Technology Integration among Teachers in Basic Education in Relation to Their Teaching Performance and Learners' Engagement

Lovelie B. Centino[1] , Analyn S. Clarin[2]

Misamis University

DOI: https://doi.org/10.47772/IJRISS.2026.1026EDU0287

Received: 09 May 2026; Accepted: 14 May 2026; Published: 09 June 2026

ABSTRACT

In today's digital era, effective teaching depends on the meaningful integration of technology in classroom practices. This study examined the relationship between technology integration, teachers' teaching performance, and learners' engagement in Basic Education in selected private schools in Ozamiz City during the SY 2025-2026. A descriptive-correlational design was employed. Data were collected from 121 teachers through simple random sampling using validated researcher-made questionnaires and analyzed using mean, standard deviation, and Spearman's rho. Findings revealed that teachers demonstrated a very great extent of technology integration across key domains, while teaching performance was excellent and learners' engagement was very high. Frequency of technology use was significantly related to teaching performance across all domains, while access and support systems were significantly related to assessment practices. Technology integration was also significantly related to cognitive engagement but not to behavioral and emotional engagement. Teaching performance and learner engagement are largely shaped by strong pedagogical practices. School principals may strengthen support systems and professional development, while teachers design interactive, learner-centered activities.

Keywords*:* Basic Education, Instructional Practices, Learner Engagement, Technology Integration, Teaching Performance

INTRODUCTION

The rapid advancement of Information and Communication Technologies (ICTs) has transformed the educational landscape by reshaping teaching and learning practices. Modern learners, often described as digital learners, require innovative instructional approaches that integrate technology effectively into the classroom. In this context, teachers play a critical role, as their attitudes, technological competence, and instructional skills largely determine the success of technology integration (Akram et al., 2022). Technology integration (TI) has therefore become a major area of research in educational technology, given its potential to enhance learning processes and influence broader societal change. Beyond teaching learners how to use digital tools, educators are also encouraged to help students understand the wider social implications of technology (Consoli et al., 2023).

Technology integration is defined as a sustainable and transformative change in school systems that supports students' knowledge construction through innovative tools and practices (Tosuntaş et al., 2019). Its growing adoption in education reflects the increasing need to improve learner engagement and teaching performance through interactive and technology-supported instruction (Bhat, 2023). Technology enables teachers to plan, implement, and evaluate learning activities more effectively, while also promoting innovation and productivity within educational institutions (Kusumaningrum et al., 2019; Rofifah et al., 2021). Teaching performance, viewed as a goal-oriented process, involves teachers' ability to adapt to technological advancements and apply effective instructional strategies that improve both classroom participation and learning outcomes (Kadiyono et al., 2020; Zhang et al., 2024).

The integration of technology has also redefined teachers' roles by requiring new competencies and instructional approaches. Studies show that teaching effectiveness in digital environments is strongly linked to teachers' digital competence and preparedness. Reich et al. (2020) found that only 14% of teachers surveyed felt

adequately prepared to address students' needs during the transition to online learning, highlighting a significant gap in digital readiness. Similarly, Budak (2021) emphasized that while many teachers possess basic digital skills, they often struggle to integrate technology meaningfully with pedagogy and content. The Technological Pedagogical Content Knowledge (TPACK) framework has therefore been widely used to guide teachers in designing instruction that effectively combines technology, pedagogy, and subject matter knowledge. Professional development programs grounded in TPACK are considered essential in ensuring that technology use supports deeper learning and improved teaching performance.

Assessment and feedback practices are likewise important indicators of effective teaching in technology-rich environments. O'Doherty et al. (2021) noted that teachers who successfully managed emergency remote teaching (ERT) employed strategies such as embedded rubrics, immediate digital feedback, and personalized learner support to sustain engagement and learning quality. These findings suggest that effective technology integration depends not only on access to digital tools but also on teachers' ability to apply them flexibly and meaningfully within pedagogical practice.

Learner engagement refers to students' emotional, cognitive, and behavioral involvement in the learning process. High levels of engagement are associated with improved academic achievement, knowledge retention, and critical thinking development (Gavín-Chocano et al., 2024). Technology integration supports learner engagement by making learning more interactive, collaborative, and self-directed through the use of multimedia resources, online platforms, and digital learning tools. These technologies enhance student motivation, encourage autonomy, and provide varied opportunities for skill development and knowledge application (Rintaningrum, 2023). According to Dixson (2015), sustained engagement reflects learners' psychological commitment to learning and is central to fostering learner autonomy.

Current research further highlights the role of technology-enhanced learning environments in strengthening engagement. Drawing on Engagement Theory, Eseryel et al. (2020) demonstrated that game-based and mixed reality environments improve learner motivation and engagement by promoting collaboration, interaction, and real-world relevance. Similarly, Kahu and Nelson (2020) emphasized that well-structured blended and hybrid learning environments—supported by clear instruction, timely feedback, and balanced synchronous and asynchronous activities—contribute to stronger behavioral, cognitive, and emotional engagement. These findings suggest that learner engagement depends not simply on the presence of technology but on how technology is intentionally designed to support meaningful participation and connection.

Localized studies also support the positive impact of technology integration on learner engagement. Dela Cruz and Isip (2022), in a study conducted in Philippine state colleges, found that interactive tools such as gamified quizzes and virtual simulations increased student motivation by 75% and improved academic performance by 10%. Students reported that these tools made learning more enjoyable, participatory, and relevant. Despite extensive research on learner engagement, inconsistencies in findings indicate that engagement remains a complex and multidimensional construct. Nevertheless, effective pedagogy supported by purposeful technology integration can help address diverse learner needs and create more dynamic and engaging educational environments (Mohammadi Zenouzagh et al., 2023).

Although numerous studies have examined technology integration, teaching performance, and learner engagement, existing research has largely focused on these variables independently or within specific educational settings. Limited studies have comprehensively explored the relationship between technology integration, teaching performance, and learner engagement in basic education contexts, particularly in local settings. Furthermore, previous studies often emphasize students' outcomes without equally examining how teachers' instructional performance influences learner engagement in technology-supported environments. Variations in findings across studies also suggest the need for further investigation into how technology integration can effectively support both teachers and learners. Hence, there remains a knowledge gap in understanding the combined influence of technology integration on teaching performance and learner engagement within contemporary educational environments.

In response to these gap, this study aims to determine the relationship between technology integration, teaching performance, and learner engagement. Specifically, it seeks to examine how technology integration contributes

to teachers' instructional effectiveness and how it influences students' engagement in the learning process. The study also intends to identify the extent to which technology-supported instructional practices create meaningful, interactive, and engaging learning experiences for students.

The findings of this study may provide valuable insights for teachers, school administrators, curriculum planners, and policymakers in strengthening technology integration practices in education. For teachers, the study may serve as a basis for improving instructional strategies and enhancing digital competencies. School administrators and policymakers may utilize the findings in designing professional development programs and technology-support initiatives that promote effective teaching and learner engagement. Additionally, the study may contribute to the growing body of literature on educational technology by providing empirical evidence on the interconnectedness of technology integration, teaching performance, and learner engagement, particularly within the context of basic education.

THEORETICAL FRAMEWORK

This study is anchored on the following theories: the Technological Pedagogical Content Knowledge (TPACK) framework by Punya Mishra and Matthew J. Koehler (2006), Self-Determination Theory (SDT) by Edward L. Deci and Richard M. Ryan (1985), and Engagement Theory by Greg Kearsley and Ben Shneiderman (1998).

The Technological Pedagogical Content Knowledge (TPACK) framework explains the effective integration of technology in teaching through the interaction of technological knowledge, pedagogical knowledge, and content knowledge. The framework emphasizes that technology should not merely support instruction but should align with teaching strategies and subject content to enhance learning experiences and learner engagement. Recent studies affirm the relevance of TPACK in guiding teachers to meaningfully integrate digital tools, particularly in remote and blended learning environments, while highlighting the importance of professional development in strengthening teachers' technological and pedagogical competencies (Loong et al., 2020; Schmid et al., 2021; Yeh et al., 2021; Yigit et al., 2023). In this study, TPACK serves as a lens for examining how teachers integrate technology to create interactive, relevant, and engaging instruction that improves teaching performance and learner outcomes.

Self-Determination Theory (SDT) by Deci and Ryan (1985) further underpins the study by emphasizing the role of motivation in teaching and learning. SDT posits that autonomy, competence, and relatedness are essential psychological needs that influence intrinsic motivation and engagement. In technology-enhanced learning environments, teachers are more motivated when they feel confident and supported in using digital tools, while students become more engaged when technology promotes independent learning, skill development, and meaningful interaction with peers and teachers.

Recent studies have demonstrated the applicability of SDT in technology-supported and blended learning settings, showing that autonomy-supportive environments significantly enhance engagement, participation, and academic performance (Alamer, 2022; Chen & Jang, 2020; Ryan & Deci, 2020; Zhou et al., 2021). Thus, SDT helps explain how purposeful technology integration can strengthen both teacher performance and learner engagement through increased motivation.

Engagement Theory by Kearsley and Shneiderman (1998) also supports the study by emphasizing that meaningful learning occurs through collaborative, interactive, and authentic activities. The theory's "relate-create-donate" framework highlights the importance of teamwork, creative problem-solving, and real-world application in fostering learner engagement.

Technology provides opportunities for teachers to design collaborative and student-centered learning experiences that encourage participation and deeper understanding. Studies applying Engagement Theory have shown that technology-enhanced, project-based, and collaborative learning environments significantly improve student motivation, engagement, and knowledge retention (Al-Samarraie & Saeed, 2022; Eseryel et al., 2020; Scherer et al., 2021). In this study, Engagement Theory explains how technology integration can support innovative teaching practices and meaningful learner involvement in the educational process.

Conceptual Framework

This explores the interrelationships between technology integration, teachers' teaching performance, and learners' engagement in Basic Education. It serves as a guide for understanding how the effective use of technology impacts teaching and learning processes and contributes to educational outcomes.

Technology integration is defined as the sustainable and transformative adoption of technology within schools' social systems to support knowledge construction (Tosuntaş et al., 2019). It is influenced by teachers' technological knowledge, skills, and attitudes (Akram et al., 2022). It encompasses the use of digital tools such as multimedia, internet platforms, and cooperative learning technologies to create engaging learning environments (Rintaningrum, 2023). Technology integration enhances teachers' ability to design interactive and meaningful learning experiences, improving their performance through innovative methodologies and resources that align with professional standards (Kadiyono et al., 2020). Furthermore, supportive organizational cultures amplify the positive impact of technology on teacher productivity and effectiveness (Rofifah et al., 2021).

Type of Technology Used. The choice of technology in classrooms, from laptops and projectors to YouTube videos and Learning Management Systems (LMS), greatly influences teaching methods and student learning experiences. A 2025 overview of U.S. classrooms found widespread use of YouTube for math in kindergarten, Chromebooks in middle school, and Google Docs in high school, signaling a shift toward personalized learning tools (Randazzo et al., 2025). Research on LMS adoption during the pandemic underscores its effectiveness in organizing course materials and enhancing teacher–student interaction, although its success relies heavily on teacher support and training. Thus, selecting the right technologies aligned with pedagogical goals, such as multimedia for demonstrations, LMS for course management, or collaborative platforms, is crucial for meaningful integration and improved learning outcomes.

Frequency of Use. The impact of technology on instruction is directly related to how often it is used. Surveys from the post-pandemic era indicated that 50% of teachers reported that students completed over half their classwork on digital devices, up from around 20% before COVID-19, while screen time averages between 98 minutes and 2¼ hours daily, depending on grade level (Randazzo et al., 2025). According to a 2023 U.S. survey, 60% of students experienced slow or unreliable internet during class, hindering frequent technology use (Miller, 2024). These findings suggest that regular, consistent usage of digital tools depends not just on teacher attitudes and competence but also on reliable infrastructure; when devices and connections are dependable, technology becomes a regular part of everyday teaching and learning.

Teacher Training and Competence. Teacher competence in technology integration is closely linked to training. A 2024 multi-country study of ICT readiness found that while some teachers had basic digital literacy, many lacked competences in applying it pedagogically, highlighting the need for structured, sustained professional development. Parallel studies emphasize that training rooted in the TPACK framework, integrating technology, pedagogy, and content, is essential for teachers to design meaningful lessons that go beyond superficial tool use. Simply providing one-off workshops is insufficient; ongoing, context-specific programs help build confidence, instructional creativity, and ultimately more effective teaching performance.

Access to Technology. Equitable access to devices, the internet, and software remains a foundational issue. A 2024 U.S. national survey reported that 28% of school-aged children lacked internet access at home or at school, and another 23% accessed it only at home, exposing deep access disparities (Gangmei & Thomas, 2025). A global review of 29 countries found clear links between digital divides and socioeconomic status, migration background, and rural vs. urban location (Herman et al., 2022). Without consistent access, especially high-quality connectivity and hardware, even well-trained teachers cannot fully integrate technology into instruction, underscoring the need for infrastructure investment as a priority for educational equity.

Support System. Finally, technical and institutional support are vital for sustainable technology integration. A 2022 study of K–12 schools found that while device access improved, significant barriers persisted: teachers lacked sufficient internet bandwidth, support materials, and time for curriculum redesign. Brookings research further shows that community and parental involvement amplify school-based efforts by extending tech benefits

into students' homes. Consistent technical assistance, peer collaboration, leadership backing, and supportive policies are essential to build teacher confidence and embed technology use in everyday practice.

Teachers' **teaching performance** refers to their achievements in planning, implementing, and evaluating effective learning activities (Kusumaningrum et al., 2019). Key constructs of teaching performance include instructional delivery, adaptability to technological tools, classroom management with technology, assessment strategies, and professional development. Effective teaching strategies, supported by technology, motivate students and enhance their class participation (Zhang et al., 2024). Teachers' ability to adapt to students' needs and integrate relevant tools sustains learners' cognitive and emotional involvement (Mohammadi Zenouzagh et al., 2023).

Instructional Delivery. Teachers' instructional delivery in technology-enhanced classrooms demands both digital resilience and pedagogical adaptability. A 2024 study of 100 Filipino public school teachers found high levels of digital proficiency and resilience, which positively correlated with effective instructional practices, including clear communication, online pedagogy, and lesson pacing, despite challenges with internet connectivity (Ogodo et al., 2021). Likewise, experts caution that technology should augment, not replace, proven instructional strategies such as modeling and formative assessment, emphasizing that digital delivery must be grounded in sound pedagogy (Schmoker et al., 2020). These findings highlight that quality instructional delivery in digital settings hinges on teachers' ability to blend technological tools with foundational teaching methods.

Adaptability to Technological Tools. Teachers' adaptability to new technological tools is a key indicator of teaching effectiveness. As illustrated by a 2024 Australian case study, educators who embraced emerging technologies even amid trial and error reported increased instructional innovation and responsiveness to diverse learner needs. This willingness to experiment, coupled with reflective teaching practices, enables teachers to tailor tools to specific curricular goals. Research shows that through deliberate experimentation and iterative refinement, teachers develop the dexterity needed to integrate technology in pedagogically meaningful ways, fostering stronger classroom dynamics and engagement.

Classroom Management with Technology. Effective classroom management in tech-rich environments requires structure, trust, and strategic oversight. A qualitative study of online classrooms featuring 97 teachers revealed that common digital challenges, such as low interaction and technical issues, could be mitigated through ongoing professional development and robust infrastructure, which support synchronous learning and student engagement (Adsız & Dinçer, 2025). Research in Thailand's smart-learning classrooms underscored how purposeful digital activity planning, clear communication, and adaptive teacher responses sustained classroom order and active participation (Nguyen et al., 2022). These studies underscore that teachers who skillfully manage digital tools and interactions can foster environments conducive to learning even remotely.

Assessment Strategies. Assessment strategies in digitally mediated instruction demand creativity and rigor. Canadian STEM teachers during the COVID-era remote teaching reported challenges with online assessments; while 86% felt technologically competent, 76% deemed their methods ineffective and inauthentic, citing a lack of formative, real-time feedback. Experts advocate integrating both formative and authentic assessment tools, such as rubrics, peer feedback, and classroom assessment techniques, to ensure assessments inform teaching and support student learning effectively. Thus, purposeful use of digital platforms must be complemented by pedagogically sound assessment practices to enhance instructional quality.

Learners' engagement involves students' emotional, cognitive, and behavioral commitment to their learning process (Gavín-Chocano et al., 2024). It is supported by various constructs, including cognitive, behavioral, emotional, collaborative, and self-regulatory engagement. High levels of engagement are associated with improved academic performance, long-term knowledge retention, and critical thinking skills (Dixson, 2015). Technology plays a crucial role in fostering this engagement by providing tools that promote motivation, attention, and autonomy in learning (Rintaningrum, 2023). Digital tools create interactive environments that make learning more engaging and participatory, fostering autonomy and experimentation and enabling students to take a more active role in their education (Rintaningrum, 2023).

Cognitive Engagement. Cognitive engagement refers to learners' psychological investment in tasks, involving deep thinking, critical analysis, and the strategic use of metacognitive skills. In cloud-supported collaborative learning, higher levels of cognitive engagement, as measured by active knowledge-seeking, summarizing, and critical discussion, consistently lead to better knowledge construction outcomes (Baanqud et al., 2020). Moreover, a MOOC study using automated analysis found that deep cognitive processing, such as reasoning and reflective content in forum discussions, was strongly correlated with higher learning achievement. These findings underscore the importance of cognitive engagement for meaningful learning and academic success in technology-enhanced environments.

Emotional Engagement. Emotional engagement involves learners' affective responses to instruction, such as interest, enjoyment, and a sense of belonging. Automated sentiment analysis of MOOC discussions revealed that positive emotions, such as enthusiasm, directly supported motivation and problem-solving engagement. A study on online secondary education also emphasized the importance of teacher presence: the lack of interaction led to student distraction. At the same time, instructors who encouraged participation fostered emotional investment and reduced feelings of disconnection (Li et al., 2021). Emotional engagement thus plays a vital role in sustaining learner motivation and participation in digital environments.

Behavioral Engagement. Behavioral engagement captures observable participation in learning activities, including time-on-task, contribution frequency, and compliance with course requirements. For instance, in online courses, students who produced more discussion posts, read peer contributions, and completed quizzes demonstrated higher behavioral involvement, which translated into improved achievement. In programming education, behavioral engagement, as reflected in assignment completion and active participation, was directly associated with improvements in both emotional involvement and higher-order cognitive skills (Li et al., 2023). These studies highlight that engaging students through structured, consistent digital activity is fundamental to effective learning.

Presented below is the schematic diagram of the study.

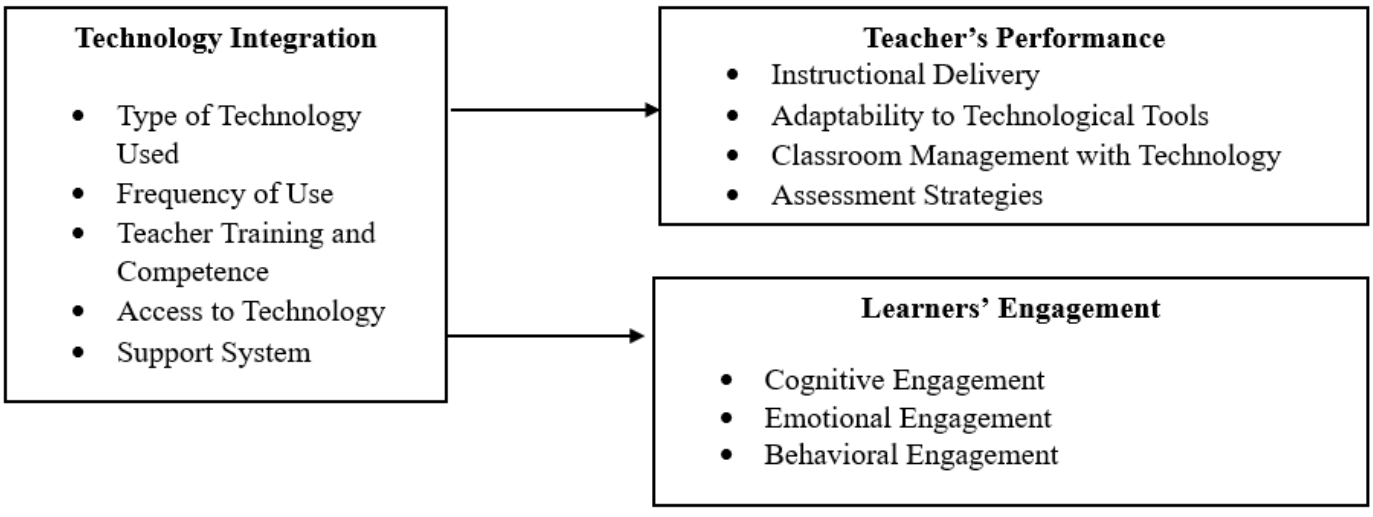

Figure 1. Schematic Diagram of the Study

Statement of the Problem

This study explored teachers' technology integration, teaching performance, and learners' engagement in Basic Education during the SY 2025-2026. Specifically, it sought to answer the following objectives:

1. What is the extent of technology integration by teachers in terms of Type of Technology Used, Frequency of Use, Teacher Training and Competence, Access to Technology, and Support System?

2. What is the teaching performance of teachers in terms of instructional delivery, adaptability to technological tools, classroom management with technology, and assessment strategies?
3. What is the level of learners' engagement in class in terms of cognitive, emotional, and behavioral aspects?
4. Is there significant relationship between the extent of technology integration and teachers' teaching performance?
5. Is there significant relationship between technology integration and learners' engagement?

Null Hypothesis

1. There is no significant relationship between the extent of technology integration and teachers' teaching performance.
2. There is no significant relationship between technology integration and learners' engagement.

RESEARCH METHODOLOGY

Design

This study utilized descriptive-correlational design. An approach that seeks to describe variables and determine their relationships without manipulating the factors involved. It provided a detailed account of the status of the variables under study and examined whether they were related and, if so, to what extent (Creswell & Creswell, 2018). This design was considered appropriate for the study to determine technology integration, teachers' teaching performance, and learners' engagement.

Setting

This study was conducted in a selected Private Schools in Ozamiz City during the Academic Year 2025–2026. The Basic Education Department of the institution comprised preschool, elementary, junior high, and senior high school levels and was dedicated to developing learners' foundational knowledge, skills, values, learning habits, and technology use. The department integrated age-appropriate instructional strategies, learner-centered pedagogies, and emerging educational technologies to support academic growth and holistic development.

Respondents

The respondents in the study were 121 teachers from the Basic Education Department during the School Year 2025–2026, selected through simple random sampling. These respondents represented different grade levels, including Preschool, Elementary, Junior High School, and Senior High School (Grades 11–12), thereby providing diverse instructional perspectives relevant to the study's objectives.

Inclusion criteria for participation were follows: (1) teachers must be officially employed in the Basic Education Department during the School Year 2025–2026; (2) teachers were handling at least one class during the conduct of the study; (3) teachers utilized or had exposure to instructional technologies such as digital learning platforms, multimedia resources, or online assessment tools in their teaching practices; and (4) teachers must voluntarily consented to participate in the study.

Instruments

Data for this study were gathered using three different sets of questionnaires:

Technology Integration Questionnaire. The researcher created this survey. It included five constructs: Type of Technology Used, Frequency of Use, Teacher Training and Competence, Access to Technology, and Support System. The respondents who were not included in the study completed a pilot version of this questionnaire. The instrument underwent pilot testing, with Cronbach's alpha coefficient (0.9060) 0.9060 to assess its reliability and validity.

In assessing the extent of technology integration, the following scale was used:

Scale	Continuum	Interpretation
5 – Always	4.20 – 5.00	Very Great Extent (VGE)
4 – Often	3.40 – 4.19	Great Extent (GE)
3 –Sometimes	2.60 – 3.39	Moderate (M)
2 –Rarely	1.80 – 2.59	Less Extent (LE)
1 –Never	1.0 – 1.79	Least Extent (LE)

Teachers' Teaching Performance Questionnaire*:* This was a researcher-developed questionnaire with four constructs and 20 indicators. It used a five–point Likert scale to measure teachers' teaching performance. The instrument underwent validation and reliability testing before being administered to the respondents, with a Cronbach's alpha coefficient of 0.8508. The data instrument demonstrated strong internal consistency and reliability.

In evaluating the teachers' teaching performance, the following scale was used:

Scale	Continuum	Interpretation
5 – Always	4.20 – 5.00	Excellent (E)
4 – Often	3.40 – 4.19	Very Satisfactory (VS)
3 –Sometimes	2.60 – 3.39	Satisfactory (S)
2 –Rarely	1.80 – 2.59	Fair (F)
1 –Never	1.0 – 1.79	Poor (P)

Learners' Engagement Questionnaire*:* This was a researcher-developed questionnaire with three constructs and 15 indicators. A five–point Likert scale was used to measure learners' engagement in classes. The instrument underwent validation and reliability testing before being administered to the respondents, with a Cronbach's alpha coefficient of 0.9230. The data instrument demonstrated strong internal consistency and reliability.

In evaluating the learners' engagement, the following scale was used:

Scale	Continuum	Interpretation
5 – Always	4.20 – 5.00	Very High (VH)
4 – Often	3.40 – 4.19	High (H)
3 –Sometimes	2.60 – 3.39	Moderate (M)
2 –Rarely	1.80 – 2.59	Low (L)
1 –Never	1.0 – 1.79	Very Low (VL)

Data Gathering Procedure

Before collecting data, permission was first sought from the Dean of the Graduate School at Misamis University, Ozamiz City, to conduct the study. Permission was also requested from the principal of the Basic Education Department, where the research took place. The researcher prepared an institutional informed consent form for the respondents and explained the study's importance. Data collection was conducted via Google Forms. The researcher personally administered and managed the survey questionnaires to ensure respondents' full cooperation and facilitate data collection. The gathered data were then tallied, analyzed, and interpreted.

Ethical Consideration

The researcher ensured that respondents participated voluntarily to uphold the study's ethical standards. They were assured that no harm would be inflicted upon them. The respondents' dignity was treated with the utmost respect. The respondents were allowed to withdraw at any time without penalty or consequence. Steps were

taken to protect respondents' privacy, ensure each respondent's anonymity, and maintain a high level of confidentiality for the research data.

Regarding the study's purposes and goals, the researcher refrained from lying or exaggeration. The authors disclosed all relevant affiliations, funding sources, and any conflicts of interest. False information and incorrect interpretations of primary data findings were avoided in all communications regarding the research, which were conducted with honesty and transparency. As confirmation of their willingness to participate, respondents must sign informed consent forms.

Data Analysis

Mean and Standard Deviation were used to determine the extent of technology integration on teachers' teaching performance and learners' engagement.

Spearman's rho was used to explore significant relationships between the extent of technology integration and teachers' teaching performance, and between technology integration and learners' engagement.

RESULTS AND DISCUSSION

Extent of Technology Integration among Teachers

Table 1 presents the extent of technology integration among teachers. The results show that the overall extent of technology integration is very great (M = 4.45, SD = 0.64). This indicates that teachers extensively utilize technology in their instructional practices and classroom activities. The finding suggests that digital tools have become an integral part of teaching, supporting lesson delivery, communication, and assessment. It also implies that teachers are responsive to the increasing demands of technology-enhanced education. The high overall result reflects teachers' readiness to integrate technology into their daily instructional routines.

The extensive integration of technology indicates that teachers not only use it frequently but also apply it across different aspects of teaching. This reflects a shift toward more modern, flexible, and learner-centered instructional approaches. The integration of technology enhances teaching efficiency, improves access to learning resources, and supports diverse instructional strategies. It also suggests that teachers are adapting to an evolving educational landscape in which digital competence is essential. Thus, technology integration is already embedded in instructional practices.

This finding is supported by studies indicating that effective technology integration enhances instructional delivery and learner engagement when aligned with pedagogical goals (Bhat, 2023; Akram et al., 2022). Research further emphasizes that digital tools foster interactive, learner-centered environments, thereby improving both teaching practices and learning outcomes (Kadiyono et al., 2020). Teachers who integrate technology meaningfully are better able to respond to diverse learner needs. Thus, the very great extent reflects both competence and adaptation to modern educational demands.

Among the constructs, the type of technology used obtained the highest mean (M = 4.60, SD = 0.96), indicating that teachers utilize a wide range of digital tools and platforms in teaching. This suggests that teachers are exposed to and capable of using a range of technologies, including multimedia, online resources, and digital applications. The high result reflects the diversity of technological tool use in instruction. It also implies that teachers can select appropriate technologies to support learning objectives. This contributes to more engaging and interactive classroom experiences.

The use of varied technological tools allows teachers to present content in multiple formats, catering to different learning styles and needs. It enhances learners' engagement by providing visual, auditory, and interactive learning experiences. Diverse technologies also support creativity and innovation in teaching practices. However, effective use depends on how well these tools are aligned with instructional goals. Therefore, technological variety must be accompanied by purposeful application.

Recent researches indicate that diverse technological tools enhance student engagement and accommodate different learning styles (Zhang et al., 2024). Multimedia and interactive platforms provide varied learning experiences that improve comprehension and participation (Perifanou et al., 2022). The use of multiple technologies also encourages creativity and innovation in teaching. Therefore, diversity in technology use contributes to more effective and engaging instruction.

Frequency of use was also rated as very great (M = 4.53, SD = 0.51), indicating that teachers consistently use technology in their daily instruction. This suggests that technology is regularly incorporated into lesson planning, delivery, and assessment. Frequent use helps teachers become more familiar and efficient with digital tools. It also contributes to improved instructional practices and classroom management. This reflects the normalization of technology in teaching.

Regular use of technology supports the development of engaging and interactive learning environments. It allows teachers to implement varied instructional strategies that enhance student participation. Frequent exposure to technology also helps learners become more comfortable and proficient in using digital tools. However, consistent use must be aligned with pedagogical goals to ensure meaningful learning. Therefore, frequency of use should be accompanied by effective instructional design.

Research indicated that frequent use of technology enhances instructional practices and student engagement (Rintaningrum, 2023; Hlazunova et al., 2024). Regular exposure allows teachers to refine their skills and integrate innovative teaching strategies. It also aligns with Connectivism, which emphasizes learning through continuous interaction with digital tools. Therefore, consistent use strengthens both teaching effectiveness and learning experiences.

Teacher training and competence also showed a very great extent (M = 4.57, SD = 0.46), indicating that teachers possess strong knowledge and skills in using technology. This suggests that teachers are confident and capable of integrating digital tools into their instruction. The high rating reflects effective training and professional development initiatives. It also implies that teachers are equipped to respond to technological demands in education. This contributes to improved teaching practices and instructional delivery.

Teacher competence plays a crucial role in successful technology integration, as it determines how effectively tools are used in teaching. Continuous training enhances teachers' ability to design interactive and meaningful learning experiences. It also supports the development of innovative teaching strategies and adaptability to new technologies. Competent teachers are more likely to integrate technology in ways that enhance learning outcomes. Thus, teacher training remains a key factor in sustaining effective integration.

Teacher competence is a key factor in successful technology integration (Reich et al., 2020; Budak, 2021). Professional development strengthens teachers' ability to align technology with pedagogy and content. The TPACK framework further explains that effective integration occurs when these domains are combined. Thus, strong training and competence enable teachers to maximize the use of digital tools in teaching.

Access to technology was rated as very great (M = 4.45, SD = 0.52), indicating that teachers generally have sufficient access to digital tools and resources. This suggests that schools provide the necessary infrastructure to support technology integration. Adequate access enables teachers to implement diverse teaching strategies and utilize multimedia resources. It also supports the delivery of flexible and interactive learning experiences. This reflects the availability of technological resources in the educational setting. Access to technology is essential for effective integration, as it provides the tools needed for instruction. When teachers have reliable access, they can explore innovative teaching methods and adapt to learners' needs. It also enables efficient communication and assessment. However, access alone does not guarantee effective use without proper training and support. Thus, access must be complemented by competence and institutional support.

Studies showed that access to digital tools enhances instructional flexibility and supports diverse teaching strategies (Zhang et al., 2024). Access enables teachers to utilize multimedia resources and digital platforms effectively. It also supports differentiated instruction and improved learner engagement. However, research highlights that access must be combined with competence for maximum effectiveness (Akram et al., 2022).

The support system was rated as great (M = 4.11, SD = 0.75), the lowest among the constructs. This indicates that while support is present, it is weaker than other aspects of technology integration. Teachers may experience limitations in terms of technical assistance, training opportunities, or administrative support. These challenges may affect the consistency and effectiveness of technology use. This suggests a need to strengthen institutional support mechanisms.

Support systems play a vital role in sustaining technology integration by providing guidance, resources, and assistance. Strong support systems enhance teachers' confidence and ability to use technology effectively. They also ensure that technical issues are addressed promptly, minimizing disruptions in instruction. Improving support systems can lead to more consistent and effective use of technology. Therefore, strengthening institutional support is essential for sustaining integration efforts. Institutional support plays a crucial role in sustaining technology integration (Rofifah et al., 2021). Support systems such as training, leadership, and technical assistance enhance teachers' ability to use technology effectively. Without adequate support, teachers may face challenges in implementation. Strengthening support systems leads to more consistent and effective integration practices.

The findings imply that teachers demonstrate a very great extent of technology integration across all constructs. This reflects their strong capability to utilize digital tools and adapt to modern educational demands. Technology integration supports more interactive, efficient, and learner-centered teaching practices. However, the relatively lower rating for support systems highlights an area for improvement. Strengthening this aspect may further enhance the quality and sustainability of technology integration in education.

Table 1 Extent of Technology Integration

Constructs	M	SD	Remarks
Type of technology Used	4.60	0.96	Very Great Extent
Frequency of Use	4.53	0.51	Very Great Extent
Teacher Training and Competence	4.57	0.46	Very Great Extent
Access to Technology	4.45	0.52	Very Great Extent
Support System	4.11	0.75	Great Extent
Overall Extent of Integration	4.45	0.64	Very Great Extent

Note: 4.20-5.00 (Very Great Extent); 3.40-4.19 (Great Extent); 2.60-3.39 (Moderate); 1.30-2.59 (Less Extent); 1.00-1.29 (Least Extent)

Teaching Performance of Teachers

Table 2 shows the excellent level of teaching performance among teachers (M = 4.66, SD = 0.43). This finding implies that teachers demonstrate a high level of competence in delivering instruction, managing classrooms, adapting to technological tools, and implementing assessment strategies. It indicates that teachers are effective in facilitating learning and meeting instructional objectives in the classroom. The high level of performance reflects teachers' strong commitment to quality teaching and their ability to integrate appropriate strategies to support student learning. This also suggests that teachers are well-prepared to address the demands of contemporary education.

Teaching performance refers to the effectiveness of teachers in delivering instruction, managing classroom activities, adapting to instructional tools, and assessing student learning. It plays a crucial role in achieving positive learning outcomes and ensuring meaningful educational experiences for students. The overall result suggests that teachers are consistently demonstrating excellence across all domains of teaching performance. This reflects their professional competence, adaptability, and ability to create structured and engaging learning environments. High teaching performance is often associated with effective instructional practices and strong pedagogical knowledge. Instructional delivery was rated excellent (M = 4.77, SD = 0.33). This indicates that teachers are highly effective in presenting lessons, explaining concepts clearly, and facilitating learning activities. Teachers can organize content systematically and deliver instruction that promotes understanding and

engagement. This suggests that they are proficient in using appropriate teaching strategies to meet learners' needs. The high rating also reflects teachers' ability to maintain clarity and coherence in lesson delivery.

Instructional delivery is a key component of teaching performance, as it directly influences students' understanding and learning outcomes. Effective instructional delivery involves clear communication, structured presentation of content, and the use of appropriate teaching strategies. Teachers who deliver instruction effectively can engage learners and facilitate meaningful learning experiences. The integration of technology can further enhance instructional delivery by making lessons more interactive and accessible. Thus, strong instructional practices contribute significantly to overall teaching effectiveness.

Classroom Management with Technology was rated as excellent (M = 4.69, SD = 0.44). This indicates that teachers are effective in managing classroom activities while integrating technology into their instruction. Teachers can maintain order, facilitate participation, and ensure technology is used appropriately during lessons. This suggests that they can balance the use of digital tools with effective classroom control. The result reflects teachers' ability to create a structured and productive learning environment.

Classroom management with technology involves organizing learning activities, maintaining discipline, and ensuring that digital tools support rather than disrupt instruction. Effective classroom management ensures that students remain focused and engaged during lessons. Teachers who are skilled in this area can maximize the benefits of technology while minimizing potential distractions. The use of clear rules, structured activities, and appropriate monitoring strategies supports effective classroom management. As a result, students can actively participate in a well-managed learning environment.

Adaptability to Technological Tools was rated as excellent (M = 4.61, SD = 0.42). This indicates that teachers are highly capable of adjusting to new technologies and integrating them into their instructional practices. Teachers can effectively use a range of digital tools and platforms to support teaching and learning. This suggests that they are flexible and responsive to technological changes in education. The high rating reflects teachers' readiness to embrace innovation in their teaching practices.

Adaptability to technological tools is essential in modern education, where new digital platforms and resources are continuously introduced. Adaptable teachers can effectively integrate these tools and enhance their instructional practices. This adaptability supports the development of innovative teaching strategies and promotes more engaging learning experiences. It also enables teachers to respond to diverse learner needs and changing educational contexts. Therefore, adaptability is a critical factor in sustaining effective technology integration.

Assessment Strategies was rated as excellent (M = 4.57, SD = 0.52). This indicates that teachers are effective in assessing student learning and providing feedback. Teachers can use various assessment methods to evaluate students' understanding and progress. This suggests that they can design and implement appropriate assessment strategies that support learning. The result reflects teachers' ability to monitor student performance effectively.

Assessment strategies play a vital role in the teaching-learning process, as they provide information about students' progress and guide instructional decisions. Effective assessment involves using diverse methods, including formative and summative approaches, to evaluate learning outcomes. Technology can enhance assessment practices by enabling timely feedback and efficient monitoring of student performance. Teachers who utilize effective assessment strategies are better able to support student learning and improvement. Thus, strong assessment practices contribute to overall teaching effectiveness.

Teaching performance has been widely recognized as a critical factor in improving student learning outcomes and engagement. Studies have shown that effective instructional delivery, classroom management, adaptability, and assessment practices contribute to higher levels of student achievement and participation (Perifanou et al., 2022; Hlazunova et al., 2024). Moreover, integrating technology enhances teaching performance by enabling more interactive, learner-centered approaches. Teachers who perform at high levels are better able to create meaningful and engaging learning experiences for students. These findings support the present results and highlight the importance of strong teaching performance in modern education.

These imply that maintaining excellent teaching performance requires continuous professional development, access to technological resources, and supportive institutional environments. School administrators may provide ongoing training and support to help teachers sustain and further enhance their instructional practices. Encouraging collaboration among teachers can also promote the sharing of effective strategies and best practices. Integrating technology meaningfully into teaching can further improve instructional delivery and student engagement. Strengthening these areas may lead to sustained excellence in teaching performance and improved learning outcomes.

Table 2 Teaching Performance of Teachers

Constructs	M	SD	Remarks
Instructional Delivery	4.77	0.33	Excellent
Adaptability to Technological Tools	4.61	0.42	Excellent
Classroom Management with Technology	4.69	0.44	Excellent
Assessment Strategies	4.57	0.52	Excellent
Overall Performance	4.66	0.43	Excellent

Note: 4.20-5.00 (Excellent); 3.40-4.19 (Very Satisfactory); 2.60-3.39 (Satisfactory); 1.30-2.59 (Fair); 1.00-1.29 (Poor)

Level of Learners' Engagement in Class

Table 3 shows the very high level of learners' engagement in class (M = 4.67, SD = 0.42). This finding implies that learners are actively involved in classroom activities and demonstrate strong participation in the learning process. It indicates that students are attentive, motivated, and responsive during instruction. The high level of engagement reflects learners' interest in classroom tasks and their willingness to participate in learning activities. This also suggests that classroom practices are effective in promoting active student involvement.

Learner engagement refers to the level of students' cognitive, behavioral, and emotional involvement in learning activities. It plays a critical role in improving academic performance, motivation, and knowledge retention. The overall result suggests that learners are highly engaged across multiple dimensions of learning. This reflects the presence of interactive and meaningful instructional practices that encourage participation. High engagement levels indicate that students are not only present in class but are also actively contributing to the learning process.

Emotional engagement was rated very high (M = 4.70, SD = 0.38). This indicates that learners demonstrate strong interest, enjoyment, and positive attitudes toward classroom activities. Students are likely motivated and emotionally connected to the learning process. This suggests that they find learning experiences meaningful and enjoyable. The high rating reflects a supportive and engaging classroom environment.

Emotional engagement is an important aspect of learning, as it influences students' motivation and willingness to participate. When students feel interested and emotionally connected, they are more likely to engage deeply in learning tasks. Positive emotional experiences in the classroom contribute to increased participation and sustained attention. Teachers play a key role in fostering such engagement through interactive and supportive teaching strategies. As a result, emotional engagement enhances the overall learning experience.

Cognitive engagement was rated as very high (M = 4.68, SD = 0.43). This indicates that learners are actively involved in thinking processes such as understanding concepts, solving problems, and applying knowledge. Students demonstrate effort and persistence in completing learning tasks. This suggests that they are intellectually invested in their learning activities. The result reflects learners' ability to engage in higher-order thinking.

Cognitive engagement involves students' mental effort and willingness to invest in learning tasks. It includes activities such as critical thinking, problem-solving, and a deep understanding of content. High cognitive engagement indicates that students are not only participating but are also processing information meaningfully.

Instructional strategies that promote inquiry, discussion, and application of knowledge support this type of engagement. Therefore, cognitive engagement contributes to improved learning outcomes.

Behavioral engagement was rated as very high (M = 4.62, SD = 0.44). This indicates that learners actively participate in classroom activities and demonstrate positive learning behaviors. Students are attentive, follow instructions, and engage in assigned tasks. This suggests that they are actively involved in the learning process. The high rating reflects learners' consistent participation in classroom activities.

Behavioral engagement refers to students' observable actions in the classroom, such as participation, attention, and involvement in tasks. It is a key indicator of active learning and classroom interaction. When students demonstrate strong behavioral engagement, they are more likely to complete tasks and achieve learning objectives. Teachers can enhance behavioral engagement through structured activities and clear expectations. As a result, students become more involved and responsive during lessons.

Learner engagement has been widely recognized as a key factor in improving academic performance and learning outcomes. Studies have shown that cognitive, emotional, and behavioral engagement contribute to deeper understanding, increased motivation, and active participation in learning (Perifanou et al., 2022; Hlazunova et al., 2024). The integration of technology further enhances engagement by creating interactive and learner-centered environments. Digital tools such as multimedia resources and interactive platforms support students' active involvement in learning activities. These findings support the present results and highlight the importance of maintaining high levels of educational engagement.

The findings imply that sustaining a very high level of learner engagement requires continuous use of interactive teaching strategies and supportive learning environments. Teachers may continue to implement learner-centered approaches that promote active participation and meaningful learning. School administrators may provide resources and support systems that enhance engagement, such as access to digital tools and training opportunities. Encouraging collaborative and interactive learning activities can further strengthen students' involvement. These efforts may contribute to improved academic performance and overall learning experiences.

Table 3 Level of Learners' Engagement in Class

Constructs	M	SD	Remarks
Cognitive Engagement	4.68	0.43	Very High
Behavioral Engagement	4.62	0.44	Very High
Emotional Engagement	4.70	0.38	Very High
Overall Level of Engagement	4.67	0.42	Very High

Note: 4.20-5.00 (Very High; 3.40-4.19 (High); 2.60-3.39 (Moderate); 1.30-2.59 (Low); 1.00-1.29 (Very Low)
Significant Relationship Between Technology Integration and Teaching Performance

Table 4 presents the results of the Spearman's rho correlation analysis examining the relationship between the extent of technology integration and teachers' teaching performance. Technology integration was examined across five dimensions, namely technology used, frequency of use, teacher training and competence, access to technology, and support system, while teaching performance was measured in terms of instructional delivery, adaptability to technological tools, classroom management with technology, and assessment strategies.

The results reveal that frequency of use showed a significant relationship with all domains of teaching performance, including instructional delivery (r_s = 0.202, p = 0.027), adaptability (r_s = 0.182, p = 0.047), classroom management (r_s = 0.192, p = 0.035), and assessment strategies (r_s = 0.218, p = 0.017). This indicates that the more frequently teachers use technology, the higher their level of teaching performance. Frequent engagement with digital tools allows teachers to develop familiarity, confidence, and efficiency in integrating technology into their instructional practices. It also supports improved classroom management and enhances assessment processes. This suggests that consistency in technology use is a key factor in improving teaching effectiveness.

Studies indicate that frequent and sustained use of technology enhances instructional delivery and classroom practices (Perifanou et al., 2022; Hlazunova et al., 2024). It also aligns with Connectivism Theory, which explains that learning and professional development occur through continuous interaction with digital tools and networks. Moreover, Self-Determination Theory (Deci & Ryan, 1985) suggests that repeated engagement strengthens competence, thereby improving performance. These perspectives emphasize that frequent and meaningful use of technology contributes to effective teaching practices.

The results further show that access to technology was significantly related to assessment strategies ($r_s = 0.199$, $p = 0.029$). This indicates that when teachers have access to digital tools and resources, they are better able to implement effective assessment practices. Technology enables teachers to conduct online assessments, provide timely feedback, and monitor student progress more efficiently. This contributes to improved evaluation processes and supports student learning. However, access to technology did not significantly influence other domains of teaching performance.

This finding is supported by research showing that digital tools enhance assessment and feedback through real-time monitoring and evaluation of student performance (Qi & Derakhshan, 2025). Technology-based assessment platforms enable teachers to provide immediate feedback and effectively track learners' progress. These tools also facilitate more efficient and data-driven decision-making in instruction. However, the effectiveness of access depends on how technology is utilized in practice, reinforcing the importance of purposeful integration.

The findings also indicate that the support system showed a highly significant relationship with assessment strategies ($r_s = 0.264$, $p = 0.004$). This suggests that institutional and technical support play a crucial role in enhancing teachers' assessment practices. Teachers who receive adequate support are more likely to utilize digital tools for evaluation and feedback. Support systems such as training, guidance, and technical assistance enable teachers to effectively implement technology-based assessment. This highlights the importance of structured support in improving specific aspects of teaching performance.

Research emphasize that institutional and technical support strengthen teachers' ability to use technology effectively. It also aligns with Self-Determination Theory (SDT) (Deci & Ryan, 1985) which holds that external support enhances competence and motivation. Additionally, and Engagement Theory (Kearsley & Schneiderman, 1998) highlights the importance of collaborative support systems in improving shared practices such as assessment and feedback. These perspectives suggest that support systems are essential in maximizing the impact of technology integration.

On the other hand, the results reveal that the technology used and teacher training and competence showed no significant relationship with all domains of teaching performance. This indicates that the mere presence of technology and teachers' competence do not directly influence teaching effectiveness. These findings suggest that having access to tools or knowledge alone is insufficient to improve performance. Instead, the effectiveness of technology integration depends on how it is applied in instructional practices. This highlights the importance of meaningful, purposeful technology use.

This finding supports the TPACK framework (Mishra & Koehler, 2006);, which emphasizes that technology must be integrated with pedagogy and content knowledge to produce meaningful instructional outcomes. It also aligns with Social Constructivism, which suggests that knowledge becomes meaningful only when applied through interaction and authentic practice. Studies have shown that pedagogical strategies have a stronger influence on teaching effectiveness than mere access to technology (Guaña-Moya et al., 2024). Therefore, the focus should be on how technology is used rather than simply on its availability or the level of competence.

These imply that frequency of use, access to technology, and support systems—particularly in assessment—are key factors influencing teaching performance. In contrast, mere access and competence alone are not sufficient. These results highlight that effective technology integration requires consistent use, targeted application, and strong institutional support. Schools may prioritize promoting frequent engagement with technology and providing structured support systems. Professional development programs may focus on practical application rather than solely on theoretical knowledge. These efforts may lead to more meaningful and sustained improvements in teachers' teaching performance.

Table 4 Significant Relationship Between the Extent of Technology Integration and Teachers' Teaching Performance

Variables		Instructional Delivery	Adaptability to Technological Tools	Classroom Management with Technology	Assessment Strategies
Technology Used	r_s	0.024	0.006	0.045	0.071
	p	0.797	0.945	0.625	0.438
	I	Accept Ho	Accept Ho	Accept Ho	Accept Ho
Frequency of Use	r_s	0.202*	0.182*	0.192*	0.218*
	p	0.027	0.047	0.035	0.017
	I	Reject Ho	Reject Ho	Reject Ho	Reject Ho
Teacher Training and Competence	r_s	0.143	0.067	0.031	0.159
	P	0.118	0.468	0.733	0.083
	I	Accept Ho	Accept Ho	Accept Ho	Accept Ho
Access to Technology	r_s	0.087	0.115	0.035	0.199*
	P	0.346	0.211	0.707	0.029
	I	Accept Ho	Accept Ho	Accept Ho	Reject Ho
Support System	r_s	0.163	0.160	0.130	0.264**
	P	0.075	0.081	0.158	0.004
	I	Accept Ho	Accept Ho	Accept Ho	Reject Ho

P value Scale: *** p < .001 (Highly Significant); **p<0.01 (Highly Significant); *p<0.05 (Significant); p>0.05 (Not significant)

Significant Relationship Between Technology Integration and Learners' Engagement

Table 5 presents the results of the Spearman's rho correlation analysis examining the relationship between technology integration and learners' engagement. Technology integration was examined across five dimensions, namely technology used, frequency of use, teacher training and competence, access to technology, and support system. At the same time, learners' engagement was measured across cognitive, behavioral, and emotional domains.

The results reveal that frequency of use was significantly related to cognitive engagement ($r_s = 0.185$, $p = 0.043$). This indicates that the more frequently teachers use technology, the higher learners' cognitive engagement. Frequent use of digital tools enables learners to engage more actively with content, solve problems, and develop a deeper understanding of lessons. It also encourages learners to think critically and participate in meaningful learning activities. This suggests that consistent exposure to technology enhances learners' cognitive involvement in the learning process.

Studies showed that regular technology use promotes active learning and deeper cognitive processing among students (Perifanou et al., 2022; Hlazunova et al., 2024). It also aligns with Connectivism, which emphasizes that learning occurs through continuous interaction with digital tools and information networks. Through repeated exposure, learners develop the ability to process and connect information more effectively. Thus, frequent technology use plays a significant role in strengthening cognitive engagement.

The results further show that access to technology was significantly related to cognitive engagement ($r_s = 0.181$, $p = 0.048$). This indicates that when learners have access to digital tools and resources, they are more likely to engage cognitively in learning activities. Access enables students to explore learning materials, interact with multimedia content, and engage in independent learning. It also supports deeper understanding by allowing learners to revisit concepts and access additional resources. This suggests that the availability of technology enhances cognitive engagement. Access to digital resources enhances students' ability to engage in meaningful learning experiences (Qi & Derakhshan, 2025).

On the other hand, the results reveal that the technology used, teacher training and competence, and the support system showed no significant relationships with cognitive, behavioral, and emotional engagement. This indicates that the mere presence of technology, teachers' competence, and institutional support do not directly influence learners' engagement. These findings suggest that engagement is not automatically achieved through access or teacher capability alone. Instead, how technology is used in instruction plays a more critical role. This highlights the importance of integrating technology meaningfully and purposefully into teaching.

This finding supports the TPACK Framework (Mishra & Koehler, 2006), which emphasizes that effective outcomes occur when technology is integrated with pedagogy and content. It also aligns with Self-Determination Theory, which suggests that learners' engagement depends on intrinsic motivation, autonomy, and meaningful learning experiences. Studies have shown that poorly implemented technology does not significantly enhance engagement (Guaña-Moya et al., 2024). Therefore, the effectiveness of technology depends on how it is applied in the learning process.

The findings imply that frequency of use and access to technology are key factors influencing learners' cognitive engagement. In contrast, other dimensions of technology integration do not show significant relationships with engagement. These results highlight that consistent exposure and availability of technology contribute to learners' active involvement in learning. Schools may focus on ensuring regular technology use and improving access to digital resources. Teachers may design interactive and meaningful activities that promote deeper engagement. These efforts may lead to improved cognitive engagement and better learning outcomes.

Table 5 Significant Relationship Between Technology Integration and Learners' Engagement

Variables		Cognitive	Behavioral	Emotional
Technology Used	r_s	0.171	0.175	0.146
	p	0.062	0.055	0.112
	I	Accept Ho	Accept Ho	Accept Ho
Frequency of Use	r_s	0.185*	0.109	0.152
	P	0.043	0.234	0.096
	I	Reject Ho	Accept Ho	Accept Ho
Teacher Training and Competence	r_s	0.113	0.046	0.114
	P	0.217	0.618	0.214
	I	Accept Ho	Accept Ho	Accept Ho
Access to Technology	r_s	0.181*	0.067	0.110
	P	0.048	0.470	0.231
	I	Reject Ho	Accept Ho	Accept Ho
Support System	r_s	0.136	0.067	0.078
	P	0.139	0.466	0.397
	I	Accept Ho	Accept Ho	Accept Ho

Note: P value Scale: *** p < .001 (Highly Significant); **p<0.01 (Highly Significant); *p<0.05 (Significant); p>0.05 (Not significant)

SUMMARY, FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

Summary

This study investigated the relationship between technology integration, teachers' teaching performance, and learners' engagement in Basic Education. Specifically, it sought to: (1) determine the extent of technology integration in terms of frequency of use, teacher training and competence, access to technology, and support system; (2) assess the level of teaching performance in terms of instructional delivery, adaptability to technological tools, classroom management with technology, and assessment strategies; (3) evaluate the level of learners' engagement in terms of cognitive, behavioral, and emotional engagement; (4) examine the significant

relationship between technology integration and teaching performance; and (5) determine the significant relationship between technology integration and learners' engagement.

The study employed a quantitative descriptive-correlational design. It was conducted among 121 teachers in Basic Education in Private schools selected through simple random sampling. Data were collected using a researcher-developed and validated questionnaire that assessed technology integration, teaching performance, and learners' engagement, each measured on a Likert scale. The instrument underwent validation and reliability testing prior to data collection. Ethical procedures were observed, including securing permissions, ensuring voluntary participation, and maintaining confidentiality of responses. Statistical analyses included mean and standard deviation to describe the extent and levels of the variables, and Spearman's rho correlation to determine the significant relationships among them.

Findings

1. Teachers demonstrated a very high level of technology integration, characterized by strong competence, consistent use, and adequate access to digital tools, although institutional support was comparatively less emphasized.
2. Teachers demonstrated excellent teaching performance across instructional delivery, adaptability to technology, classroom management, and assessment practices.
3. Learners showed a very high level of engagement, reflected in strong emotional, cognitive, and behavioral involvement in classroom activities.
4. Technology integration was significantly associated with teaching performance primarily through frequent use. In contrast, access to technology and support systems specifically contributed to assessment practices, whereas mere technology availability and teacher competence showed no significant relationship.
5. Technology integration was significantly related to learners' cognitive engagement through frequent use and access. In contrast, no significant relationship was found with behavioral or emotional engagement, indicating that meaningful use is more influential than mere availability.

Conclusions

1. Technology integration is already embedded in teaching practices, but its sustainability depends on stronger institutional support.
2. Teachers effectively translate their knowledge into classroom practice. Pedagogical strength remains the key driver of instructional success even in technology-rich environments.
3. Learners are meaningfully engaged, showing both active participation and deeper learning involvement.
4. Technology improves teaching performance when it is applied consistently and purposefully.
5. Learner engagement is shaped by how technology is integrated into instruction rather than by its presence alone. Pedagogical design plays a crucial role in maximizing the benefits of technology in education.

Recommendations:

1. Schools may strengthen institutional support systems by providing continuous technical assistance, structured training, and accessible digital resources to sustain effective technology integration.
2. Teachers may continue enhancing pedagogical practices through ongoing professional development and collaborative learning to maintain high levels of teaching performance.
3. Teachers may design more interactive, learner-centered activities that sustain students' cognitive, emotional, and behavioral engagement in classroom learning.
4. Schools may encourage consistent and purposeful technology use through targeted training and monitoring to further improve teaching performance.

5. Teachers may integrate technology meaningfully into instructional design by using interactive strategies and relevant digital tools to enhance learners' engagement.

6. Future researchers may conduct further studies exploring additional factors and contexts to better understand how technology integration influences teaching performance and learner engagement.

REFERRENCES

1. Adsız, M., & Dinçer, S. (2025). The analysis of classroom management challenges faced by teachers in online classrooms. TechTrends, 1–17.
2. Akram, H., Abdelrady, A. H., Al-Adwan, A. S., & Ramzan, M. (2022). Teachers' perceptions of technology integration in teaching-learning practices: A systematic review. Frontiers in Psychology, 13, Article 920317. https://doi.org/10.3389/fpsyg.2022.920317
3. Alamer, A. (2022). The role of basic psychological needs in EFL students' motivation and performance: Applying self-determination theory in Saudi Arabia. System, 107, Article 102813. https://doi.org/10.1016/j.system.2022.102813
4. Al-Samarraie, H., & Saeed, N. (2022). A conceptual framework for understanding engagement in digital collaborative learning. Education and Information Technologies, 27(1), 97–117. https://doi.org/10.1007/s10639-021-10678-2
5. Baanqud, N. S., Al-Samarraie, H., Alzahrani, A. I., & Alfarraj, O. (2020). Engagement in cloud-supported collaborative learning and student knowledge construction: A modeling study. International Journal of Educational Technology in Higher Education, 17(1), Article 56.
6. Bhat, R. A. (2023). The impact of technology integration on student learning outcomes: A comparative study. International Journal of Social Science, Educational, Economics, Agriculture Research and Technology (IJSET), 2(9), 592–596.
7. Budak, Y. (2021). Exploring pre-service teachers' TPACK development. Education and Information Technologies, 26, 5023–5044. https://doi.org/10.1007/s10639-021-10546-2
8. Capili, S. R., & Paglinawan, J. L. (2024). Technological competence and professional development on instructional quality delivery of teachers. International Journal of All Research Writings, 6(5), 224–230.
9. Chen, K. C., & Jang, S. J. (2020). Motivation in online learning: Applying self-determination theory to understand student engagement. Interactive Learning Environments, 28(4), 494–513.
10. Consoli, T., Désiron, J., & Cattaneo, A. (2023). What is "technology integration" and how is it measured in K–12 education? A systematic review of survey instruments from 2010 to 2021. Computers & Education, 197, Article 104742. https://doi.org/10.1016/j.compedu.2023.104742
11. Deci, E. L., & Ryan, R. M. (2012). Self-determination theory. In P. A. M. Van Lange et al. (Eds.), Handbook of theories of social psychology (Vol. 1, pp. 416–436).
12. Dela Cruz, E. B., & Isip, J. D. (2022). Exploring student engagement and motivation in remote learning: A Philippine perspective. International Journal of Educational Technology in Higher Education, 19(1), 1–15. https://doi.org/10.1186/s41239-022-00333-5
13. Edumadze, J. K. E., & Govender, D. W. (2024). The community of inquiry as a tool for measuring student engagement in blended massive open online courses (MOOCs): A case study of university students in a developing country. Smart Learning Environments, 11(1), Article 19.
14. El-Hamamsy, L., Monnier, E. C., Avry, S., Chessel-Lazzarotto, F., Liégeois, G., Bruno, B., & Mondada, F. (2024). An adapted cascade model to scale primary school digital education curricular reforms and teacher professional development programs. Education and Information Technologies, 29(9), 10391–10436.
15. Eseryel, D., Law, V., Ifenthaler, D., Ge, X., & Miller, R. (2020). An investigation of the impact of game-based learning environments on student engagement in STEM. Educational Technology Research and Development, 68(4), 1769–1795. https://doi.org/10.1007/s11423-020-09752-9
16. Gangmei, N., & Thomas, K. A. (2025). Teachers' technology proficiency for quality learning and teaching: A scoping review. International Journal of Educational Reform.
17. Gavín-Chocano, Ó., García-Martínez, I., Pérez-Navío, E., & de la Rosa, A. L. (2024). Learner engagement, academic motivation and learning strategies of university students. Educación XX1, 27(1), 57–79. https://doi.org/10.5944/educxx1.36951

18. Herman, K., Kessenich, E., & Geven, S. (2022). The digital divide in online education: Inequality in digital readiness of students and schools. Computers and Education Open, 3, Article 100100. https://doi.org/10.1016/j.caeo.2022.100100
19. Kahu, E. R., & Nelson, K. (2020). Student engagement in the educational interface: Understanding the mechanisms of student success. Higher Education Research & Development, 39(1), 1–14. https://doi.org/10.1080/07294360.2019.1680950
20. Kearsley, G., & Shneiderman, B. (1998). Engagement theory: A framework for technology-based teaching and learning. Educational Technology, 38(5), 20–23.
21. Kusumaningrum, D. E., Sumarsono, R. B., & Gunawan, I. (2019). Professional ethics and teacher teaching performance: Measurement of teacher empowerment with a soft system methodology approach. International Journal of Innovation, Creativity and Change, 5(4), 611–624.
22. Li, F., Jin, T., Edirisingha, P., & Zhang, X. (2021). School-aged students' sustainable online learning engagement during COVID-19: Community of inquiry in a Chinese secondary education context. Sustainability, 13(18), Article 10147.
23. Li, W., Huang, J. Y., Liu, C. Y., Tseng, J. C., & Wang, S. P. (2023). A study on the relationship between students' learning engagements and higher-order thinking skills in programming learning. Thinking Skills and Creativity, 49, Article 101369.
24. Loong, E. Y.-K., Sharpe, R., & Chandra, V. (2020). A systematic review of TPACK in mathematics education: Looking back to move forward. Australasian Journal of Educational Technology, 36(3), 106–122. https://doi.org/10.14742/ajet.5583
25. McLeod, J. (2024). Building a community of inquiry around narrative practice. The Qualitative Report, 29(12), 232–246.
26. Miller, M. (2024, July 30). How states and districts can close the digital divide to increase college and career readiness. Center for American Progress. https://www.americanprogress.org/article/how-states-and-districts-can-close-the-digital-divide-to-increase-college-and-career-readiness/
27. Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. Teachers College Record, 108(6), 1017–1054.
28. Mohammadi Zenouzagh, Z., Admiraal, W., & Saab, N. (2023). Learner autonomy, learner engagement and learner satisfaction in text-based and multimodal computer-mediated writing environments. Education and Information Technologies, 28(11), 14283–14323. https://doi.org/10.1007/s10639-023-11615-w
29. Nguyen, L. T., Kanjug, I., Lowatcharin, G., Manakul, T., Poonpon, K., Sarakorn, W., & Tuamsuk, K. (2022). How teachers manage their classroom in the digital learning environment: Experiences from the University Smart Learning Project. Heliyon, 8(10).
30. Ogodo, J. A., Simon, M., Morris, D., & Akubo, M. (2021). Examining K–12 teachers' digital competency and technology self-efficacy during COVID-19 pandemic. Journal of Higher Education Theory and Practice, 21(11).
31. O'Doherty, D., Dromey, M., Lougheed, J., Hannigan, A., Last, J., & McGrath, D. (2021). Barriers and solutions to online learning in medical education during the COVID-19 pandemic: A national survey. BMC Medical Education, 21(1), 1–13. https://doi.org/10.1186/s12909-021-02856-4
32. Prestridge, S., & Cox, D. (2023). Play like a team in teams: A typology of online cognitive-social learning engagement. Active Learning in Higher Education, 24(1), 3–20.
33. Randazzo, S., Barnum, M., & Jargon, J. (2025, January 23). Screens have taken over classrooms. Even students have had enough. The Wall Street Journal. https://www.wsj.com/us-news/education/schools-phone-screens-technology-research-c268bda5
34. Reich, J., Buttimer, C. J., Fang, A., Hillaire, G., Hirsch, K., & Slama, R. (2020). Remote learning guidance from state education agencies during the COVID-19 pandemic: A first look. EdArXiv. https://doi.org/10.35542/osf.io/437e2
35. Rintaningrum, R. (2023). Technology integration in English language teaching and learning: Benefits and challenges. Cogent Education, 10(1), Article 2164690. https://doi.org/10.1080/2331186X.2022.2164690
36. Rofifah, S., Sirojuddin, A., Maarif, M. A., & Zuana, M. M. M. (2021). The influence of organizational culture and work motivation on teacher performance at the international standard school, Amanatul

Ummah Mojokerto. Nidhomul Haq: Jurnal Manajemen Pendidikan Islam, 6(1), 27–40. https://e-journal.uac.ac.id/index.php/nidhomulhaq/article/view/899

37. Scherer, R., Howard, S. K., Tondeur, J., & Siddiq, F. (2021). Profiling teachers' readiness for online teaching and learning. Educational Technology Research and Development, 69(4), 2207–2235. https://doi.org/10.1007/s11423-021-09974-2
38. Schmid, M. L., et al. (2022). When barriers are not an issue: Tracing the relationship between technology integration and teaching practices. Computers & Education.
39. Sui, C. J., Yen, M. H., & Chang, C. Y. (2023). Investigating effects of perceived technology-enhanced environment on self-regulated learning: Beyond p-values. arXiv. https://arxiv.org/abs/2306.02392
40. Tosuntaş, Ş. B., Çubukçu, Z., & İnci, T. (2019). A holistic view to barriers to technology integration in education. Turkish Online Journal of Qualitative Inquiry, 10(4), 439–461. https://dergipark.org.tr/tr/pub/tojqi/issue/49800/613969
41. Yeh, Y.-F., Hsu, Y.-S., & Chuang, F.-C. (2021). Enhancing teacher knowledge for technological pedagogical content knowledge integration: A short-term TPACK learning experience. Journal of Educational Computing Research, 59(2), 400–423. https://doi.org/10.1177/0735633120966632
42. Yigit, M., Tas, H., & Aksu, Z. (2023). Exploring the role of professional development in fostering teachers' TPACK: A mixed-method study. Education and Information Technologies, 28, 2387–2405. https://doi.org/10.1007/s10639-023-11502-2
43. Zhang, P., Zhao, P., & Kim, J. (2024). Assessing the learner's engagement through virtual classroom and teaching pedagogy: The mediating role of technology usage. Comunicar, 32(78), 16–28. https://doi.org/10.58262/V32178.2
44. Zhou, M., Wang, L., & Wang, M. (2021). Learner motivation in online learning environments: A self-determination theory perspective. Education and Information Technologies, 26(3), 2615–2634. https://doi.org/10.1007/s10639-020-10358-1