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Technological Self- Efficacy and Classroom Technology Use of Early Childhood Teachers

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ABSTRACT

This study examined technological self-efficacy and classroom technology use among early childhood teachers at Cabangahan Elementary School, Siaton, Negros Oriental. Employing a quantitative descriptive-correlational design, the researchers collected self-reported data from five teachers using an expert-reviewed, Google Forms questionnaire. Descriptive frequencies, percentages, and five-point weighted means were used to characterize teachers' profiles, basic technology skills, confidence in pedagogical integration, troubleshooting ability, frequency of technology use, diversity of digital tools, and perceived effects on children's learning and engagement. The reported mean scores were 4.56 for basic technology skills, 4.56 for pedagogical integration, and 4.52 for technical troubleshooting, all interpreted as highly confident. Classroom technology use was rated 4.60 for frequency, 4.16 for diversity of tools, and 4.76 for perceived learning engagement. The study reported a very strong positive Pearson correlation between self-efficacy and classroom technology implementation ($r = .94$); no corresponding significance test was provided. Results suggest that the participating teachers perceived themselves as technologically capable and frequent users of digital resources, although the range of tools used was comparatively limited. The proposed action plan prioritizes device access, technical support, targeted professional learning, and classroom monitoring. Given the five-person, single-school sample and reliance on self-report, the findings should be interpreted as local descriptive evidence, not as proof of causal effects on children's outcomes.

Keywords: *technological self-efficacy; early childhood education; classroom technology integration; digital teaching skills; ICT resource access; teacher confidence*

INTRODUCTION

Technology-mediated learning has become part of early childhood education, where digital media and interactive tools can complement play-based and developmentally appropriate instruction. Yet the availability of devices does not guarantee meaningful classroom application: teachers must choose suitable materials, manage activities, and determine whether a digital task advances learning rather than merely occupying screen time. Studies of preschool technology use have documented uneven integration and the importance of pedagogy, preparation, and teacher attitudes (Konca & Tantekin Erden, 2021; Alotaibi, 2023).

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Technological self-efficacy concerns teachers' confidence in performing technology-related instructional tasks. It encompasses basic operations, purposeful pedagogical integration, and managing technical or classroom disruptions. These capabilities interact with technological pedagogical content knowledge (TPACK) and technology acceptance. A meta-analysis found a positive relationship between teachers' technology-integration self-efficacy and TPACK (Zeng et al., 2022), while research on technology acceptance demonstrates that perceptions of usefulness and ease of use can help explain adoption (Scherer et al., 2019). Such evidence supports attention to both teachers' skills and their opportunity to apply those skills.

In the rural school context of Cabangahan Elementary School, Siaton, Negros Oriental, access to and diversity of technology resources may shape day-to-day teaching decisions. The source study therefore examined five early childhood teachers' demographic and professional profiles, their reported technological self-efficacy across three dimensions, their classroom technology use across three dimensions, and the association between the two principal variables. The findings were intended to inform an appropriately scaled school action plan. Because the design used one-time teacher self-reports, it assessed reported practices and perceived learner engagement rather than directly measured effects on pupil learning.

Literature Review

Technological Self-Efficacy and Teacher Readiness

Beliefs about one's ability to complete technology-related tasks influence decisions to explore new instructional tools and respond to classroom difficulties. The source study framed this issue through self-efficacy theory and examined whether early childhood teachers felt able to operate common devices, manage files, locate educational resources, and use classroom applications. This distinction between access and perceived capability is important because merely placing devices in schools does not ensure instructional use. Alotaibi (2023) identified beliefs, knowledge, and access as important considerations in early childhood educators' adoption of digital aids.

Teachers' digital confidence is also shaped by professional learning and experience. Blannin et al. (2026) found that computing capability and digital literacy were associated with self-efficacy for teaching digital technologies in Australian teacher cohorts. Zeng et al. (2022) similarly reported a substantial positive association between self-efficacy for technology integration and TPACK. These findings suggest that self-efficacy involves both operational fluency and the confidence to select digital approaches for particular teaching purposes.

In the Philippine professional-development context, continuing learning can support educators' confidence and adaptability (Bernardo et al., 2020; Lamud, 2024). Nevertheless, generalized findings from other contexts must not be treated as evidence that a particular training program improved the five teachers in the current study. They instead provide a rationale for observing teachers' existing competence and identifying practical areas for support.

Pedagogical Integration and TPACK

Technological pedagogical content knowledge emphasizes the interaction of subject content, instructional strategies, and technological resources. Teachers may be competent in operating a device without necessarily knowing when a digital activity is developmentally suitable. The source questionnaire therefore included selecting age-appropriate materials, preparing technology-enhanced lessons, enabling pupil interaction, and using digital tools to monitor progress. Bai and Li (2025) analyzed TPACK profiles in early childhood educational settings, underscoring differences among teachers and preschools rather than assuming identical readiness. Related work on the alignment of TPACK and confidence is also discussed by Gacayan (2025) and Lee and Lee (2025).

Evidence from teacher education indicates that technology integration should be learned through authentic teaching tasks, reflection, and the evaluation of specific tools. Tondeur et al. (2020) considered how future educators should be prepared for meaningful educational technology use, while Tondeur et al. (2023) proposed a digital-competence framework for higher education teachers. Though the latter focuses on a different educational level, the importance of practical, context-sensitive digital competency is relevant to the preparation of early childhood educators.

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Teachers' intentions to adopt technology also depend on their perceptions of usefulness and usability. Scherer et al. (2019) synthesized evidence supporting the Technology Acceptance Model as an explanation of teachers' technology adoption. Tzimas and Demetriadis (2025) further examined teachers' acceptance and resistance to learning analytics, highlighting that technology acceptance does not occur independently of organizational conditions. These strands suggest the importance of studying both confidence and actual reported application.

Classroom Technology Use and Developmentally Appropriate Learning

Early childhood technology use includes the regularity of use, the types of digital resources selected, and the purposes for which devices are employed. A preschool teacher may frequently use a laptop or projector but rarely provide other interactive or assistive experiences. Konca and Tantekin Erden (2021) found that although preschool classrooms had access to digital technologies, practice could remain concentrated in a narrow range of activities. This helps explain why frequency and diversity should be measured as separate outcomes.

Developmentally appropriate digital learning requires teachers to facilitate rather than simply present electronic content. Alotaibi (2023) examined early childhood educators' decisions about digital learning aids, while Li and Hidayat (2025) discussed the role of teacher self-efficacy and beliefs in links between TPACK and technology use. The present study's third classroom-use dimension therefore measured teachers' perceptions of children's enthusiasm, participation, and completion of tasks, rather than standardized achievement gains.

Wider research on student engagement and educational technology has emphasized the need to distinguish what is measured from what is inferred (Bond et al., 2020). This is especially important in studies that rely on teacher-reported observations. Reports of greater excitement or participation provide useful classroom-level impressions, but do not independently establish improvement in cognitive, social, or academic outcomes.

Digital Access, Institutional Support, and the Research Gap

Digital infrastructure and teacher capability are mutually relevant to technology integration. Teachers may have reliable internet and a laptop yet remain constrained by limited access to projectors, tablets, assistive resources, or equipment shared across rooms. UNESCO (2023) cautioned that educational technology needs to be evaluated against equity, access, instructional purpose, and actual classroom conditions. Its recommendations support assessing access alongside teacher confidence rather than interpreting equipment ownership as comprehensive readiness.

Institutional planning must address teacher training, technology maintenance, and realistic classroom implementation. Tondeur et al. (2023) situated digital competencies within a broader professional context, while the study by Blannin et al. (2026) highlighted computing capability as a practical training priority. These perspectives support school-level action planning that begins with an inventory of existing assets, identifies difficult instructional tasks, and connects professional learning to resource availability. International education indicators likewise point to differences in teacher-support contexts (Organisation for Economic Co-operation and Development, 2023).

The identified gap in the original research was the limited school-specific evidence on technological self-efficacy and classroom technology use among early childhood teachers in Cabangahan Elementary School. Unlike multi-school population studies, this investigation focused on five local respondents and explored their self-assessed capabilities, technology practices, and observed association. Its contribution is therefore contextual baseline evidence for local planning, rather than a basis for generalization to all Philippine early childhood teachers.

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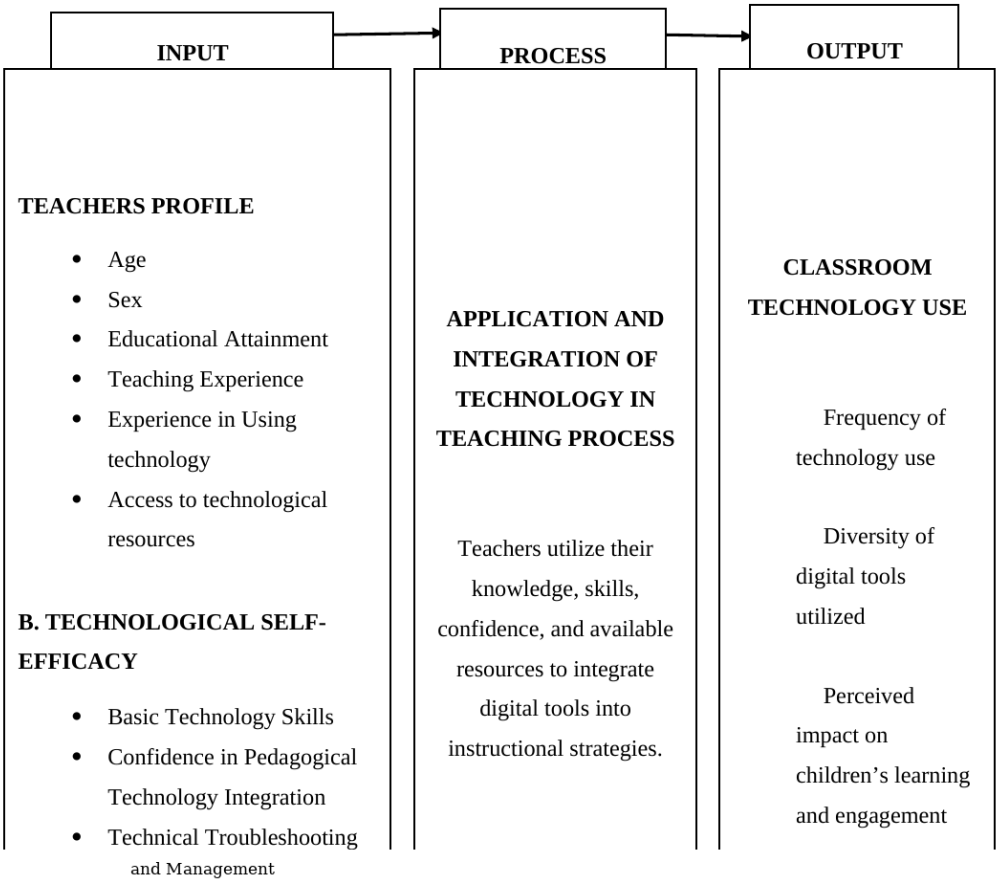


Figure 1. *Conceptual Framework of the Study*

METHODS

Research Design

The study used a quantitative descriptive-correlational approach. Descriptive measures summarized teachers' background information, technological self-efficacy, and classroom technology use. Pearson's product–moment correlation was used to examine the association between the two principal reported constructs. As the study was observational and cross-sectional, the design did not support causal conclusions.

Research Locale

Research was undertaken at Cabangahan Elementary School, Siaton IV District, Negros Oriental, Philippines. The source described a rural public-school setting in which early childhood teachers conducted classroom activities with varying access to technology resources.

Participants and Sampling Technique

Five early childhood teachers participated in the survey. The methodology described random selection among eligible early childhood teachers assigned to the school, with voluntary participation after permission was obtained. The source did not provide a separate sampling frame or the total number of eligible teachers, limiting assessment of sampling coverage.

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Research Instrument

A researcher-made questionnaire, distributed through Google Forms, comprised three parts: teacher profile, technological self-efficacy, and classroom technology use. Technological self-efficacy covered basic technology skills, confidence in pedagogical integration, and technical troubleshooting and management. Classroom-use indicators measured frequency, diversity of digital tools, and perceived effects on children's learning and engagement. Responses used five-point scales. The source reported expert review by Negros Oriental State University personnel and pilot testing; it did not provide a numerical reliability coefficient.

Data Gathering Procedure

The researchers secured permission from the Siaton IV District Supervisor and the school head, informed selected teachers of the study's purpose, and distributed the online questionnaire. Responses were collected and organized electronically before tabulation and descriptive analysis.

Data Analysis

Frequencies and percentages described the participants' profiles and available resources, while weighted means summarized Likert-scale responses. The original self-efficacy scale interpreted scores of 4.21–5.00 as "Highly Confident," and the classroom-use scale interpreted the same interval as "Always"; values of 3.41–4.20 corresponded to "Confident" and "Often," respectively. The source reported Pearson's r = .94 for the relationship between self-efficacy and implementation, interpreted as very high. No significance probability or confidence interval was supplied for that coefficient.

Ethical Consideration

The researchers reported obtaining administrative permission, explaining the purpose of the survey, securing voluntary consent, preserving the anonymity and confidentiality of individual teachers, and allowing withdrawal. A named institutional ethics-review approval number was not stated in the source.

RESULTS AND DISCUSSION

Respondent Characteristics and Resource Access

Table 1. *Profile of the Five Early Childhood Teacher-Respondents*

Characteristic	Category	n	%
Age	30–40 years	3	60
Age	41–50 years	2	40
Sex	Female	5	100
Education	Bachelor's degree	1	20
Education	With master's units	3	60
Education	Master's degree	1	20
Teaching experience	1–3 years	1	20
Teaching experience	4–6 years	2	40
Teaching experience	7–10 years	1	20
Teaching experience	Over 10 years	1	20

Percentages use n = 5. Educational attainment and teaching-experience categories are mutually exclusive within their respective dimensions.

All five respondents were female, with three aged 30–40 years and two aged 41–50 years. Three had completed master's-level units, one held a bachelor's degree, and one had earned a master's degree. Teaching experience ranged from 1–3 years to more than 10 years. These characteristics describe a small, heterogeneous teacher group; they cannot establish differences in performance by demographic category.

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The source's resource table indicated internet access and laptops for all five respondents, projectors for three (60%), and cellphones for one (20%). Because these were resource indicators rather than mutually exclusive categories, their percentages were not expected to sum to 100%. The profile's reported digital access creates a basis for regular implementation, although it does not establish equivalent availability or functionality of devices during every lesson.

Technological Self-Efficacy

Table 2. *Technological Self-Efficacy and Classroom Technology Use*

Dimension	Reported mean	Source interpretation
Basic technology skills	4.56	Highly Confident
Pedagogical technology integration	4.56	Highly Confident
Technical troubleshooting and management	4.52	Highly Confident
Frequency of classroom technology use	4.60	Always
Diversity of digital tools utilized	4.16	Often
Perceived impact on learning and engagement	4.76	Always

Teachers reported high confidence in basic computer and digital-file operations (mean = 4.56) and in selecting tools, designing activities, and assessing learning through technology (mean = 4.56). In both dimensions, three teachers were classified as highly confident and two as confident. Individual ratings were particularly high for operating core devices and identifying learning resources; the item on peripheral-device use was somewhat lower (4.40). This pattern is broadly compatible with research associating digital literacy with confidence in technology-mediated teaching (Blannin et al., 2026; Zeng et al., 2022).

Technical troubleshooting and classroom management yielded a similarly high mean (4.52). The teachers' responses were more favorable for guiding children in safe device use, maintaining classroom order, and preparing alternative activities (each 4.60) than for independently solving connectivity and application problems or controlling digital distractions (each 4.40). Although the differences are small and not inferentially tested, the lower item scores identify practical targets for technical support and scenario-based training. Teachers' reported confidence should not be equated with formal certification in troubleshooting competence.

Frequency, Diversity, and Perceived Learner Engagement

Classroom technology was reportedly used regularly, with a frequency mean of 4.60 ("Always"). All five frequency indicators—including instructional presentations, support for core learning areas, digital-device activities, multimedia use, and documentation of pupil work—received the same mean. Three teachers were characterized as always using technology and two as often using it. Such consistent self-report suggests that technology was embedded in ordinary instructional routines at this school, while the absence of classroom-observation data prevents external confirmation.

In contrast, the variety of tools used received a lower mean of 4.16 ("Often"). The source's item data placed use of varied classroom hardware at 4.00 and use of software, multimedia resources, new platforms, and assistive technologies at 4.20 each. This distinction is important: frequent digital instruction can coexist with reliance on a relatively narrow range of equipment and applications. Konca and Tantekin Erden (2021) similarly documented that access and favorable attitudes need not translate into diversified technology use.

The highest domain score concerned teachers perceived impact on children's learning and engagement (mean = 4.76, "Always"). Teachers gave high ratings for pupil interest, participation, task completion, and enjoyment when digital activities were used. The reported score is a perception of classroom engagement, however, not evidence from pupil assessments or direct behavioral observation. Accordingly, it supports a description of positive teacher impressions rather than a conclusion that technology demonstrably increased learning outcomes (Bond et al., 2020).

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Association Between Self-Efficacy and Implementation

Table 3. *Paired Self-Reported Scores and Correlation*

Teacher	Self-efficacy (X)	Implementation (Y)
A	4.73	4.86
B	4.00	4.00
C	5.00	5.00
D	4.00	4.00
E	5.00	4.66

The original correlation summary gave r = .94 for technological self-efficacy and classroom technology implementation. The paired responses in Table 3 follow the same overall pattern: teachers with higher reported confidence tended to report higher classroom technology use. This result is directionally consistent with models connecting self-efficacy, TPACK, and adoption (Scherer et al., 2019; Zeng et al., 2022; Li & Hidayat, 2025).

Interpretation nevertheless requires particular caution. The relationship was calculated using only five self-reported pairs, and two participants had identical scores on both constructs. With such a small sample, the coefficient is sensitive to individual responses and does not explain potential confounding by resources, teacher preparation, or experience. The thesis did not present p-values for comparisons involving respondent profiles; therefore, no profile-related significance claim is made here. The observed correlation is not evidence of a causal influence of self-efficacy on technology use.

Research-Based School Action Plan

Table 4. *Condensed Action Priorities from the Proposed School Plan*

Priority	Proposed activity	Indicative monitoring
Infrastructure baseline	Inventory laptops, internet access, display devices, and technical constraints	Completed resource inventory and needs report
Resource diversification	Seek additional age-appropriate devices through budgets and partnerships	Availability and use of varied tools
Instructional support	Provide coaching on multimedia, assistive tools, backup strategies, and digital safety	Teacher reflection and lesson-use records
Monitoring	Review utilization, device condition, access, and barriers each semester	Classroom-use and maintenance reports

The original action plan emphasized technology needs assessment, additional hardware, external resource partnerships, efficient sharing of equipment, and regular monitoring. These priorities follow directly from the contrast between high frequency of use and comparatively lower diversity. The proposed program could be strengthened by focusing on developmentally appropriate instruction, assistive and interactive resources, technical problem-solving, and the continued assessment of access across classrooms. Such priorities align with broader guidance on equitable, educationally justified technology use (UNESCO, 2023).

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CONCLUSION

The five early childhood teachers surveyed at Cabangahan Elementary School generally reported high technological self-efficacy across basic operations, pedagogical integration, and troubleshooting, together with frequent classroom technology use and favorable perceptions of children's engagement. Diversity of digital tools received the lowest of the six reported dimension means, indicating a potential opportunity to improve the range of classroom technology experiences. The study also reported a very strong positive Pearson correlation ($r = .94$) between technological self-efficacy and implementation. Given the small, single-school sample, the reliance on teacher ratings, and the absence of a reported significance test, these findings provide contextual descriptive evidence of association rather than proof of causal or generalizable educational effects. Its contribution is a locally grounded basis for teacher support and technology planning.

Recommendation

School leaders should prioritize an inventory of equipment and support needs, improve access to suitable digital tools, and establish realistic device-sharing and maintenance arrangements. Professional development should extend beyond basic operations to the design of child-centered activities, troubleshooting and contingency plans, appropriate digital safety, and evaluation of children's experiences. Teachers may use peer coaching and reflective lesson records to assess the educational purpose of each digital activity. Future research should include more schools and participants, documented reliability testing, independent classroom observations, and direct measures of learner engagement or learning. Inferential analyses and longer-term follow-up would clarify whether the observed association persists across settings. The proposed intervention should be evaluated before claims of effectiveness are made.

References

Alotaibi, M. S. (2023). Factors influencing early childhood educators' use of digital educational aids: A sequential explanatory study. SAGE Open, 13(4). https://doi.org/10.1177/21582440231217727

Bai, B., & Li, J. (2025). Profiling TPACK in early childhood education: A multilevel latent profile analysis of teachers and preschools. Education and Information Technologies, 30, 26827–26855. https://doi.org/10.1007/s10639-025-13800-5

Bernardo, A. B. I., Wong-Fernandez, B., Macalaguing, M. D., Jr., & Navarro, R. C. (2020). Filipino senior high school teachers' continuing professional development attitudes: Exploring the roles of perceived demand amid a national education reform. Journal of Research, Policy & Practice of Teachers and Teacher Education, 10(2), 63–76.

Blannin, J., Lee, J., Mason, T., Rowston, K., Abril, J. M. V., Bower, M., & Redmond, P. (2026). Examining the determinants of teacher self-efficacy to teach digital technologies in Australian schools. Journal of Education for Teaching, 52(2), 380–393. https://doi.org/10.1080/02607476.2025.2577209

Bond, M., Buntins, K., Bedenlier, S., Zawacki-Richter, O., & Kerres, M. (2020). Mapping research in student engagement and educational technology in higher education: A systematic evidence map. International Journal of Educational Technology in Higher Education, 17, Article 2. https://doi.org/10.1186/s41239-019-0176-8

Gacayan, J. B. (2025). Teachers' technological pedagogical and content knowledge (TPACK) competence and technology integration self-efficacy beliefs for science teaching. Journal of Interdisciplinary Perspectives, 3(7), 798–811. https://doi.org/10.69569/jip.2025.323

Konca, A. S., & Tantekin Erden, F. (2021). Digital technology (DT) usage of preschool teachers in early childhood classrooms. Journal of Education and Future, (19), 1–12. https://doi.org/10.30786/jef.627809

Lamud, C. (2024). Lifelong learning tendencies as predictors of teachers' engagement in continuing professional development: An ordinal regression analysis. Journal of Education, Management and Development Studies, 4(4), 26–41. https://doi.org/10.52631/jemds.v4i4.327

Lee, E., & Lee, S. (2025). The mediating effect of TPACK in the relationship between preschool teachers' technology acceptance intention, technostress and technology usage behavior. Journal of Child Welfare and Development, 23(2), 1–16. https://doi.org/10.35639/daehan.2025.23.2.1

Li, Q., & Hidayat, R. (2025). The mediating role of self-efficacy and belief between TPACK and technology use among teachers. Acta Psychologica, 260, Article 105408. https://doi.org/10.1016/j.actpsy.2025.105408

Organisation for Economic Co-operation and Development. (2023). Education at a glance 2023: OECD indicators. OECD Publishing.

Scherer, R., Siddiq, F., & Tondeur, J. (2019). The technology acceptance model (TAM): A meta-analytic structural equation modeling approach to explaining teachers' adoption of digital technology in education. Computers & Education, 128, 13–35. https://doi.org/10.1016/j.compedu.2018.09.009

Tondeur, J., Howard, S., Van Zanten, M., Gorissen, P., Van der Neut, I., Uerz, D., & Kral, M. (2023). The HeDiCom framework: Higher Education teachers' digital competencies for the future. Educational Technology Research and Development, 71, 33–53. https://doi.org/10.1007/s11423-023-10193-5

Tondeur, J., van Braak, J., Siddiq, F., & Scherer, R. (2020). Time for a new approach to prepare future teachers for educational technology use: Its meaning and measurement. Computers & Education, 145, Article 103638. https://doi.org/10.1016/j.compedu.2019.103638

Tzimas, D., & Demetriadis, S. (2025). K–12 teachers' acceptance and resistance perceptions of learning analytics adoption: A mixed-methods approach. TechTrends, 69, 385–399. https://doi.org/10.1007/s11528-025-01045-5

UNESCO. (2023). Global education monitoring report 2023: Technology in education—A tool on whose terms? https://www.unesco.org/gem-report/en/2023-technology-education

Zeng, Y., Wang, Y., & Li, S. (2022). The relationship between teachers' information technology integration self-efficacy and TPACK: A meta-analysis. Frontiers in Psychology, 13, Article 1091017. https://doi.org/10.3389/fpsyg.2022.1091017