, yet their application in Global South contexts, particularly in English language teacher education, remains under-researched [7]. To illustrate, while TPACK emphasizes the interplay of technological, pedagogical, and content knowledge (CK) [8], its real-world implementation often overlooks contextual barriers such as limited infrastructure or resistance from traditionalist faculty [9]. Similarly, the SAMR model's hierarchical stages [10] are frequently cited but rarely critiqued for their Western-centric assumptions about resource availability and teacher autonomy [11]. This study fills these gaps by evaluating how these frameworks are operationalized or sidelined in Thailand's unique educational landscape.

The urgency of this study is, thereby, further underscored by the disruptive emergence of generative AI (GenAI), which has exposed new vulnerabilities in teacher preparedness [12]. While Thai studies have explored pre-service teachers' use of technology for self-learning materials [2]. None has systematically examined how curricula address AI-driven tools like ChatGPT or adaptive learning platforms. This omission is striking given that GenAI challenges foundational assumptions of TPACK and SAMR, necessitating an expanded AI-TPACK model that incorporates ethical AI use and prompt engineering as core literacies. Concurrently, the DIGCOMP framework's focus on digital skills [13] and Connectivism's emphasis on networked learning [14] remain siloed in Thai ELT curricula, as evidenced by the preliminary findings of this study, which show 93% alignment with DIGCOMP but only 50% with Connectivism [14]. Such disparities reveal a systemic preference for basic digital competencies over transformative pedagogies, a trend that risks leaving Thai graduates ill-equipped for future classrooms. These significant gaps mirror global trends in teacher education. Studies in Global South contexts [15], [16] reveal similar disparities: while basic digital skills (DIGCOMP) are increasingly institutionalized, transformative frameworks like SAMR and Connectivism lag, particularly in resource-constrained settings. In Latin America, Romero-Tena et al. [15] note that 78% of educators use technology for substitution (SAMR's lowest tier), while networked learning remains siloed in STEM disciplines. Similarly, Southeast Asian institutions [17] report about 50% adoption of Connectivism due to infrastructural barriers and pedagogical conservatism. This global pattern underscores the urgency of contextualizing digital competencies beyond technical literacy.

The significance of this study lies in its dual focus on benchmarking and innovation. By documenting the current state of digital literacy integration across

38 Rajabhat universities, it provides the first comprehensive snapshot of Thailand's progress and pitfalls. Methodologically, it advances documentary research through a rigorous coding protocol that aligns curricular content with TPACK, SAMR, DIGCOMP, and Connectivism, a novel approach for Global South contexts. [15] Practically, its findings inform three actionable priorities: (1) updating TPACK to include AI literacy, (2) adapting SAMR for low-resource settings, and (3) bridging the gap between DIGCOMP's individual competencies and Connectivism's collaborative ethos. The AI-TPACK is, therefore, necessitating an expanded AI-TPACK model (see Figure 1) that incorporates four dimensions: (1) Technical AI Literacy (e.g., prompt engineering for LLMs), (2) Ethical AI Governance (bias mitigation, data privacy), (3) Pedagogical AI Integration (adaptive learning design), and (4) Critical Disciplinary AI (e.g., AI's impact on language acquisition). Unlike TPACK's tripartite structure, AI-TPACK centers ethical and critical dimensions as core literacies, positioning AI not merely as a tool but as a complex agent reshaping pedagogical ecosystems. These contributions are timely, as Thailand's Ministry of Education seeks evidence-based strategies to achieve its "Thailand 4.0" digital education goals [3]. Ultimately, this study not only maps the uneven terrain of digital literacy in Thai ELT curricula but also sounds a clarion call: without urgent reforms to address AI, contextualize frameworks, and prioritize transformative over tokenistic technology use, Thailand's pre-service teachers will enter classrooms where their digital pedagogies are already obsolete. By centering this study on policy-practice gaps and emergent technologies, we aim to catalyze a broader conversation about equitable digital integration in teacher education, one that resonates across the Global South. The objectives of this study are 1. to analyze the extent to which digital literacies are embedded within the English teaching curricula of local government universities in Thailand and 2. to identify the existing gaps and suggest improvements for curriculum development based on contemporary digital literacy theories.

2 LITERATURE REVIEW

2.1 Networked learning and digital competencies: Global perspectives

Connectivism's emphasis on decentralized, collaborative knowledge-building [18] faces implementation hurdles transcending Thailand. European higher education institutions leverage DIGCOMP to standardize digital literacy [19] yet struggle to integrate networked pedagogies, especially in humanities [20]. Meanwhile, African and South Asian universities [21] report sub-40% Connectivism alignment due to bandwidth limitations and teacher-centered traditions. Critically, this global implementation gap underscores a limitation inherent in standardized digital competence models alone; foundational literacies, while necessary, prove insufficient for cultivating the complex, collaborative learning ecologies central to Connectivism's promise [18]. As [22] demonstrated that effective technology integration requires moving beyond technical proficiency to address complex interplays of teacher belief systems, pedagogical knowledge, and supportive school cultures, challenges are equally pertinent to networked learning adoption in higher education. Similarly, [23] emphasizes that culturally responsive approaches are essential for meaningful online learning, highlighting the critical role of context beyond mere technical access or skill. Consequently, the persistent disconnect between possessing discrete digital skills and fostering truly interdependent, learner-driven environments [18] is widely attributed to a confluence of factors: unreliable connectivity hindering sustained collaboration and profoundly rooted academic cultures often prioritizing

transmission over co-creation [24]. This necessitates a fundamental shift towards contextually attuned models. As [24] argues in AI & Society, uncritical technological solutionism frequently overlooks entrenched socio-material realities and pedagogical legacies, a critique highly relevant to networked learning implementation. Kalogiannakis and Papadakis [25] and [26] empirically demonstrate that technical access alone fails to foster collaborative digital pedagogies. Their studies on mobile learning in early STEM show that pre-service teachers' struggles with tools like ScratchJr stem from pedagogical hesitancy, not skill deficits, mirroring barriers to Connectivism in Thai humanities. Consequently, the persistent gap between holding discrete technical abilities and cultivating the complex, interdependent learning ecologies envisioned by Connectivism [18] is widely recognized. This gap is frequently ascribed to a combination of infrastructural shortcomings (such as unreliable connectivity hindering online collaboration) and deeply ingrained pedagogical traditions favoring instructor-led exposition over learner autonomy and co-creation of knowledge. The work of [26] further illustrates this point; their study on pre-service teachers' acceptance of tools like ScratchJr for computational thinking highlights the importance of factors beyond technical skill, including pedagogical confidence and alignment with learning goals, factors equally relevant to adopting Connectivism practices in higher education humanities. This worldwide variation necessitates purposeful localization. Truly effective models must acknowledge and address distinct socio-cultural, pedagogical, and infrastructural conditions. Emerging blended frameworks, such as HeDiCom [27], represent promising pathways. HeDiCom's integration of SAMR's focus on task redesign with cultural sensitivity offers a pragmatic approach, particularly relevant to Global South contexts. This resonates with the findings of [25] and [26], which suggest that successful integration models often combine practical activity design with sensitivity to educator readiness and context. Blended approaches such as HeDiCom [27], integrating SAMR's activity modification with cultural sensitivity, present viable routes specifically for Global South environments. Yet, major obstacles endure concerning the thorough assimilation of the fluid, collaborative teaching methods fundamental to networked learning, especially in fields like the humanities, where conventional didactic practices stay firmly rooted [18]. The referenced challenge points to a disconnect between holding discrete technical abilities and cultivating the intricate, interdependent educational environments imagined by Connectivism [18]. Consequently, this pronounced gap is often ascribed to a combination of infrastructural shortcomings, particularly inadequate and erratic connectivity impeding reliable online teamwork, alongside profoundly established scholastic customs preferring instructor-led, expository methods rather than learner autonomy and collaborative meaning-making. This worldwide variation emphasizes a vital realization: uniform digital proficiency structures, while indispensable for setting elementary literacies, are by themselves inadequate for realizing the revolutionary capacity inherent in networked pedagogy. Authentically powerful models require purposeful localization, recognizing and tackling distinct socio-cultural, instructional, and infrastructural conditions. Developing composite frameworks exemplified by HeDiCom [27] denotes hopeful directions, particularly pertinent to Global South situations since it deliberately combines SAMR's pragmatic emphasis on redesigning tasks with an essential tenet of cultural responsiveness. This combination seeks to support educators in gradually advancing their methods towards networked pedagogy while staying attuned to local limitations, conventions, and resource contexts, thus furnishing a more feasible and enduring pathway for nurturing digital proficiencies inside genuine, cooperative learning communities.

2.2 AI-TPACK: Evolving the framework for generative technologies

The Technological Pedagogical Content Knowledge framework [28] offers a valuable foundation for conceptualizing teacher knowledge integration. However, applying TPACK directly to the distinct complexities presented by Artificial Intelligence (AI) in educational settings requires substantial theoretical adaptation. Recognizing AI not simply as another digital resource but as a unique technological sphere, marked by significant ethical challenges, inherent complexity, rapid evolution, and powerful generative potential, the proposed AI-TPACK model addresses this critical gap.

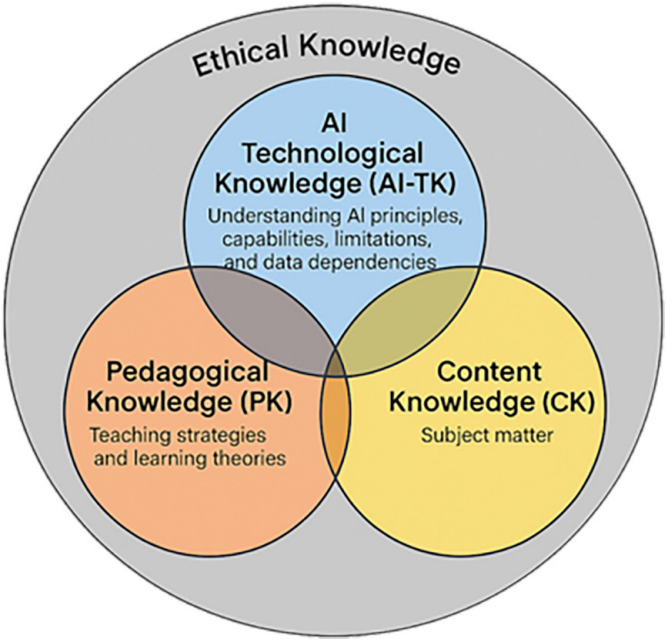

Fig. 1. AI-TPACK model (adapted from [28])

Crucially, grounding AI-TPACK within the expanding scholarship on AI ethics in education [20], [21] strengthens its theoretical validity and originality. [20] Systematic analysis highlighted fundamental ethical concerns in AIEd, such as data privacy, algorithmic bias, transparency deficits, accountability issues, and impacts on learner autonomy. [21] further argues that ethical frameworks must be intrinsically woven into the design and implementation of educational AI, emphasizing the vital connection between technological function and responsible pedagogy. Consequently, AI-TPACK integrates ethical knowledge (EK) as a core, permeating dimension, fundamentally shaping the interactions between its essential knowledge domains: AI technological knowledge (AI-TK) (understanding AI principles, capabilities, limitations, and data requirements); pedagogical knowledge (PK) (teaching strategies and learning theories); and content knowledge (CK) (subject matter). This design underscores that educators pursuing effective and responsible AI integration must move beyond mastering how to use AI (combining AI-TK and PK) or what AI can teach (combining AI-TK and CK). They must also critically engage with why and under which ethical principles AI should be employed within specific pedagogical and content scenarios (integrating AI-TK, PK, CK, and EK). The model proposes that transformative AI integration emerges from the synergistic convergence of deep comprehension of AI's affordances and limits, sound pedagogical design, specific content requirements, and rigorous ethical deliberation. AI-TPACK surfaces as a vital expansion, incorporating

specialized proficiencies indispensable for twenty-first-century instructors operating within this dynamically changing terrain. Technical AI literacy transcends elementary digital abilities, necessitating skill in prompt crafting for efficient tool engagement, comprehending large language model (LLM) customization potentials and constraints, and cultivating core algorithmic understanding to evaluate AI outcomes critically [21]. Impactful Pedagogical AI Implementation centers on structuring instructional encounters that utilize artificial intelligence to substantially improve, not simply replace, conventional assignments; this necessitates transcending SAMR's substitution and augmentation levels to devise exercises such as ChatGPT-facilitated argument exercises that promote advanced cognition and teamwork. Moreover, Critical Disciplinary AI entails appraising how artificial intelligence radically transforms domain-specific knowledge and techniques, for instance, scrutinizing AI's function in textual analysis during ELT or its consequences for solution-finding strategies in STEM disciplines. AI-TPACK, consequently, addresses directly GenAI's disturbance of TPACK's formerly more stable view of technology, essentially reconfiguring artificial intelligence not as an inert instrument but as an active, morally intricate co-agent inside the educational journey, requiring refined, fresh instructor expertise for conscientious and revolutionary assimilation. While frameworks such as UNESCO's AI Competency Profiles [29] emphasize transversal skills (e.g., algorithmic literacy) and TEACH [30] focuses on operational AI tool integration, AI-TPACK uniquely addresses the intersection of ethical governance, cultural responsiveness, and discipline-specific criticality required in Global South contexts. This tripartite emphasis, absent in existing models, enables educators to navigate AI's pedagogical complexities beyond technical proficiency, aligning with critiques of decontextualized technology transfer [24], [27].

3 METHOD

This study employs a documentary research design, focusing on the analysis of ELT curricula across local government institutions in Thailand, specifically the Rajabhat Universities. The primary objective is to examine how these institutions have integrated digital pedagogical frameworks such as Teacher 21st Century competencies, TPACK, SAMR, DIGCOMP, and Connectivism.

3.1 Population and sample

The population for this study comprises all 38 Rajabhat Universities, the local government universities, across Thailand. These universities play a pivotal role in regional teacher education and curriculum innovation. Given the diversity in educational policies, regional priorities, and digital infrastructure, a purposive sampling technique was employed to select the sample. The sample includes seven Rajabhat Universities, carefully selected from the four major regions of Thailand (North, Northeast, Central, and South). The universities were chosen from each region to ensure regional representation and curriculum diversity. There were 108 courses selected from seven Rajabhat Universities. The courses were compulsory subjects required in English Education programs for which the criteria of selection were based on the availability of publicly accessible curriculum documents, institutional emphasis on digital transformation, and the integration of technology in English teacher education, and all curriculum documents analyzed (e.g., syllabi, course outlines, policy guidelines) were publicly accessible via institutional repositories or official websites. Crucially,

this documentary analysis exclusively utilized anonymized, non-personal data; no student or instructor identifiers were accessed or processed, aligning with ethical standards for public-domain educational research. As this study exclusively analyzed publicly accessible curricular documents without involving human subjects or personal identifiers, Institutional Review Board (IRB) approval was not required per international standards for documentary research [15].

3.2 Instrument and data analysis

The document analysis protocol has been primarily employed in this study, specifically developed to examine the English teaching curricula of selected Rajabhat universities. This protocol includes a structured coding framework informed by the TPACK, SAMR, DIGCOMP, and Connectivism models, which facilitates the systematic extraction of data related to digital integration, pedagogical strategies, and grammar instruction. Each document—such as curriculum outlines, course descriptions, and policy guidelines—is reviewed and coded thematically. And the data interpretation follows the six-phase thematic analysis process proposed by Braun and Clarke and further refined by [15], including familiarization with the data, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the report. This method supports credibility, dependability, and confirmability, ensuring a rigorous qualitative interpretation of curricular practices.

1. **Thematic analysis:** The course descriptions were thematically analyzed based on the 21st-century teacher competencies and theories in digital education, as shown in Table 1. It indicates whether each course aligns with the specified theories or frameworks through coding and theming.

Table 1. Thematic analysis codes and themes

Course Description	21st-Century Teacher Competencies (Pedagogical Adaptability)	TPACK Model	SAMR Model	DIGCOMP Framework	Connectivism
Example Course 1: "Integrating Technology in the Classroom" – Focuses on using digital tools to enhance lesson delivery.	Yes	Yes (Tech + Pedagogy + Content)	Yes (Modification/ Redefinition)	Yes (Digital skills for teaching)	None
Example Course 2: "Digital Literacy for Educators" – Covers essential digital skills for teachers.	Yes	None (no strong content integration)	None (no transformation focus)	Yes (competence areas 1–5)	None
Example Course 3: "Networked Learning in the Digital Age" – Explores how learners use online networks for knowledge.	Yes	None (no explicit content focus)	None	Partial (Communication & Collaboration)	Yes (Learning via networks)
Example Course 4: "Traditional Teaching Methods" – Focuses on non-digital instructional strategies.	None	None	None	None	None

Table 1 presents a thematic analysis of four example courses, evaluating their alignment with prominent frameworks in technology-enhanced education. The findings reveal that courses emphasizing adaptive digital teaching strategies, such as "*Integrating Technology in the Classroom*," align well with 21st Century Teacher Competencies by fostering pedagogical flexibility, whereas non-technical courses like "*Traditional Teaching Methods*" lack this dimension. Regarding the TPACK Model, which requires balanced integration of technology, pedagogy, and content knowledge, only "*Integrating Technology in the Classroom*" demonstrates full alignment, while others like "*Digital Literacy for Educators*" focus primarily on skills without strong content integration. The SAMR Model's emphasis on technology-driven task transformation is evident in courses that explore tech-enhanced lesson redesign, with "*Integrating Technology in the Classroom*" reaching Modification/Redefinition levels, while courses lacking transformative tech use, such as "*Digital Literacy for Educators*," show no alignment. The DIGCOMP Framework's focus on digital competence appears in courses covering skills like online safety and collaboration, with "*Digital Literacy for Educators*" addressing multiple competence areas and "*Networked Learning in the Digital Age*" partially covering communication and collaboration. Finally, Connectivism's principle of networked learning is uniquely reflected in "*Networked Learning in the Digital Age*," which explores knowledge acquisition through digital communities, whereas other courses do not engage with this theory.

2. **Reliability and validity:** To ensure reliability and validity in measuring curriculum alignment with digital education frameworks, the classification into Strong (5), Partial (3–4), and Weak (0–2) was based on three key criteria shown in Table 2.

Table 2. Alignment level classification criteria

Criterion	Strong (5/5)	Partial (3–4/5)	Weak (0–2/5)	Example from Curricula
1. Explicit Tech Integration	Direct, required use of advanced tools (VR, AI, adaptive platforms)	Optional or supplemental tech (e.g., PDFs, basic apps)	No tech or substitution (paper-based, static digital resources)	**Strong:** AI-driven assessment (Curriculum 7) **Weak:** Traditional grammar drills (Curriculum 1)
2. Theoretical Coverage	Addresses **all** core theory components (e.g., TPACK's Tech + Pedagogy + Content)	Addresses **2/3 components** (e.g., SAMR's Modification without Redefinition)	Addresses **≤1 component** (e.g., DIGCOMP's "Safety" only)	**Strong:** Materials Dev (DIGCOMP 5/5) **Partial:** E-books without interactivity (SAMR 3/5)
3. Pedagogical Transformation	Tech **redefines** learning (e.g., AI personalization, networked PLCs)	Tech **enhances** but doesn't transform (e.g., Google Docs for collaboration)	Tech as a **substitute** (e.g., scanned textbooks)	**Strong:** VR classroom sims (Curriculum 4) **Weak:** Static PowerPoint slides (Curriculum 2)

4 RESULTS AND DISCUSSION

After having the data analyzed, the results can be presented as follows:

Table 3. Digital literacy framework alignment across 108 ELT courses

Framework	Strong (%)	Partial (%)	Weak (%)	Mean Score (1–6)	Regional Variance (Min–Max Strong %)
DIGCOMP	93	6	2	5.5	88% (Central) – 100% (South)
TPACK	84	11	5	5.1	76% (Northeast) – 95% (South)
SAMR	64	26	10	4.2	41% (Northeast) – 79% (Central)
Connectivism	50	14	36	2.9	20% (North) – 68% (South)
21st-C Comp	69	21	9	4.5	53% (Northeast) – 84% (South)

As synthesized in Table 3, DIGCOMP (93% strong alignment) and TPACK (84%) dominate Thai ELT curricula, while SAMR (64%) and Connectivism (50%) lag significantly. Notably, regional disparities reveal Connectivism's alignment ranges from 20% in Northern universities to 68% in Southern institutions, a gap reflecting uneven digital infrastructure and pedagogical conservatism. Mean scores further quantify this hierarchy: DIGCOMP (5.5/6) and TPACK (5.1) far exceed SAMR (4.2) and Connectivism (2.9), confirming that advanced technology integration remains emergent. This study identifies a consistent hierarchy of digital framework adoption in Thai ELT curricula: foundational competencies (DIGCOMP, 93% strong alignment) precede integrative knowledge (TPACK, 84%), while transformative practices (SAMR, 64%) and networked paradigms (Connectivism, 50%) lag significantly. This pattern reveals Thailand's readiness gap, a systemic emphasis on skills acquisition over pedagogical reimagining, reflecting broader Global South trajectories where digital education is often reduced to technical literacy [20], [21]. Such hierarchical adoption suggests a sequential theory of change; basic digital competencies must be institutionalized before advanced pedagogies emerge. However, GenAI's disruption demands concurrent development of all layers, exposing a critical tension between incrementalist models (e.g., SAMR) and technological acceleration that reflects broader global trends in 21st-century education.

4.1 Socio-cultural and institutional barriers to networked learning

The results portray the persistent underperformance of Connectivism (50% strong alignment vs. DIGCOMP's 93%), which cannot be attributed solely to technical limitations; it reflects deeper socio-cultural, institutional, and epistemological tensions. Thailand's teacher-centered traditions [6], [18], which prioritize hierarchical transmission, clash with Connectivism's decentralized ethos. This mirrors resistance observed in Nigerian humanities [21] and Vietnamese institutions [16], where communal values paradoxically reinforce didacticism despite digital access [24], [27]. This cultural paradigm manifests concretely in ELT classrooms, were instructors function as sole knowledge authorities, positioning students as passive recipients rather than active co-constructors. Such dynamics actively suppress the peer-to-peer interaction and distributed expertise central to networked learning models [8]. This challenge is not only intensified within humanities fields such as literary studies, but

traditional knowledge authority remains firmly embedded [20], [11]. Structurally, inflexible evaluation mechanisms prioritizing solitary accomplishment over cooperative results discourage networked methods [19]. Thus, educators and learners alike marginalize time-consuming collaborative digital activities, viewing them as supplementary rather than fundamental to scholastic achievement [15]. Philosophically, the Western formulation of Connectivism presumes learner independence and digital self-sufficiency, conditions frequently unrealized in Global South settings like Thailand, where teacher direction persists as a cultural norm [15]. These obstacles reflect difficulties documented across African and Latin American higher education [15], [19], [21], indicating that culturally dominant premises within networked learning theories demand rigorous scrutiny. This reveals an essential mandate: frameworks such as Connectivism require intentional de-westernizing, not simple linguistic conversion, but re-envisioning prioritizing regional knowledge systems. Absent such contextually responsive reinvention, transplanted digital teaching approaches hazard remaining perpetually peripheral, irrespective of the technological foundations underpinning them [20], [21], [31].

4.2 Global contexts: Divergent paths, shared challenges

Thailand's patterns of digital incorporation, evidenced by the findings, exhibit notable resemblances alongside educational distinctions when compared to other Global South environments. Like Malaysia [15], [17], [18], Thailand demonstrates proficiency in formalizing fundamental digital competencies (DIGCOMP) yet encounters significant difficulties implementing transformative pedagogical approaches (SAMR/Connectivism). This emphasis on establishing foundational skills differs markedly from highly digitized systems (e.g., South Korea, Estonia), in which governmental directives concurrently propel infrastructural development, educator professional development, and instructional innovation [31]. Significantly, however, Thailand's implementation of SAMR (64% substantial alignment) surpasses typical Latin American outcomes (78% utilization at the substitution level [27]), attributable partly to centralized ICT investments [33]. Conversely, the delayed adoption of Connectivism (50% alignment) finds parallels in Vietnam and Nigeria, contexts where communal cultural values paradoxically obstruct digital cooperation by strengthening in-person hierarchical structures [16], [17], [21]. The fundamental obstacle pervasive throughout Global South environments involves incongruity between externally introduced frameworks and indigenous pedagogical understandings. SAMR and Connectivism inherently assume learner self-direction, plentiful resources, and constructivist foundations—conditions frequently absent within systems emphasizing direct knowledge transmission. In Vietnam, researchers [16] observe that 72% of educators conflate technology integration with distributing materials using PowerPoint (Substitution), perceiving Redefinition as threatening to curricular control. Correspondingly, literature departments in Thailand oppose networked analytical methods, apprehensive that GenAI technologies like ChatGPT could potentially undermine established textual interpretations they are professionally obligated to preserve [31] [32]. These frictions signify a wider epistemic imbalance; digital frameworks originating within affluent, individualistic societies seldom integrate knowledge traditions prioritizing authoritative guidance, stability, and structured skill acquisition [27]. These tensions expose a critical flaw in uncritical policy transfer: frameworks emerging from affluent, individualistic societies frequently disregard or marginalize knowledge traditions emphasizing communal learning, structured progression, and respect for canonical knowledge [27].

This inherent incompatibility between Western-originating digital frameworks and Global South pedagogical philosophies demands a radical rethinking of both policy and professional development. The findings compel the argument that imposing Connectivism without addressing its embedded Western assumptions of learner autonomy and decentralized knowledge is not merely ineffective but potentially epistemically unjust. Consequently, policy recommendations must move beyond technical upskilling. They should mandate the co-creation of digitally enabled pedagogies that actively integrate, rather than override, indigenous educational values and communal knowledge practices [33]. Similarly, teacher professional development cannot be reduced to training on tools or frameworks like SAMR/Connectivism. It must explicitly equip educators with critical frameworks to deconstruct the cultural assumptions within imported models and empower them to design blended approaches that honor local epistemologies while selectively leveraging digital affordances for meaningful, contextually relevant transformation [34]. This might involve adapting Connectivism principles to function within more structured, facilitator-guided online communities or redefining 'Redefinition' in SAMR to include culturally situated knowledge creation that respects authoritative sources while enabling new forms of expression. Therefore, these comparative analyses highlight the pivotal Global South challenge: sustainable and equitable digital transformation is impeded more profoundly by the epistemic incompatibility between adopted Western models and localized educational philosophies than by infrastructural limitations alone. Addressing this requires centering Global South voices and epistemologies in the design of digital education policy and practice.

5 CONCLUSION

This study concludes that Thailand's ELT curricula exhibit a phased adoption sequence: establishing fundamental digital skills (DIGCOMP) occurs before integrative (TPACK) and transformative (SAMR/Connectivism) methodologies. This prioritization, grounded in cultural and institutional reluctance (instructor-focused knowledge traditions, communal educational customs) and systemic limitations (localized connectivity deficiencies, inflexible evaluation), mirrors a wider Global South reality where externally imposed models conflict with indigenous instructional philosophies. Critically, Connectivism's limited adoption (50%) reflects not only infrastructural gaps but deeper conceptual tensions: its Western-derived model of distributed knowledge conflicts with Thai educational hierarchies and canonical mastery traditions [18], [24]. Internationally, Thailand's phased adoption mirrors Malaysia's prioritization of technical over transformative literacies [17], while lagging Estonia's systemic integration of pedagogy, infrastructure, and ethics [31] [32]. This reflects a broader Global South pattern wherein imported frameworks encounter epistemic friction [24], [27], [33], demanding co-created models such as HeDiCom [27]. Its superior SAMR integration compared to Latin America emphasizes the impact of coordinated ICT funding while simultaneously revealing common deficiencies in implementing collaborative networked pedagogies.

6 REFERENCES

[1] B. Hammoda, "Digital technology in entrepreneurship education: An overview of the status quo," in *Digital Transformation for Entrepreneurship*, S. Durst and A. Pevkur, Eds., World Scientific, 2024, pp. 71–93. https://doi.org/10.1142/9789811270178_0006

[2] A. Boonmoh and I. Kulavichian, "Exploring the creation of online English self-learning materials by Thai pre-service teachers," *Computer Assisted Language Learning Electronic Journal*, vol. 26, no. 2, pp. 198–232, 2025. https://doi.org/10.54855/callej.252628

[3] C. Paiwithayasiritham, K. Mingsiritham, G. Chanyawudhiwan, S. Amatmontree, and A. Iamsa-ard, "Self-perception about digital skills of pre-service teachers in a Thailand university context," *Journal of Education and Learning*, vol. 14, no. 1, p. 177, 2024. https://doi.org/10.5539/jel.v14n1p177

[4] N. A. Rahman, R. Rosli, A. S. Rambely, and L. Halim, "Mathematics teachers practices of STEM education: A systematic literature review," *European Journal of Educational Research*, vol. 10, no. 3, pp. 1541–1559, 2021. https://doi.org/10.12973/eu-jer.10.3.1541

[5] H. Sukmawarti, H. Hidayat, and L. A. Putri, "Workshop worksheet berbasis budaya bagi Guru MI Jamiatul Qamar Tanjung Morawa," *PaKMas*, vol. 2, no. 1, pp. 202–207, 2022. https://doi.org/10.54259/pakmas.v2i1.848

[6] T. Jantakeeree, "Online instructional management in the digital era," *Journal of Modern Learning Development*, vol. 7, no. 10, pp. 349–363, 2022. [Online]. Available: https://so06.tci-thaijo.org/index.php/jomld/article/view/257687

[7] B. Zou, L. Huang, W. Ma, and Y. Qiu, "Evaluation of the effectiveness of EFL online teaching during the COVID-19 pandemic," *SAGE Journal*, vol. 11, no. 4, pp. 1–17, 2021. https://doi.org/10.1177/21582440211054491

[8] M. J. Koehler, P. Mishra, M. Akcaoglu, and J. M. Rosenberg, "The technological pedagogical content knowledge framework for teachers and teacher educators," in *ICT Integrated Teacher Education Models*. New Delhi, India: Commonwealth Educational Media Center for Asia, 2013, pp. 2–7. [Online]. Available: https://www.researchgate.net/publication/267028784_The_Technological_Pedagogical_Content_Knowledge_Framework_for_Teachers_and_Teacher_Educators

[9] O. M. A. Aldalalah, "Employment of the word cloud in brainstorming via the web and its effectiveness in developing design thinking skills," *International Journal of Instruction*, vol. 15, no. 1, pp. 1045–1064, 2022. https://doi.org/10.29333/iji.2022.15159a

[10] R. R. Puentedura, "SAMR: A model for technology integration," 2014. [Online]. Available: http://www.hippasus.com

[11] S. Wahyuni, J. Mujiyanto, D. Rukmini, and S. W. Fitriati, "Teachers' technology integration into English instructions: SAMR model," in *Proceedings of the International Conference on Science and Education and Technology (ISET 2019)*, 2020, pp. 546–550. https://doi.org/10.2991/assehr.k.200620.109

[12] M. Halaweh, "ChatGPT in education: Strategies for responsible implementation," *Contemporary Educational Technology*., vol. 15, no. 2, p. ep421, 2023. https://doi.org/10.30935/cedtech/13036

[13] B. Jones-Kavalier and S. Flannigan, "Connecting the digital dots: Literacy of the 21st century," *EDUCAUSE Review*, 2021. [Online]. Available: https://er.educause.edu/articles/2006/4/connecting-the-digital-dots-literacy-of-the-21st-century

[14] G. Siemens, "Connectivism: A learning theory for the digital age," *International Journal of Instructional Technology and Distance Learning*, vol. 2, no. 1, pp. 1–9, 2005. [Online]. Available: http://jotamac.typepad.com/jotamacs_weblog/files/Connectivism.pdf.

[15] J. M. Fernández-Batanero, M. Montenegro-Rueda, J. Fernández-Cerero, and P. Tadeu, "Formación del profesorado y TIC para el alumnado com discapacidad: Una revisión sistemática," *Rev. Bras. Educ. Espec*., vol. 26, pp. 711–732, 2020. https://doi.org/10.1590/1980-54702020v26e0078

[16] T. X. Zou and J. A. Timmermans, "What is in a name? Unpacking internationalisation of the curriculum using a threshold concepts lens," *High. Educ*., pp. 1–20, 2025. https://doi.org/10.1007/s10734-025-01427-x

[17] S. Wahyuni, "Effective teaching practices in higher education during COVID-19 pandemic: Lecturers and students' lens," *NOBEL J. Lit. Lang. Teach.*, vol. 14, no. 1, pp. 28–44, 2023. https://doi.org/10.15642/NOBEL.2023.14.1.28-44

[18] H. Mukhlis, E. Y. Haenilah, D. Maulina, and L. Nursafitri, "Connectivism and digital age education: Insights, challenges, and future directions," *Kasetsart J. Soc. Sci.*, vol. 45, no. 3, pp. 803–814, 2024. https://doi.org/10.34044/j.kjss.2024.45.3.11

[19] M. Cabezas-González, S. Casillas-Martín, and F. J. García-Peñalvo, "The digital competence of pre-service educators: The influence of personal variables," *Sustainability*, vol. 13, no. 4, p. 2318, 2021. https://doi.org/10.3390/su13042318

[20] O. Zawacki-Richter, V. I. Marín, M. Bond, and F. Gouverneur, "Systematic review of research on artificial intelligence applications in higher education—Where are the educators?" *Int. J. Educ. Technol. High. Educ.*, vol. 16, no. 1, pp. 1–27, 2019. https://doi.org/10.1186/s41239-019-0171-0

[21] M. Halaweh, "ChatGPT in education: Strategies for responsible implementation," *Contemp. Educ. Technol.*, vol. 15, no. 2, p. ep421, 2023. https://doi.org/10.30935/cedtech/13036

[22] J. Tondeur, J. van Braak, P. A. Ertmer, and A. Ottenbreit-Leftwich, "Understanding the relationship between teachers' pedagogical beliefs and technology use in education: A systematic review of qualitative evidence," *Educ. Technol. Res. Dev.*, vol. 65, no. 3, pp. 555–575, 2017. https://doi.org/10.1007/s11423-016-9481-2

[23] S. K. Howard, J. Tondeur, F. Siddiq, and R. Scherer, "Ready, set, go! Profiling teachers' readiness for online teaching in secondary education," *Brit. J. Educ. Technol.*, vol. 49, no. 1, pp. 149–162, 2018. https://doi.org/10.1111/bjet.12569

[24] J. Knox, Y. Wang, and M. Gallagher, "Introduction: AI, inclusion, and 'Everyone Learning Everything'," in *Artificial Intelligence and Inclusive Education*, in Perspectives on Rethinking and Reforming Education, J. Knox, Y. Wang, and M. Gallagher, Eds., Singapore: Springer, 2019. https://doi.org/10.1007/978-981-13-8161-4_1

[25] S. Papadakis, "Apps to promote computational thinking concepts and coding skills in children of preschool and pre-primary school age," in *Mobile Learning Applications in Early Childhood Education*, IGI Global Scientific Publishing, 2020, pp. 101–121. https://doi.org/10.4018/978-1-7998-1486-3.ch006

[26] M. Drolia, E. Sifaki, S. Papadakis, and M. Kalogiannakis, "An overview of mobile learning for refugee students: Juxtaposing refugee needs with mobile applications' characteristics," *Challenges*, vol. 11, no. 2, p. 31, 2020. https://doi.org/10.3390/challe11020031

[27] J. Tondeur *et al.*, "The HeDiCom framework: Higher education teachers' digital competencies for the future," *Educ. Technol. Res. Dev.*, vol. 71, no. 1, pp. 33–53, 2023. https://doi.org/10.1007/s11423-023-10193-5

[28] P. Mishra, "Considering contextual knowledge: The TPACK diagram gets an upgrade," *J. Digit. Learn. Teach. Educ.*, vol. 35, no. 2, pp. 76–78, 2019. https://doi.org/10.1080/21532974.2019.1588611

[29] UNESCO, "K-12 AI curricula: A mapping of government-endorsed AI curricula," 2022.

[30] H. Crompton, D. Burke, K. Jordan, and S. W. Wilson, "Learning with technology during emergencies: A systematic review of K-12 education," *Brit. J. Educ. Technol.*, vol. 52, no. 4, pp. 1554–1575, 2021. https://doi.org/10.1111/bjet.13114

[31] F. J. García-Peñalvo, A. Corell, V. Abella-García, and M. Grande-de-Prado, "Recommendations for mandatory online assessment in higher education during the COVID-19 pandemic," in *Radical Solutions for Education in a Crisis Context*, Singapore: Springer, 2020, pp. 85–98. https://doi.org/10.1007/978-981-15-7869-4_6

[32] O. Ismail and N. Ahmad, "Ethical and governance frameworks for artificial intelligence: A systematic literature review," *Int. J. Interact. Mob. Technol.*, vol. 19, no. 14, pp. 121–136, 2025. https://doi.org/10.3991/ijim.v19i14.56981

[33] R. Aloqlah, "Exploring AI-powered mobile technologies in educational leadership: Perceptions, challenges, and opportunities," *Int. J. Interact. Mob. Technol.*, vol. 19, no. 13, pp. 78–95, 2025. https://doi.org/10.3991/ijim.v19i13.53081

[34] J. Boonyopakorn, P. Tasatanattakool, P. Nilsook, and P. Wannapiroon, "Mobile language learning: A digital approach to improving English communication," *Int. J. Interact. Mob. Technol.*, vol. 18, no. 22, pp. 159–173, 2024. https://doi.org/10.3991/ijim.v18i22.50001

7 AUTHORS

Benjapon Nualprasert is with the Thepsatri Rajabhat University, Lopburi, Thailand.

Wunwisa Punkhoom is with the Thepsatri Rajabhat University, Lopburi, Thailand.

Hambalee Jehma is with the Prince of Songkla University, Songkla, Thailand (Corresponding E-mail: hambalee.j@psu.ac.th).