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Attitude Towards Technology Enhance Learning and Assessment on Teaching Learning Process of K-3 Teachers

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ABSTRACT

The successful integration of technology-enhanced learning in early-grade classrooms depends largely on teachers' attitudes toward technology and on the support provided by their schools. This study determined the attitudes of kindergarten to Grade 3 (K–3) teachers toward technology-enhanced learning and their assessment of the teaching-learning process at Holy Cross High School, a private basic education institution in Dumaguete City, Philippines. Using a quantitative descriptive-correlational survey design, the study involved all ten K–3 teachers of the school through total enumeration. An adapted questionnaire measured teachers' attitudes in terms of facilitating learning, facilitating teaching, and institutional support, and their assessment of the teaching-learning process in relation to educators' sex, age, and designation, using a 4-point Likert scale. Data were analyzed using frequency, percentage, mean, and Spearman's rank correlation. The respondents were all female, mostly 24–26 years old, and mostly holders of a bachelor's degree. Teachers strongly agreed that technology facilitates learning (M = 3.76), facilitates teaching (M = 3.66), and is supported by their institution (M = 3.48), although training programs and the abundance of online resources received comparatively lower ratings. Their assessment of the teaching-learning process was Agree in terms of sex (M = 3.04) and designation (M = 3.18) and Strongly Agree in terms of age (M = 3.28). A moderate positive and significant correlation was found between teachers' overall attitude toward technology-enhanced learning and the teaching-learning process ($r_s = 0.652$, $p < .05$). The findings suggest that positive teacher attitudes, supported by continuous professional development and adequate institutional resources, are associated with a more favorable teaching-learning process in K–3 classrooms.

Keywords: *technology-enhanced learning, teacher attitudes, institutional support, teaching-learning process, K–3 teachers, early childhood education*

INTRODUCTION

Education has undergone significant changes due to the continuous advancement of technology. Schools have increasingly integrated technological tools into teaching and learning to create more engaging, interactive, and effective educational experiences, allowing teachers to deliver lessons in innovative ways and giving learners greater access to information and learning resources. International policy frameworks, such as the European Commission's (2020) Digital Education Action Plan, now treat digital education as a central component of quality

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education. At the same time, global reviews caution that technology improves learning only when its use is guided by sound pedagogy and appropriate support (UNESCO, 2023).

Technology-enhanced learning refers to the use of digital tools, online resources, multimedia materials, and educational applications to support and improve the teaching-learning process. For Kindergarten to Grade 3 (K–3) learners, technology plays a vital role in supporting early learning experiences because young children often learn best through interactive activities, visual materials, and engaging learning environments. Evidence from early-grade settings, however, is mixed: technology-delivered and blended instruction has been associated with gains in literacy and mathematics (Dahl-Leonard et al., 2024; Kurvinen et al., 2020; Macaruso et al., 2020), whereas a longitudinal analysis of American K–3 classrooms found that some forms of educational technology use were associated with negative and gap-widening effects on achievement (Ahn, 2022).

The successful integration of technology-enhanced learning therefore depends largely on teachers. Teachers who possess positive attitudes toward technology are more likely to use digital tools effectively and incorporate innovative practices into their instruction, and teachers' knowledge, confidence, beliefs, and school culture jointly determine whether technology is used in meaningful ways (Ertmer & Ottenbreit-Leftwich, 2010). Institutional support, including training, technological resources, internet connectivity, and administrative assistance, further strengthens teachers' confidence and encourages the consistent use of technology in instruction (Venkatesh et al., 2003).

At Holy Cross High School in Dumaguete City, technology-enhanced learning was increasingly used to support classroom instruction among K–3 teachers, yet no study had examined these teachers' attitudes toward technology or how those attitudes relate to the teaching-learning process. This study therefore aimed to determine the socio-demographic profile of the K–3 teachers; to determine their attitudes toward technology-enhanced learning in terms of facilitating learning, facilitating teaching, and institutional support; to describe their assessment of the teaching-learning process in terms of educators' sex, age, and designation; to determine whether teachers' overall attitude significantly relates to the teaching-learning process; and to propose recommendations for improving the implementation of technology-enhanced teaching strategies. The findings are intended to inform teachers, school administrators, educational institutions, and future researchers in promoting effective technology integration in early-grade classrooms.

Literature Review

Technology-Enhanced Learning in the Early Grades

Technology-enhanced learning environments have been associated with greater learner engagement and improved learning when they are designed to promote active participation (Duterte, 2024). Multimedia learning research explains why: learners understand more deeply when words and pictures are combined in ways that respect the limits of working memory and guide attention to essential material (Mayer, 2021). In early-grade classrooms, educational videos, interactive applications, and digital manipulatives can therefore support literacy, numeracy, and participation when they are aligned with learning goals.

Empirical evidence from elementary education supports this potential. A meta-analysis of technology-delivered literacy instruction for elementary students reported positive effects on literacy outcomes (Dahl-Leonard et al., 2024), and a study of blended learning in elementary schools found that a technology-based reading program supported reading gains when combined with teacher-led instruction (Macaruso et al., 2020). In mathematics, weekly digital lessons produced long-term benefits for primary school learners (Kurvinen et al., 2020), and computer technology interventions improved the mathematics achievement of low-performing K–12 students (Ran et al., 2021). A mapping analysis of empirical studies further linked technology use aligned with the ISTE Standards to students' academic progress (Crompton & Burke, 2024).

Other studies, however, urge caution. Using longitudinal data from American K–3 classrooms, Ahn (2022) found that frequent educational technology use was associated with lower achievement for some groups of young

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learners and could widen existing gaps, and UNESCO (2023) concluded that evidence on the added value of technology in education remains uneven and that technology should be adopted on terms that serve learners. Critical perspectives likewise emphasize that the effects of educational technology depend on how it is embedded in social and institutional contexts rather than on the tools themselves (Selwyn, 2021). These mixed findings underscore the central role of teachers in deciding how technology is used in early-grade classrooms.

Teachers' Attitudes and Institutional Support

Teachers' attitudes toward technology significantly affect the extent of technology integration. Ertmer and Ottenbreit-Leftwich (2010) argued that meaningful technology use requires changes in teachers' knowledge, self-efficacy, and pedagogical beliefs as well as a supportive school culture, and that teachers who view technology as valuable for student learning are more likely to use it in ways that support student-centered instruction. Positive attitudes encourage experimentation with innovative teaching approaches and promote effective technology use in the classroom.

Institutional support is another important factor. Adequate technological infrastructure, administrative support, and professional development opportunities enhance teachers' acceptance and use of educational technologies, while the absence of such condition's limits implementation even among willing teachers (UNESCO, 2023). Policy frameworks similarly call for investment in digital infrastructure, connectivity, and teacher digital competence as prerequisites for high-quality digital education (European Commission, 2020). Teachers' socio-demographic characteristics, such as age, sex, years of teaching experience, educational attainment, and professional designation, may also influence their confidence, competence, and readiness to use digital tools in instruction.

Theoretical Framework

This study was anchored on three theories. The Technological Pedagogical Content Knowledge (TPACK) framework holds that effective technology integration requires teachers to combine knowledge of technology, pedagogy, and content rather than treating technology as a separate add-on (Mishra & Koehler, 2006). In K–3 classrooms, teachers with strong TPACK are better able to design developmentally appropriate, technology-enhanced activities that support young learners' understanding.

Constructivist learning theory posits that learners actively construct knowledge through meaningful experience and social interaction, and technology can support constructivist learning by providing interactive, learner-centered environments for exploration and collaboration (Tam, 2000). Technology-enhanced strategies thus give K–3 pupils opportunities for hands-on, exploratory, and collaborative learning. Finally, the Unified Theory of Acceptance and Use of Technology (UTAUT) explain technology acceptance through performance expectancy, effort expectancy, social influence, and facilitating conditions (Venkatesh et al., 2003). In this study, teachers' perceptions that technology facilitates learning and teaching correspond to performance expectancy, while institutional support corresponds to facilitating conditions.

Research Gap and Conceptual Framework

Although research has examined the effects of educational technology on learner achievement and the factors that influence teachers' technology use, few studies have focused on the attitudes of K–3 teachers in Philippine private schools toward technology-enhanced learning and on how these attitudes relate to the teaching-learning process. This study addressed that gap at Holy Cross High School.

Figure 1 presents the conceptual framework of the study. Teachers' attitude toward technology, in terms of facilitating learning, facilitating teaching, and institutional support, and the implementation of technology-enhanced teaching strategies are treated as independent variables, with teachers' socio-demographic profile as a moderating variable. These factors are assumed to influence the teaching-learning process, which serves as a mediating variable leading to the academic performance of K–3 pupils. The present study examined the first

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segment of this framework, namely teachers' profile, their attitude toward technology-enhanced learning, and its relationship with the teaching-learning process.

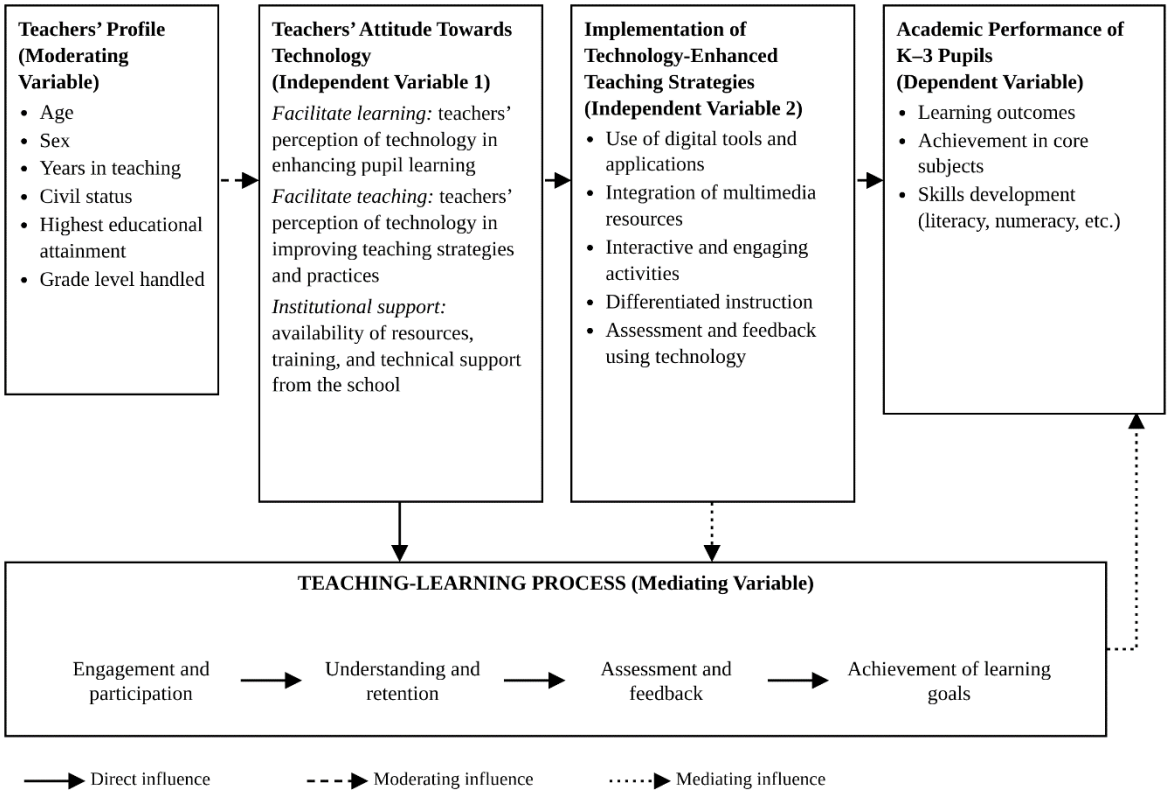


Figure 1. *Conceptual Framework of the Study*

METHODS

Research Design

The study used a quantitative descriptive-correlational research design. Quantitative research focuses on collecting and analyzing numerical data to determine patterns, relationships, and trends among variables. The researchers employed a survey method using a structured questionnaire, with responses measured on a Likert scale, to describe teachers' attitudes toward technology-enhanced learning and their assessment of the teaching-learning process and to determine the relationship between these variables.

Research Locale

The study was conducted at Holy Cross High School, a private educational institution located on Dr. V. Locsin Street, Dumaguete City, Negros Oriental, Philippines. Originally established in 1926 as Dumaguete Chinese School, the institution offers complete basic education from preschool to senior high school. It is guided by core values rooted in Filipino values, Christian idealism, and Chinese cultural influences, which emphasize discipline, character formation, and academic excellence, and it is dedicated to the holistic development of learners.

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Participants and Sampling Technique

The respondents were the K–3 teachers of Holy Cross High School for School Year 2026–2027. Total enumeration was used, so all ten K–3 teachers were included: two Kindergarten teachers, two Grade 1 teachers, three Grade 2 teachers, and three Grade 3 teachers. These teachers were directly involved in implementing technology-enhanced teaching strategies and could provide relevant information about technology integration in the teaching-learning process. Teachers not assigned to kindergarten to Grade 3 were excluded.

Research Instrument

The researchers used an adapted and realigned survey questionnaire aligned with the variables of the study. The first part gathered the respondents' demographic profile. The second part contained 15 items on teachers' attitudes toward technology-enhanced learning, with five items each on facilitating learning, facilitating teaching, and institutional support. The third part contained 15 items on the respondents' assessment of the teaching-learning process in terms of educators' sex, age, and designation, with five items each. All items were rated on a 4-point Likert scale interpreted as 3.26–4.00, Strongly Agree; 2.51–3.25, Agree; 1.76–2.50, Disagree; and 1.00–1.75, Strongly Disagree.

Data Gathering Procedure

The researchers prepared a letter requesting permission to conduct the study, which was reviewed and approved by the research adviser before being submitted to the school administration. Upon approval, the researchers coordinated with the school principal to schedule data gathering. On the scheduled date, the researchers personally administered the questionnaires to the K–3 teachers, explained the purpose of the study, provided clear instructions, and guided the respondents to ensure that all items were properly understood. The completed questionnaires were collected, checked for completeness and accuracy, and then encoded and tallied for statistical treatment.

Data Analysis

Frequency and percentage were used to describe the respondents' demographic profile. The mean was used to determine teachers' attitudes toward technology-enhanced learning and their assessment of the teaching-learning process. Spearman's rank correlation coefficient was used to determine the relationship between teachers' overall attitude toward technology-enhanced learning and the teaching-learning process, at the .05 level of significance. Correlation coefficients were interpreted as negligible (±0.01–0.20), low (±0.21–0.40), moderate (±0.41–0.70), high (±0.71–0.90), or very high (±0.91–0.99).

Ethical Consideration

Permission to conduct the study was secured from the school administration of Holy Cross High School before data collection. The researchers explained the purpose of the study to the respondents, participation was voluntary, and all responses were kept confidential and reported only in aggregate form.

RESULTS AND DISCUSSION

Profile of the Respondents

Table 1 presents the profile of the respondents. Most were 24–26 years old (60%), while the 20–23 and 27–29 age groups each comprised 20%. All ten respondents were female. Most held a bachelor's degree (70%), while 30% had earned units toward a master's degree. Respondents were distributed across kindergarten (20%), Grade 1 (20%), Grade 2 (30%), and Grade 3 (30%).

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Table 1. *Profile of the Respondents (n = 10)*

Profile	Frequency	Percentage
Age		
20–23 years old	2	20
24–26 years old	6	60
27–29 years old	2	20
Sex		
Female	10	100
Male	0	0
Highest educational attainment		
Bachelor's degree	7	70
With units in master's degree	3	30
Grade level handled		
Kindergarten	2	20
Grade 1	2	20
Grade 2	3	30
Grade 3	3	30

The profile indicates that the respondents were young, early-career educators. Teachers in this age group are often more exposed to digital tools and modern instructional strategies, which may make them more adaptable and open to integrating technology in teaching. The absence of male respondents reflects the predominance of female teachers in early childhood and primary education, and it also means that the findings represent female perspectives only. The proportion of teachers pursuing graduate studies suggests a commitment to professional growth, and the spread of respondents across grade levels allows the study to capture teaching experiences at different stages of early learning.

Teachers' Attitudes Toward Technology-Enhanced Learning

Table 2 presents teachers' attitudes toward technology-enhanced learning. Teachers strongly agreed that technology facilitates learning (M = 3.76), facilitates teaching (M = 3.66), and is supported by their institution (M = 3.48).

Table 2. *Teachers' Attitudes Toward Technology-Enhanced Learning*

Indicator	Mean	Interpretation
Facilitate learning		
Accessibility of learning resources	4.00	Strongly Agree
Support for diverse learning needs	4.00	Strongly Agree
Enhancement of student collaboration	3.80	Strongly Agree
Availability of online educational resources	3.20	Agree
Monitoring and tracking of student progress	3.80	Strongly Agree
Overall	3.76	Strongly Agree
Facilitate teaching		
Engaging delivery of lessons	3.80	Strongly Agree
Improved classroom management	3.30	Strongly Agree
Creative teaching methods	3.60	Strongly Agree
Resource sharing and collaboration	3.80	Strongly Agree
Professional development opportunities	3.80	Strongly Agree
Overall	3.66	Strongly Agree
Institutional support		
Technology training programs	3.20	Agree
Investment in technological infrastructure	3.40	Strongly Agree
Allocation of technology resources	3.60	Strongly Agree

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Indicator	Mean	Interpretation
Clear technology policies and guidelines	3.60	Strongly Agree
Encouragement of innovation in technology use	3.60	Strongly Agree
Overall	3.48	Strongly Agree

Note. 3.26–4.00 = Strongly Agree; 2.51–3.25 = Agree; 1.76–2.50 = Disagree; 1.00–1.75 = Strongly Disagree.

In facilitating learning, all teachers strongly agreed that technology makes learning resources more accessible and supports diverse learning needs (M = 4.00 each). They also strongly agreed that technology enhances student collaboration and helps them monitor and track student progress (M = 3.80 each). Appreciation for the extensive online educational resources available for teaching and learning received the lowest rating (M = 3.20, Agree). These results show that teachers view technology as an essential means of promoting accessibility, collaboration, differentiated instruction, and the monitoring of student achievement, consistent with evidence that well-designed technology-enhanced environments support engagement and learning (Duterte, 2024; Mayer, 2021). The lower rating for online resources may reflect the need to select content carefully for young learners, in line with cautions that technology benefits depend on appropriate use (Ahn, 2022; UNESCO, 2023).

In facilitating teaching, teachers strongly agreed that technology enables more engaging lesson delivery, easier sharing of resources and collaboration with co-teachers, and access to professional development opportunities (M = 3.80 each), as well as creative teaching methods (M = 3.60). Improved classroom management received the lowest rating (M = 3.30), although it remained Strongly Agree. These findings indicate that teachers perceive technology as enhancing teaching effectiveness by making instruction more interactive, supporting collaboration, and enabling professional growth, in line with the TPACK view that technology adds value when it is integrated with pedagogy and content (Mishra & Koehler, 2006).

In institutional support, teachers strongly agreed that the school allocates technology resources, provides clear technology policies and guidelines, and encourages innovation in technology use (M = 3.60 each), and that it invests in technological infrastructure (M = 3.40). Technology training programs received the lowest rating (M = 3.20, Agree), suggesting that although training is available, there is room for improvement in professional development related to technology integration. This finding is consistent with UTAUT, in which facilitating conditions shape teachers' acceptance and use of technology (Venkatesh et al., 2003), and with the view that teacher knowledge and confidence must be developed alongside access to tools (Ertmer & Ottenbreit-Leftwich, 2010).

Assessment of the Teaching-Learning Process

Table 3 presents the respondents' assessment of the teaching-learning process in relation to educators' sex, age, and designation. The overall assessment was Agree in terms of sex (M = 3.04) and designation (M = 3.18) and Strongly Agree in terms of age (M = 3.28).

Table 3. *Respondents' Assessment of the Teaching-Learning Process*

Indicator	Mean	Interpretation
In terms of sex		
Patience and willingness to explain concepts (female educators)	3.20	Agree
Structured classroom management (male educators)	2.70	Agree
Collaborative and inclusive teaching methods (female educators)	3.20	Agree
Integration of technology and multimedia (male educators)	3.00	Agree
Use of diverse instructional strategies (female educators)	3.10	Agree
Overall	3.04	Agree
In terms of age		
Younger educators' familiarity with current trends and technologies	3.60	Strongly Agree
Experience and subject expertise of older educators	3.40	Strongly Agree
Approachability of younger educators	2.90	Agree
Practical examples from experienced educators	3.40	Strongly Agree

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Indicator	Mean	Interpretation
Flexibility and openness to feedback (younger educators)	3.10	Agree
Overall	3.28	Strongly Agree
In terms of designation		
Academic standards and expectations (professors)	3.10	Agree
Accessibility and academic support (assistant professors)	3.10	Agree
Collaboration and peer learning support (assistant professors)	3.10	Agree
Academic advising and mentoring (professors)	3.40	Strongly Agree
Research-oriented teaching approach (professors)	3.20	Agree
Overall	3.18	Agree

Note. 3.26–4.00 = Strongly Agree; 2.51–3.25 = Agree; 1.76–2.50 = Disagree; 1.00–1.75 = Strongly Disagree.

In terms of sex, respondents agreed most that female educators are patient and willing to spend extra time explaining difficult concepts and that they use collaborative and inclusive teaching methods (M = 3.20 each), followed by female educators' use of diverse instructional strategies (M = 3.10) and male educators' use of technology and multimedia (M = 3.00). The perception that male educators have a more structured and disciplined approach to classroom management received the lowest rating (M = 2.70). Overall, respondents recognized positive teaching qualities among educators regardless of sex.

In terms of age, respondents strongly agreed that younger educators are more in tune with current trends and technologies (M = 3.60) and that older educators contribute subject expertise and practical examples from long experience (M = 3.40 each). They agreed that younger educators are flexible and open to feedback (M = 3.10) and approachable (M = 2.90). These results suggest that respondents value the complementary contributions of younger and older educators, combining familiarity with technology and innovation with experience and practical knowledge.

In terms of designation, respondents strongly agreed that professors are involved in academic advising and mentoring (M = 3.40) and agreed that professors use a research-oriented approach (M = 3.20). They also agreed that professors maintain high academic standards and that assistant professors are accessible and collaborative (M = 3.10 each). These results indicate that respondents perceived educators in various designations as competent and supportive of the teaching-learning process through mentoring, research integration, and student support.

Relationship Between Teachers' Attitude and the Teaching-Learning Process

Table 4 shows a moderate positive correlation between teachers' overall attitude toward technology-enhanced learning and the teaching-learning process ($r_s = 0.652$). The relationship was significant at the .05 level; thus, the null hypothesis was rejected. Teachers who held more positive attitudes toward technology-enhanced learning also tended to assess the teaching-learning process more favorably.

Table 4. *Relationship Between Teachers' Overall Attitude Toward Technology-Enhanced Learning and the Teaching-Learning Process*

Variables	*r*s	Strength	Decision	Interpretation
Overall attitude of teachers and teaching-learning process	0.652	Moderate	Reject H_0	Significant

Note. Spearman's rank correlation; significant at $\alpha = .05$ ($n = 10$).

This finding is consistent with the view that teachers' beliefs and attitudes are central to how technology is used in classrooms (Ertmer & Ottenbreit-Leftwich, 2010) and with UTAUT, in which perceived usefulness and facilitating conditions shape the acceptance and use of technology (Venkatesh et al., 2003). Teachers who demonstrate enthusiasm, adaptability, and commitment to instructional improvement are more likely to foster an engaging and supportive learning environment. Because the study used a correlational design with a small sample,

however, the result indicates an association rather than a causal effect, and it should be interpreted with caution given the limited statistical power of a ten-respondent sample.

CONCLUSION

The K–3 teachers of Holy Cross High School were young, early-career, all-female educators, most of whom held a bachelor's degree and some of whom were pursuing graduate studies. They held highly positive attitudes toward technology-enhanced learning, strongly agreeing that technology facilitates learning, facilitates teaching, and is supported by their institution, while identifying technology training programs and the use of online resources as areas needing further attention. They also held favorable views of the teaching-learning process, recognizing the complementary strengths of educators across sex, age, and designation.

Teachers' overall attitude toward technology-enhanced learning was moderately and positively related to their assessment of the teaching-learning process. This implies that strengthening teachers' positive attitudes toward technology, together with adequate training and institutional support, can contribute to more effective technology-enhanced instruction and a more favorable teaching-learning process in K–3 classrooms.

Recommendation

Based on the findings and conclusions, schools should provide K–3 teachers with continuous professional development, including regular training, seminars, and workshops on the effective use of educational technologies, to strengthen their skills and confidence in technology integration. School administrators should ensure the availability of reliable internet access, updated digital devices, appropriate educational software, and other resources needed for technology-enhanced learning, and should establish mechanisms for monitoring and evaluating the effectiveness of technology integration.

K–3 teachers are encouraged to use a variety of technology-based instructional strategies, such as multimedia presentations, educational applications, online assessments, and interactive and collaborative digital activities, to address pupils' diverse learning needs and promote participation, critical thinking, and creativity. Schools should foster a supportive environment that encourages teachers to embrace technology as a tool for improving the teaching-learning process, and parents should be encouraged to guide and monitor their children's use of educational technology at home. Future researchers may conduct similar studies with larger samples, more than one school, and additional variables, including pupils' academic performance, to further examine the relationships proposed in the conceptual framework.

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