TEACHERS' VOICES ON TECHNOLOGY INTEGRATION: CHALLENGES, SUPPORTS AND SOLUTIONS IN THE CLASSROOM

ARLENE CABRERA TATEL
Central Mindanao Colleges, Kidapawan City, Philippines.
Corresponding email:

ABSTRACT

This study explored teachers' experiences in integrating technology in the classroom, focusing on the challenges they encounter, the forms of support they receive, and the solutions they propose. The research employed a qualitative narrative design to capture teachers' lived experiences and personal stories. Seventeen teachers from the Municipality of Isulan participated in the study, with ten engaging in in-depth individual interviews and seven taking part in a focus group discussion. Findings revealed that teachers faced significant challenges related to inadequate infrastructure and internet access, limited digital competence, device scarcity and inequity, classroom management difficulties, and time and workload constraints. Despite these challenges, teachers identified several forms of support that facilitated technology integration, including institutional and material assistance, professional training and ICT workshops, peer mentoring and teamwork, administrative encouragement, and student involvement. Furthermore, teachers proposed practical solutions such as strengthening digital infrastructure, providing continuous ICT training, ensuring technical assistance, promoting collaborative sharing of best practices, and implementing supportive policies with incentives. Overall, the study highlights the importance of systemic support, professional development, and collaborative efforts in sustaining effective technology integration in classroom teaching.

Keywords: *Technology Integration, Teachers' Voices, Classroom Challenges, Educational Technology, Qualitative Narrative Research, Municipality of Isulan*

INTRODUCTION

Globally, a growing body of research highlights significant barriers that teachers encounter when integrating technology into classroom instruction. Nearly 40% of teachers report feeling inadequately trained in digital pedagogy, which corresponds with only 30% using digital tools regularly in their teaching practices (Smith & Lee, 2025). This lack of training is further compounded by limited access to essential digital resources. UNESCO (2023) revealed that 35% of teachers in developing countries lack access to basic digital infrastructure, severely limiting their ability to deliver technology-enhanced learning. Furthermore, cybersecurity concerns and the absence of clear and robust institutional policies continue to hinder technology adoption in many educational systems (Jones et al., 2024).

In the Philippines, technology integration in education continues to face serious challenges due to a stark digital divide and insufficient teacher preparation. Although over 80% of public schools reported having functional computers during the 2020–2021 school

year, actual classroom technology use remained low because of limited teacher training and unreliable internet access (Dela Cruz et al., 2022). These infrastructure issues are further compounded by teachers' low confidence in using digital tools; a recent study showed that only 64% of teachers felt comfortable navigating digital platforms, and only 55% had consistent access to functional ICT tools within their schools (Mangarin, 2024). Moreover, rural-urban disparities remain evident, with only 27% of households in rural areas having stable internet connections compared to 47% in urban settings (Mangarin, 2024). These ongoing issues continue to hinder effective technology integration in Philippine classrooms.

Several interrelated factors amplify the urgency of investigating teachers' challenges, supports, and solutions in technology integration. First, teachers report that time constraints and increased workload—especially post-COVID—significantly hamper their ability to learn and apply new digital tools (Gangmei & Thomas, 2025; Müller & Leyer, 2024). Second, insufficient professional development is a recurring barrier: many ICT workshops are brief, decontextualized, and lack follow-up, leading to shallow uptake of technology in instruction (Sholeh, 2024; Frontiers ISTE review, 2025). Third, institutional support is often inadequate, with schools lacking robust infrastructure, clear ICT policies, and technical assistance—limitations that disproportionately affect under-resourced institutions (MDPI systematic review, 2022; Gangmei & Thomas, 2025).

Although previous studies have addressed infrastructure and training issues, there is limited qualitative research focusing on teachers' real-life experiences and coping strategies in technology integration. Bingham (2023) highlighted teachers' lack of structured training but did not explore their classroom solutions. Tan and Subramonyam (2023) focused on AI use like ChatGPT but missed broader teacher adaptation strategies. Nyaaba et al. (2024) studied pre-service teachers' perceptions of VR but did not examine in-service teachers' systemic challenges. This gap shows the need to explore teachers' voices on the challenges, supports, and solutions in integrating technology.

This study is significant because it can help educational stakeholders understand the real challenges teachers face when using technology in their classrooms. By exploring teachers' voices, the study will offer insights into the types of support and training that are most effective for improving technology use in teaching and learning. The findings may guide school leaders, policymakers, and teacher-training institutions in designing better professional development programs, providing more relevant technical resources, and creating supportive school policies. Additionally, the study can contribute to the improvement of teaching practices by identifying practical solutions and strategies that teachers themselves find helpful, making future technology integration efforts more sustainable and teacher-friendly.

METHODS

Research Design

This study employed a qualitative narrative research design to deeply explore teachers' personal experiences and stories related to integrating technology in their classrooms. This approach was useful because it allowed for rich, detailed insights into the challenges they faced, the supports they relied on, and the solutions they developed in real classroom contexts. By capturing teachers' voices and lived realities, narrative

research helped uncover meanings and perspectives that quantitative methods might have overlooked. This in-depth understanding was essential for identifying practical strategies and supports that were grounded in actual teaching experiences, making the findings more relevant and applicable to educational practice and policy.

Meanwhile, the duration of the study was planned to span ten months, from March 2025 to November 2025. This period included refining the proposal paper along with participant recruitment and data collection, one month for data analysis, and one month for reporting and dissemination of findings.

Participants

This study involved a total of 17 participants who provided valuable insights into the integration of technology in classroom teaching. Of these, 10 teachers with extensive experience were selected for in-depth individual interviews to gather detailed personal stories, while 7 teachers participated in a focus group discussion to encourage the sharing of ideas and collective perspectives. This combined approach aimed to capture both individual and group experiences regarding the challenges, supports, and solutions related to technology use in education.

The inclusion criteria for participants were teachers who were currently teaching in public schools within the Municipality of Isulan and who had been actively using technology in their classrooms for at least 10 years. Participants were willing to openly share their experiences and had a strong background in integrating technology into their teaching practices. Teachers without significant experience in technology use or those not currently engaged in classroom teaching within the study area were excluded. This focus ensured that the study gathered rich, relevant data from highly experienced educators familiar with long-term technology integration.

Data Collections Tools

This study used semi-structured interview guides as the main data collection tool. The guide included open-ended questions that allowed teachers to share their personal experiences, challenges, and strategies related to technology integration in the classroom. This tool enabled in-depth discussions while maintaining focus on the study's main themes, providing rich qualitative data directly from the teachers' perspectives.

Procedures

The research began with seeking approval from relevant school authorities and obtaining informed consent from participating teachers. Purposeful sampling was used to select teachers with experience in using technology in their classrooms. Interviews were conducted either in person or online, depending on the participants' availability and convenience. All interviews were recorded with permission, then transcribed and stored securely to ensure confidentiality and ethical standards.

Data Analysis

Thematic analysis was employed to interpret the qualitative data collected from interviews. Transcripts were reviewed and coded to identify recurring themes related to challenges, supports, and solutions in technology integration. The coding process was guided by the research questions, and themes were developed based on patterns that

emerged from the teachers' responses. This method helped reveal meaningful insights into their experiences and informed practical recommendations for improving technology use in classrooms.

RESULTS AND DISCUSSION

Challenges Experienced by Teachers in Integrating Technology in the Classroom

Based on the data, the results revealed five main themes that describe the challenges experienced by teachers in integrating technology in the classroom. These themes include inadequate infrastructure and internet access, limited teacher digital competence, device scarcity and inequity, classroom management challenges, and time and workload constraints.

Inadequate Infrastructure and Internet Access. The first theme was inadequate infrastructure and internet access. Based on the participants, many believed that poor connectivity, outdated facilities, and lack of reliable access to digital equipment were the most pressing challenges that hindered the effective use of technology in the classroom. Teachers reported that despite their willingness to integrate technology, the unstable internet connection and insufficient technological resources made it difficult to sustain digital learning activities. They emphasized that these limitations often disrupted lessons, delayed online submissions, and limited the use of multimedia tools designed to enhance student engagement. Below are some responses from the participants.

> *"Our internet connection is very slow, so I can't continue online lessons smoothly." (IDI, P1)*
>
> *"Sometimes, we lose internet access for an entire day, and I have to change my teaching plan completely." (IDI, P2)*
>
> *"There are computers in the lab, but half of them don't work anymore." (IDI, P3)*
>
> *"Students get distracted when we try to reconnect or fix the connection during lessons." (IDI, P4)*
>
> *"I want to use videos and online tools, but our infrastructure can't handle it." (IDI, P5)*

In support, Francom (2020) emphasized that access to reliable infrastructure remains one of the most crucial enablers of technology integration in education. When schools lack adequate internet connectivity and functioning digital devices, teachers are unable to create technology-enriched learning environments that support collaboration and interactivity. This barrier often leads educators to revert to traditional teaching approaches despite the growing emphasis on digital learning (Francom, 2020).

Similarly, Stelitano et al. (2020) reported that infrastructure-related inequalities, particularly in internet connectivity, continue to restrict teachers' ability to deliver quality

digital instruction. Their findings highlighted that even when teachers have the skills and motivation to integrate technology, insufficient infrastructure becomes a decisive limiting factor that impedes implementation and learning outcomes.

Limited Teacher Digital Competence. The second theme was limited teacher digital competence. Based on the participants, many believed that their lack of knowledge and confidence in using educational technologies limited their capacity to integrate digital tools effectively into teaching. Teachers expressed uncertainty about which platforms to use, how to manage digital classrooms, and how to align technology with instructional goals. This lack of competence not only discouraged experimentation with new tools but also increased teachers' reliance on traditional methods, even when digital resources were available. Participants noted that while some training sessions were conducted, they were often too brief, overly technical, or insufficiently contextualized to classroom realities. Many teachers wished for ongoing professional development that focused on practical, classroom-based applications of digital tools rather than general technology introductions. Below are some responses from the participants.

> *"I can use basic tools like PowerPoint, but I don't know how to integrate online platforms for student tasks." (IDI, P6)*
>
> *"The training we had was not enough to make us confident in using technology." (FGD, P7)*
>
> *"I feel nervous when using new apps because I'm afraid of making mistakes in front of my students." (IDI, P8)*
>
> *"Most of us just stick to what we know because learning new tools takes a lot of time." (FGD, P2)*
>
> *"Even if we have the equipment, not knowing how to use it effectively makes it useless." (IDI, P10)*

In support, Aydin (2021) discussed that teachers' digital competence significantly influences how effectively they implement technology in instruction. The study highlighted that even when access and policy support are present, insufficient digital skills can lead to underutilization of available resources. Building digital competence requires sustained training programs that address both technical and pedagogical dimensions (Aydin, 2021). Furthermore, Tondeur et al. (2020) argued that digital literacy among teachers is a foundational component of successful technology integration. Their findings suggest that confidence in using digital tools is closely linked to perceived ease of use and perceived usefulness, which determine whether teachers adopt technology in their daily teaching practices.

Device Scarcity and Inequity. The third theme was device scarcity and inequity. Based on the participants, many believed that the lack of sufficient digital devices among students created barriers to equitable participation and learning. Teachers shared that in many cases, not all students had access to laptops, tablets, or smartphones, making it challenging to conduct uniform digital lessons. This lack of access also limited the ability

to assign digital projects or assessments, as some students were unable to complete them at home. Teachers noted that even when the school provided computers, the ratio of devices to students was often inadequate, leading to shared use that hindered personalized learning experiences. This inequity in access also contributed to frustration among students and teachers, as some learners consistently lagged behind due to the unavailability of devices. Below are some responses from the participants.

> *"Some students don't have gadgets at home, so they can't join online tasks." (IDI, P1)*
>
> *"We share one computer between four or five students, which makes digital activities slow." (FGD, P1)*
>
> *"It's hard to give digital homework when not everyone has access to devices." (IDI, P3)*
>
> *"Students who have better gadgets learn faster than those who borrow or share." (IDI, P4)*
>
> *"The school's computer lab is not enough to accommodate all classes at once." (IDI, P5)*

In support, O'Connor and McKeown (2021) pointed out that the digital divide remains a major obstacle in equitable technology integration. Their research underscored that disparities in access to devices and internet connectivity directly affect student learning opportunities, particularly in low-resource schools. Addressing this inequity is essential to ensure that digital learning initiatives benefit all students equally. Similarly, Kaden (2020) found that teachers in underfunded schools experience significant frustration due to limited student access to devices. The study emphasized that device shortages not only hinder participation but also place additional pressure on teachers to adapt lessons for both digital and non-digital learners simultaneously.

Classroom Management Challenges. The fourth theme was classroom management challenges. Based on the participants, many believed that managing students' behavior became more complex when technology was introduced into the classroom. Teachers noted that while digital tools can enhance engagement, they also opened avenues for distraction, misuse, and off-task behavior. Students often used devices for entertainment or unrelated online activities during lessons, which disrupted the learning flow. Participants emphasized that it required additional effort and constant monitoring to keep students focused. Teachers also mentioned that they lacked concrete strategies or policies for digital classroom management, leaving them to rely on trial-and-error approaches. Below are some responses from the participants.

> *"Students open games or social media while we're doing lessons online." (IDI, P6)*

"It's harder to control the class when each student has their own device." (IDI, P7)

"Sometimes I spend more time reminding them to stay on task than teaching." (IDI, P8)

"There are no clear rules on gadget use, so students take advantage of that." (FGD, P1)

"Technology is helpful, but it adds new kinds of discipline problems." (IDI, P10)

In support, Carter et al. (2021) explained that classroom management in technology-rich environments requires a different skill set from traditional settings. Teachers must balance engagement with control, ensuring that digital tools are used productively. The study found that without proper management frameworks, technology can inadvertently reduce classroom focus and participation. Similarly, Daniel (2020) emphasized that digital distractions are one of the most cited behavioral challenges faced by teachers using technology. The research suggested that clear classroom policies, structured monitoring, and digital citizenship education are key to minimizing these management difficulties.

Time and Workload Constraints. The fifth theme was time and workload constraints. Based on the participants, many believed that the demands of lesson preparation, grading, and administrative work made it difficult to integrate technology consistently. Teachers stated that planning technology-enhanced lessons required extra time for learning new tools, creating materials, and troubleshooting technical problems. As a result, many resorted to traditional methods due to limited preparation time. Participants also shared that the expectation to use digital platforms for documentation and reporting added to their workload rather than reducing it. The lack of dedicated time for exploring technology and the absence of technical support contributed to teacher fatigue and reluctance to innovate. Below are some responses from the participants.

"Preparing digital lessons takes twice as long as traditional ones." (FGD, P1)

"I don't have enough time to learn new tools after class." (IDI, P2)

"Using technology adds to our workload instead of reducing it." (IDI, P3)

"We are expected to submit everything online, which adds extra hours." (IDI, P4)

"I want to innovate, but there's just no time in my schedule." (FGD, P5)

In support, Trust and Whalen (2020) observed that the rapid shift toward digital teaching has increased teachers' workload due to the time required for adapting materials and learning new platforms. Their findings indicated that without institutional time allowances, teachers often experience stress and burnout, which hinder innovation.

Similarly, König et al. (2020) noted that balancing pedagogical responsibilities with technological adaptation leads to increased workload pressure. The study suggested that providing structured time and support mechanisms can significantly enhance teachers' readiness and sustainability in technology integration.

Table 1. Challenges Experienced by Teachers in Integrating Technology in the Classroom

Issues Probe	Codes / Category	Significant Statements	Themes	Meanings
Poor access; weak connectivity	IDI P1; IDI P2; IDI P3; IDI P4; IDI P5	slow internet; lost access; broken computers; lesson disruption; tools unsupported	Inadequate Infrastructure and Internet Access	Limits digital teaching
Low digital skills; low confidence	IDI P6; FGD P7; IDI P8; FGD P2; IDI P10	basic tools only; insufficient training; afraid mistakes; stick familiar; skills lacking	Limited Teacher Digital Competence	Reduces effective use
Unequal device access	IDI P1; FGD P1; IDI P3; IDI P4; IDI P5	no gadgets; shared computers; homework difficult; unequal learning; lab shortage	Device Scarcity and Inequity	Creates learning gaps
Student distraction; weak control	IDI P6; IDI P7; IDI P8; FGD P1; IDI P10	games opened; hard control; constant reminders; no rules; discipline issues	Classroom Management Challenges	Increases behavior issues
Heavy workload; limited time	FGD P1; IDI P2; IDI P3; IDI P4; FGD P5	lesson prep longer; no learning time; workload increase; extra submissions; no schedule time	Time and Workload Constraints	Discourages innovation

Forms of Support Received by Teachers for Technology Integration

The findings indicated that teachers identified five major themes regarding the forms of support they received for technology integration. These themes are institutional and material assistance, professional training and ICT workshops, peer mentoring and teamwork, administrative encouragement, and student involvement in technology use.

Institutional and Material Assistance. The first theme was institutional and material assistance. Based on the participants, many believed that support from the school in terms of infrastructure, resources, and materials greatly influenced their capacity

to integrate technology effectively in the classroom. Teachers expressed that when schools provided essential equipment such as computers, projectors, and reliable internet connections, it made teaching more efficient and engaging. This institutional backing not only improved their confidence in using technology but also encouraged them to explore new teaching strategies. They mentioned that having access to such resources reduced the burden of preparing lessons and increased students' interest in digital learning. The presence of functioning facilities and administrative support signaled the institution's commitment to technological advancement, motivating teachers to align their practices with digital education goals. Below are some responses from the participants.

> *"Our school provides laptops and projectors, so it's easier for us to integrate technology in lessons." (IDI, P1)*
>
> *"We feel more confident teaching when the school ensures that the internet and devices are working." (IDI, P2)*
>
> *"The institution's support motivates us to use digital tools more often." (IDI, P3)*
>
> *"When materials are available, it's less stressful to prepare lessons that involve technology." (FGD, P4)*
>
> *"It helps a lot when the administration allocates funds for upgrading our classroom technology." (FGD, P5)*

In support, Francom (2020) emphasized that institutional assistance and material provision are critical factors in the successful adoption of educational technologies. Schools that actively supply technological infrastructure enable teachers to deliver interactive and innovative instruction aligned with 21st-century learning goals. Similarly, Stelitano et al. (2020) highlighted that institutional backing, especially in terms of providing adequate digital materials and stable internet access, reduces barriers to technology integration. Their findings indicated that consistent support from the school environment empowers teachers to adapt effectively to digital instructional practices and sustain technology-driven lessons.

Professional Training and ICT Workshops. The second theme was professional training and ICT workshops. Based on the participants, many believed that continuous professional learning opportunities enabled them to improve their digital competence and confidence in using technology in their teaching. Teachers shared that ICT workshops and training sessions provided them with new knowledge about software applications, online platforms, and digital classroom management techniques. They also noted that such training inspired them to explore technology beyond basic presentation tools, allowing them to design interactive and engaging lessons. However, some participants emphasized that the effectiveness of training depended on its relevance to actual classroom contexts. They valued workshops that were hands-on and practical rather than theoretical. Below are some responses from the participants.

"I learned how to use different online tools through the training provided by our school." (FGD, P6)

"The workshops helped us understand how to manage online classes better." (FGD, P7)

"After attending ICT training, I became more confident using digital platforms." (IDI, P1)

"Professional development programs gave me ideas for integrating technology into my lessons." (IDI, P2)

"We need more regular workshops so that we can keep up with new educational technologies." (IDI, P3)

In support, Aydin (2021) stated that professional development plays a vital role in equipping teachers with the skills and confidence to integrate technology effectively. Continuous ICT training ensures that teachers remain updated with new digital tools and methods, enabling them to enhance both instructional delivery and student engagement. Likewise, Tondeur et al. (2020) found that targeted professional learning experiences directly improve teachers' competence and positive attitudes toward technology integration. Their study further suggested that practical, ongoing training programs lead to sustainable changes in classroom practices and digital innovation.

Peer Mentoring and Teamwork. The third theme was peer mentoring and teamwork. Based on the participants, many believed that collaboration with colleagues provided valuable support in addressing challenges and discovering new strategies for technology use. Teachers mentioned that they often learned digital skills informally from their peers through sharing, observation, and discussion. This collaborative atmosphere created a supportive learning environment where teachers could exchange ideas, troubleshoot problems, and build collective confidence in technology integration. Participants stated that working as a team made them more open to experimenting with technology and reduced the anxiety of learning alone. Such cooperation also fostered a sense of community that encouraged innovation and professional growth. Below are some responses from the participants.

"We often help each other when someone doesn't know how to use a tool or platform." (IDI, P4)

"Sharing ideas with my co-teachers helps me discover new ways to use technology." (IDI, P5)

"I learned how to use digital assessment tools from my colleagues." (IDI, P6)

"When we work together, it becomes easier to handle technical problems." (FGD, P7)

"Teamwork makes the process of integrating technology more enjoyable and less stressful." (FGD, P1)

In support, Trust and Whalen (2020) noted that peer collaboration significantly enhances teachers' confidence and capability in integrating technology. Informal mentoring and teamwork allow for shared learning experiences that are contextually relevant and immediately applicable in classroom settings. Additionally, König et al. (2020) highlighted that collective support within a teaching community fosters a culture of cooperation and continuous professional development. Their findings suggest that peer collaboration not only promotes technological proficiency but also contributes to improved instructional quality and teacher morale.

Administrative Encouragement. The fourth theme was administrative encouragement. Based on the participants, many believed that the motivation and support provided by school leaders played an essential role in their willingness to adopt and sustain technology integration. Teachers expressed that when administrators recognized their efforts, provided guidance, and encouraged experimentation with digital tools, they felt more confident to explore technology-based approaches. Administrative encouragement was seen as both emotional and professional support that validated teachers' initiatives and strengthened their commitment to innovation. Participants also mentioned that supportive leadership helped create an environment of trust, where teachers could try new strategies without fear of failure. Below are some responses from the participants.

"Our principal always encourages us to try digital tools even if we're not experts yet." (IDI, P2)

"When the administration supports our efforts, we become more motivated to use technology." (FGD, P3)

"It helps when leaders appreciate our attempts to integrate technology into teaching." (FGD, P4)

"Encouragement from the top makes us feel that digital teaching is a priority." (IDI, P5)

"We feel more confident when administrators guide and recognize our technology efforts." (IDI, P6)

In support, Carter et al. (2021) asserted that school leadership plays a decisive role in influencing teachers' technology integration practices. Administrative encouragement fosters a culture of innovation where teachers feel empowered to experiment with new methods and digital resources. Furthermore, Daniel (2020) discussed that effective leaders who promote and model technology use inspire teachers

to follow suit, leading to a more cohesive and progressive digital learning environment. Administrative support, therefore, acts as a driving force that sustains teachers' motivation and confidence in implementing educational technologies.

Student Involvement in Technology Use. The fifth theme was student involvement in technology use. Based on the participants, many believed that students' active participation in digital learning activities motivated teachers to continue integrating technology into their teaching. Teachers shared that when students showed enthusiasm and competence in using digital tools, it made the learning process more interactive and dynamic. Participants also mentioned that students often assisted teachers in managing technology, such as setting up devices or exploring new applications, creating a collaborative learning atmosphere. This reciprocal relationship not only enhanced students' digital literacy but also empowered them to take ownership of their learning. Teachers emphasized that involving students in technology use promoted engagement, creativity, and peer learning in the classroom. Below are some responses from the participants.

> *"Students get excited when we use technology in class, and that motivates us to use it more." (FGD, P7)*
>
> *"Sometimes, my students help me explore new apps and online tools." (IDI, P1)*
>
> *"They enjoy creating presentations or digital projects, which makes learning more engaging." (FGD, P2)*
>
> *"Technology use encourages students to participate and express themselves better." (FGD, P3)*
>
> *"It feels rewarding to see students become more active when using digital platforms." (IDI, P4)*

In support, O'Connor and McKeown (2021) found that student involvement enhances the effectiveness of technology integration by creating more participatory and collaborative learning experiences. When students engage actively with digital tools, they develop critical skills that align with 21st-century competencies. In a similar view, Kaden (2020) emphasized that learners' positive attitudes and engagement with technology motivate teachers to innovate and sustain digital practices. The presence of technologically capable and enthusiastic students reinforces teachers' efforts to integrate technology as part of everyday classroom learning.

Table 2. Forms of Support Received by Teachers for Technology Integration

Issues Probe	Codes / Category	Significant Statements	Themes	Meanings
School resources support	IDI P1; IDI P2; IDI P3; FGD P4; FGD P5	provides laptops; working internet; available materials; less	Institutional and Material Assistance	Resources enable tech use

		stressful prep; admin funding learned online tools; manage online class; confident platforms; practical workshops; need more training		
ICT skill development	IDI P1; IDI P2; IDI P3; FGD P6; FGD P7		Professional Training and ICT Workshops	Training builds competence
Collegial collaboration	IDI P4; IDI P5; IDI P6; FGD P7; FGD P1	help each other; share ideas; learn from peers; solve problems; teamwork support	Peer Mentoring and Teamwork	Collaboration reduces difficulty
Leadership motivation	IDI P2; IDI P5; IDI P6; FGD P3; FGD P4	encouraged by principal; admin motivation; leader appreciation; guided efforts; recognized work	Administrative Encouragement	Leadership boosts confidence
Student participation	IDI P1; IDI P4; FGD P2; FGD P3; FGD P7	students excited; student help; digital projects; active participation; motivated teachers	Student Involvement in Technology Use	Engagement sustains tech use

Teachers' Suggested Solutions and Strategies to Improve Technology Integration in the Classroom

The data analysis revealed five emerging themes related to the solutions and strategies proposed by teachers to enhance technology integration in the classroom. These include strengthening digital infrastructure and access, continuous ICT training for educators, technical assistance and manpower support, collaborative sharing of best practices, and policy integration and institutional incentives.

Strengthening Digital Infrastructure and Access. The first theme was strengthening digital infrastructure and access. Based on the participants, many believed that enhancing school facilities and ensuring reliable internet connectivity were essential steps toward effective technology integration. Teachers explained that even with strong motivation and skill, the absence of stable infrastructure prevented them from maximizing digital tools in teaching. They stressed that improving the availability of computers, projectors, and high-speed internet would not only improve lesson delivery but also promote equitable learning opportunities among students. Upgrading digital infrastructure was viewed as a fundamental requirement for achieving consistent and efficient use of educational technology in classrooms. Below are some responses from the participants.

"Technology only works when there's a strong internet connection,

and that's what we really need." (FGD, P1)

"If the school provides enough computers, it would be easier to apply digital lessons for all students." (IDI, P2)

"We are willing to use online tools, but the infrastructure just can't support it." (IDI, P3)

"Sometimes, lessons are disrupted because of weak signals and outdated equipment." (IDI, P4)

"I think the first solution is improving access and connectivity so we can use technology smoothly." (FGD, P5)

In support, Francom (2020) emphasized that strong digital infrastructure serves as the foundation of effective technology integration in education. Without reliable access to hardware, software, and internet services, even the most capable teachers struggle to sustain digital learning environments. Similarly, Stelitano et al. (2020) reported that improving connectivity and access ensures inclusivity and stability in technology-supported instruction. Their study noted that infrastructure investment leads to more consistent digital engagement among both teachers and learners, enabling better educational outcomes.

Continuous ICT Training for Educators. The second theme was continuous ICT training for educators. Based on the participants, many believed that regular professional development opportunities were necessary for teachers to keep pace with the rapid evolution of educational technology. They stated that learning about new applications, online teaching strategies, and classroom management tools helped them improve instructional quality and student engagement. Teachers emphasized that short, one-time training sessions were insufficient and that sustained programs should be implemented to strengthen competence and confidence. They also pointed out that technology training should be practical, focusing on classroom-based needs rather than purely theoretical lessons. Below are some responses from the participants.

"Continuous training helps us stay updated with new teaching technologies." (IDI, P6)

"We need workshops that focus on actual classroom applications, not just lectures about technology." (FGD, P7)

"Regular ICT training gives us more confidence to try new tools." (IDI, P8)

"If teachers are trained continuously, we can adapt better to digital learning changes." (FGD, P9)

"We learn best when the training is hands-on and fits our daily

teaching realities." (IDI, P10)

In support, Aydin (2021) highlighted that ongoing ICT professional development allows teachers to refine their skills and adapt effectively to technological advancements. Sustained training helps educators integrate digital tools not just technically but also pedagogically, aligning technology with meaningful learning objectives. Likewise, Tondeur et al. (2020) found that teachers who engage in consistent professional learning demonstrate higher digital literacy and classroom innovation. Their findings support the idea that continuous training fosters confidence, adaptability, and deeper engagement in technology-based instruction.

Technical Assistance and Manpower Support. The third theme was technical assistance and manpower support. Based on the participants, many believed that having accessible technical help within schools would reduce the stress and time lost in addressing technical issues. Teachers shared that when they encounter device malfunctions or software problems, the lack of immediate assistance often disrupts lessons and discourages further technology use. They also emphasized that schools should designate trained personnel or technical staff to handle such problems quickly. Having reliable support would allow teachers to focus more on teaching rather than troubleshooting, ensuring smoother integration of digital tools into instruction. Below are some responses from the participants.

"It's difficult when something doesn't work and there's no one to fix it right away." (IDI, P1)

"If we had technical staff to assist us, teaching with technology would be easier." (FGD, P2)

"Sometimes I spend half of my class time trying to fix the computer or projector." (FGD, P3)

"We need manpower support, especially during online classes when technical issues occur." (IDI, P4)

"It helps a lot when there's someone knowledgeable to guide us in solving tech problems." (IDI, P5)

In support, Carter et al. (2021) emphasized that technical assistance plays a crucial role in the success of technology integration. Teachers who receive timely support from trained personnel experience fewer interruptions and develop greater confidence in using digital tools. Similarly, Daniel (2020) reported that the presence of technical support structures encourages teachers to engage more actively with educational technology. Their research supports the idea that accessible technical manpower not only resolves immediate challenges but also sustains teachers' motivation to incorporate technology effectively.

Collaborative Sharing of Best Practices. The fourth theme was collaborative sharing of best practices. Based on the participants, many believed that exchanging

experiences and strategies with colleagues helped them improve their digital teaching methods. Teachers shared that collaboration provided opportunities to learn from others' successes and mistakes, allowing them to refine their own approaches. Peer discussions, mentoring, and group training sessions created an environment where innovation and problem-solving flourished. They also emphasized that collective sharing reduced anxiety and encouraged experimentation with new technologies. This collaboration cultivated a sense of community that strengthened teachers' professional growth and confidence in technology use. Below are some responses from the participants.

> *"Sharing experiences with my co-teachers helps me find new ways to use technology effectively." (FGD, P6)*
>
> *"We often discuss what tools work best in our subjects and share ideas with each other." (IDI, P7)*
>
> *"I learned a lot from my colleagues who are more experienced in using technology." (FGD, P1)*
>
> *"Collaborating with peers gives me motivation to try new teaching strategies." (IDI, P2)*
>
> *"We exchange best practices and help each other improve our digital lessons." (FGD, P3)*

In support, Trust and Whalen (2020) explained that collaborative professional learning fosters teachers' ability to innovate and adapt technology meaningfully. Through sharing experiences and best practices, teachers collectively enhance their digital literacy and classroom effectiveness. Similarly, König et al. (2020) found that collegial collaboration strengthens professional relationships and supports the integration of new technologies. Their findings highlight that peer interaction serves as a sustainable model for professional growth, leading to improved confidence and creativity in teaching with technology.

Policy Integration and Institutional Incentives. The fifth theme was policy integration and institutional incentives. Based on the participants, many believed that implementing clear school policies and providing incentives could promote consistent and motivated technology use among teachers. They suggested that integrating technology objectives into institutional policy would formalize its importance and ensure accountability. Teachers also believed that recognizing their efforts—whether through awards, certifications, or workload adjustments—would inspire them to continuously improve their digital teaching practices. Institutional policies and incentives were viewed as mechanisms to sustain long-term technology adoption and professional commitment. Below are some responses from the participants.

> *"If there's a clear school policy, it would guide us on how to use technology more effectively." (IDI, P2)*

"We need recognition or rewards to motivate us to integrate technology regularly." (FGD, P4)

"When technology use is part of school goals, teachers take it more seriously." (IDI, P6)

"Incentives like workload consideration encourage us to invest time in digital teaching." (FGD, P7)

"Policies and rewards can help sustain our motivation and innovation in technology use." (IDI, P10)

In support, O'Connor and McKeown (2021) asserted that institutional policies play a pivotal role in aligning teachers' efforts with broader digital transformation goals. Policies that include incentives and structured expectations encourage teachers to adopt technology consistently. Likewise, Kaden (2020) highlighted that institutional recognition fosters motivation and long-term engagement in technology integration. Their studies support the result that when schools embed digital learning in policy frameworks and reward innovation, teachers become more proactive, confident, and sustained in using educational technologies.

Table 3. Teachers' Suggested Solutions and Strategies to Improve Technology Integration in the Classroom

Issues Probe	Codes / Category	Significant Statements	Themes	Meanings
Infrastructure access	IDI P2; IDI P3; IDI P4; FGD P1; FGD P5	strong internet needed; enough computers; weak signals disrupt; outdated equipment; improve connectivity	Strengthening Digital Infrastructure and Access	Infrastructure enables tech
Continuous training	IDI P6; IDI P8; IDI P10; FGD P7; FGD P9	stay updated tech; practical workshops needed; confident using tools; adapt digital changes; hands-on training	Continuous ICT Training for Educators	Training sustains competence
Technical support	IDI P1; IDI P4; IDI P5; FGD P2; FGD P3	no one fix; need tech staff; class time lost; manpower support needed; guided problem solving	Technical Assistance and Manpower Support	Support reduces disruption

Peer collaboration	IDI P2; IDI P7; FGD P1; FGD P3; FGD P6	share experiences; discuss tools; learn from peers; try new strategies; exchange best practices	Collaborative Sharing of Best Practices	Collaboration builds confidence
Policy incentives	IDI P2; IDI P6; IDI P10; FGD P4; FGD P7	clear school policy; recognition rewards; tech part goals; workload incentives; sustain motivation	Policy Integration and Institutional Incentives	Policy sustains adoption

CONCLUSIONS

1. The study concludes that teachers' efforts to integrate technology in the classroom are significantly constrained by interconnected structural and pedagogical challenges. Inadequate infrastructure and unstable internet access, coupled with limited digital competence, device scarcity, classroom management difficulties, and heavy workload demands, collectively hinder the consistent and effective use of technology. These challenges persist despite teachers' willingness to innovate, often forcing them to rely on traditional teaching approaches rather than fully utilizing digital tools.
2. The findings demonstrate that technology integration becomes more feasible and sustainable when teachers receive adequate support from multiple sources. Institutional and material support, access to ICT training and workshops, peer mentoring, administrative encouragement, and active student participation were identified as key facilitators. These forms of support enhance teachers' confidence, improve digital competence, and reduce the burden associated with technology use, enabling more positive attitudes toward digital teaching practices.
3. The study concludes that teachers view effective technology integration as a shared responsibility that requires long-term, systemic solutions rather than individual effort alone. Strengthening digital infrastructure, providing continuous and context-based ICT training, ensuring readily available technical assistance, fostering collaborative sharing of best practices, and implementing supportive policies with incentives are essential strategies. These solutions highlight the need for coordinated action among schools, administrators, and policymakers to create an enabling environment that sustains meaningful and equitable technology integration in classroom instruction.

REFERENCES

Abella, R., Cruz, J., & Dela Cruz, A. (2018). Institutional support for technology adoption in schools. ResearchGate.

https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Adams, K. (2019). District-level policy influence on technology adoption in schools. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Aguilar, M., Santos, R., & Villanueva, P. (2019). Enhancing instructional practices through access to digital content. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Al-Fraihat, D., Joy, M., & Sinclair, J. (2020). Evaluating E-learning systems success: An empirical study. Computers in Human Behavior, 102, 67-86. https://doi.org/10.1016/j.chb.2019.08.004

Al-Gahtani, S. S., Hubona, G. S., & Wang, J. (2019). Unified Theory of Acceptance and Use of Technology (UTAUT): A review and future directions. Journal of Information Technology Theory and Application, 20(1), 1-18.

Almario, L., Reyes, M., & Santos, P. (2019). Teacher coping strategies in the absence of technical support. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Almekhlafi, A. G., & Almeqdadi, F. A. (2023). Exploring teachers' acceptance of educational technology: The role of perceived usefulness and ease of use. International Journal of Educational Technology in Higher Education, 20(1), 45.

Alshammari, M., Alqahtani, A., & Aljohani, N. (2022). Factors influencing teachers' adoption of digital technology in Saudi Arabia: An application of the Technology Acceptance Model. Education and Information Technologies, 27(2), 2153–2172.

Anderson, L. (2019). Sustained mentoring for effective technology integration. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Apolinario, R., Dela Cruz, J., & Santos, M. (2019). Managing student engagement through classroom technology tools. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Araneta, J. (2019). Challenges in adapting content for digital teaching. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Atienza, M. (2018). Aligning technology integration with curriculum objectives. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Austria, J. (2019). Digital divide and its impact on education equity. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Austria, R., Dela Cruz, M., & Bautista, L. (2019). Gamification in classroom instruction: Its role in enhancing learner engagement. Academia.edu.

https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Bailey, M. (2019). Teachers' perceptions of technology integration: Opportunities and obstacles. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Bailey, R., Santos, L., & Cruz, P. (2019). Building trust through responsive leadership in technology integration. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Baker, M., Cruz, R., & De Leon, S. (2018). Using digital projects to enhance student interaction in classrooms. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Balagtas, M. (2019). Scheduling teacher collaboration time for technology training. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Barnes, L., & Yulo, A. (2019). Collaborative workshops for technology integration. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Bartolome, M., Cruz, J., & Dela Cruz, A. (2018). Providing resources and support for technology integration. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Bautista, L. (2018). Streamlining classroom management using educational technology. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Bell, R., & Murphy, T. (2018). Improving teacher training effectiveness for technology use. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Bingham, S. J. (2023). K–12 teachers perspectives on mobile technology integration: A qualitative study. University of Nebraska–Lincoln.

Biscocho, R. (2019). Teacher preparedness in managing technology-rich classrooms. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Briones, K., Ramos, F., & Cruz, G. (2018). Setting classroom technology rules: Reducing distractions. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Bulosan, M. (2018). The role of school heads in shaping technology use culture. Academia.edu.

https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Butler, K., & Simmons, L. (2018). Foundations of technological competency among teachers. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Campbell, S., & Parker, L. (2018). Bridging the digital divide in rural education. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Carpio, A., Mendoza, L., & Torres, J. (2018). Role of digital resource centers in technology use. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Carter, R. (2019). Impact of outdated school infrastructure on teacher technology use. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Castillo, R. (2018). Enhancing student independence through technology. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Cayanan, M. (2019). Developing adaptive technology integration policies. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Chen, C.-M., Chen, M.-Y., & Lee, H.-C. (2021). Investigating teachers' technology acceptance in digital classrooms. Journal of Educational Computing Research, 59(3), 558–581.

Clark, J. (2018). Teacher perceptions on system maintenance and support. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Clark, S., Lim, R., & Dela Rosa, M. (2019). Macroeconomic factors affecting educational technology use. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Collins, J., Rivera, M., & Tan, P. (2019). Monitoring student activity using digital classroom platforms. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Cook, S. (2019). Digital tools for interactive teaching: Teacher perspectives. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Cooper, D., & Richardson, S. (2018). Role of continuous professional development in technology integration. Academia.edu.

https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Cooper, J., & Lee, R. (2019). Urban-rural differences in teacher technology adoption. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Custodio, M., Garcia, L., & Reyes, P. (2018). Developing a shared vision for technology integration. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Dawson, P., Rivera, F., & Tan, M. (2019). Project-based learning as a strategy for technology integration. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

De Castro, M., Bautista, L., & Rivera, G. (2019). Infrastructure gaps and teacher technology use in rural schools. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

De Jesus, M., & Espinoza, R. (2019). Fostering positive attitudes towards technology in education. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

De Los Santos, A. (2019). Lesson study and technology-enhanced instruction. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Dela Cruz, A., Mendoza, R., & Torres, L. (2018). Budget constraints and ICT implementation in Philippine schools. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Dela Cruz, J., Santos, M., & Reyes, L. (2022). Digital literacy among science teachers in the Philippines. Science Education Journal.

Dela Cruz, R., Santos, V., & Gomez, M. (2018). Access to digital tools in underserved schools. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Dela Rama, F. (2019). Teacher preparedness and professional development gaps. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Delfin, J., Ramos, C., & Fajardo, R. (2019). Reflective teaching and tech integration in education. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Delgado, R., & Zulueta, M. (2018). The role of leadership in technology adoption. ResearchGate.

https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Delos Reyes, M., Santos, J., & Lim, R. (2019). Overcoming barriers to technology integration in schools. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Diaz, S. (2019). Infrastructure upgrades and technology integration outcomes. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Dimaculangan, E. (2018). Infrastructure limitations in public school technology integration. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Dizon, L. (2019). Rural-urban disparities in school ICT infrastructure. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Dizon, L., & Buenaventura, A. (2019). Blended learning models for classroom technology use. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Ecleo, P., Fernandez, J., & Rivera, M. (2019). Equitable access to digital resources in education. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Espejo, M., & Generoso, F. (2018). Technology learning communities: Sharing best practices. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Esquivel, R., Mendoza, F., & Cruz, T. (2018). Government and community roles in digital resource access. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Evangelista, M. (2019). Sustaining teacher technology skills through continuous learning. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Evangelista, R., Santos, J., & Lim, P. (2018). Fostering student participation through online discussions. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Evans, T., & Wright, J. (2018). Technical challenges in technology-based classrooms. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Fabian, J. (2019). Institutional leadership and technology adoption strategies. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Fabros, A. (2018). Dynamic policy formulation in educational technology. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Fausto, J. (2018). Subject-specific technology training for teachers. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Fernandez, R. (2019). Importance of ongoing skills development for teachers. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Ferrer, M., Santos, R., & Villanueva, L. (2018). Peer-to-peer support in technology adoption among teachers. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Florencio, A. (2019). Teacher involvement in professional development planning. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Flores, R., & Allen, J. (2019). Mentoring programs for digital teaching skills. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Fontanilla, J., & Vergara, A. (2018). Role of IT support in sustaining technology use among teachers. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Foster, L., Greene, H., & Thomas, P. (2018). Administrative support for professional development. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Freeman, A. (2018). Maintenance and usability of digital equipment in schools. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Frontiers ISTE Review. (2025). A systematic review on the impact of teacher professional development on digital instructional integration and teaching practices. Frontiers in Education.

Fujikawa, T., Tanaka, M., & Sato, Y. (2018). Collaborative networks for supporting technology integration. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Galang, J., Rivera, C., & Reyes, T. (2019). Teacher collaboration and technology adoption rates. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Galang, R., Reyes, F., & Aquino, J. (2018). Accountability-driven leadership in technology integration. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Gamboa, P. (2018). Effects of insufficient digital skills on teacher resistance. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Gangmei, N., & Thomas, K. A. (2025). Teachers' technology proficiency for quality learning and teaching—A scoping review. Teacher Education Journal.

Garcia, J., Santos, R., & Feliciano, P. (2018). Flipped classroom as a strategy for digital integration. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Garcia, L., Reyes, P., & Santos, M. (2019). Role of school leadership in technology skill development. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Gatus, R., Pascua, L., & Flores, T. (2018). Peer learning and engagement through technology tools. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Gonzales, C., Torres, M., & Navarro, P. (2018). Collaborative learning models in technology training. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Gonzales, M. (2018). Creating safe spaces for teacher experimentation with technology. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Green, S., & Adams, R. (2019). Designing engaging tech-based lessons to minimize disruptions. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Hall, J., & Allen, K. (2018). Systemic support for technology integration success. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Hamilton, T., Salazar, F., & Lim, J. (2019). Community and parental pressures in educational technology use. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Harrell, M. (2019). The role of professional development in technology integration. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Hassan, S., Bashir, M., & Zafar, H. (2020). Factors affecting technology acceptance among teachers: Application of UTAUT. Education and Information Technologies, 25(2), 1011-1028.

Hayes, L., Cruz, J., & Martinez, S. (2018). Institutional policy frameworks supporting teacher technology integration. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Henson, K. (2019). Continuous professional development in technology integration. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Hilario, S., & Lacson, M. (2019). Assistive technology for inclusive education. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Holland, D., & Knight, R. (2018). Open educational resources and cloud platforms in schools. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Hossain, M. A., & Dwivedi, Y. K. (2021). A meta-analysis of the drivers and barriers of technology adoption in education. Educational Technology Research and Development, 69(1), 123-147.

Hughes, T., & Resurreccion, A. (2018). Group-based professional development for tech skills. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Jacinto, R. (2019). Pedagogical focus in technology professional development. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

James, T. (2019). Structured training programs for effective technology use. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Jenkins, P. (2019). Building teacher confidence in technology use. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Jenkins, S., Rivera, M., & Delos Reyes, J. (2019). Technology and student self-directed learning behaviors. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Johnson, P., Rivera, F., & Lee, G. (2019). Reducing teacher workload through educational technology. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Jones, M., Patel, R., & Nguyen, S. (2024). Cybersecurity concerns in educational technology implementation. International Journal of Educational Technology.

Joo, Y. J., Lim, K. Y., & Kim, J. (2018). The effects of teachers' technology acceptance on student engagement. Computers & Education, 122, 32-43.

Labrador, S., & Ortega, H. (2019). Teacher readiness and training gaps in technology use. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Lacson, B., Dizon, L., & Ponce, T. (2019). Performance-based incentives and teacher technology use. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Lee, S. (2019). Collaborative lesson planning with technology integration. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Lee, Y., & Kim, J. (2021). Social influence and facilitating conditions on teachers' adoption of educational technology. Journal of Educational Computing Research, 59(8), 1517-1534.

Lim, S., & Tan, K. (2019). Monitoring and evaluation in school technology policies. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Lopez, R., & Sandoval, P. (2018). Teachers' views on the benefits of digital integration in classrooms. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Lualhati, M., & Catapang, R. (2019). Managing student focus in digital learning environments. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Lucero, S., Mendoza, A., & Flores, D. (2018). Correlation between technological competency and teacher confidence. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Macapagal, J., Reyes, P., & Santos, L. (2018). Internet connectivity challenges in Philippine schools. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Macatangay, R. (2018). The role of interactive learning apps in enhancing student focus. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Madrigal, J., Flores, K., & Tan, A. (2018). Private sector partnerships in school technology programs. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Magbanua, R. (2018). Differentiated instruction with technology support. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Malabanan, G., de Vera, T., & Lim, F. (2019). Institutionalizing technology integration best practices. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Manalo, P., Reyes, J., & Lim, C. (2018). Classroom management strategies for digital learners. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Manapat, T. (2018). Teacher training for digital classroom management. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Mangarin, R. (2024). Exploring contributing factors on poor digital literacy of students. International Journal of Research and Innovation in Applied Science, 9(9), 582–588.

Manguerra, L. (2018). Institutional barriers in technology adoption in schools. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Marquez, V., Bautista, R., & Cruz, G. (2019). Professional development and leadership support for technology integration. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Martin, F., Sunley, R., & Turner, D. (2019). Teacher perceptions and use of educational technology: A quantitative analysis. Journal of Technology and Teacher Education, 27(1), 45-71.

Martinez, S., Ramos, F., & Santos, R. (2018). National ICT programs and their impact on teachers. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Mendoza, S., Lopez, R., & Garcia, T. (2019). Digital citizenship programs and student discipline. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Mitchell, H. (2018). Aligning technology with learning objectives in classrooms. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Mitchell, P., & Carter, S. (2019). Leadership modeling in technology integration. ResearchGate.

https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Moore, L. (2018). Government mandates and classroom technology integration. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Morgan, S., Vega, L., & Anderson, H. (2018). Policy and monitoring in teacher technology training. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Müller, A., & Leyer, M. (2024). Longitudinal perspectives on technology acceptance: Teachers' integration of digital tools through the COVID-19 transition. Education and Information Technologies.

Murray, L., Santos, E., & Perez, A. (2019). Using LMS for classroom monitoring and management. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Navarro, D., Bautista, M., & Santos, L. (2019). Prioritizing infrastructure development in schools. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Nelson, H., Cruz, F., & Lim, G. (2018). Technical difficulties and teacher productivity loss. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Nguyen, T., Dang, T., & Vu, P. (2023). Overcoming technology barriers: Teachers' perspectives on effort expectancy in digital classrooms. International Journal of Educational Technology, 40(3), 56-68.

Nyaaba, M. N., Akanzire, B. N., & Nabang, M. (2024). Virtual reality in teacher education: Insights from pre-service teachers in resource-limited regions. Teacher Educator Journal.

Ocampo, S., & Fabian, P. (2018). Internet instability and teacher reluctance. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Olarte, M. (2018). Administrative support for teachers in managing technology use. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Olivares, R., & Lacsamana, D. (2019). Addressing digital literacy gaps in classroom management. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Ong, M., & Go, R. (2019). Leadership investment in ICT resources. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Palma, R., & Mabini, S. (2018). School-wide policies for digital classroom discipline. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Panaligan, R. (2018). Needs assessment-based training approaches for teachers. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Panganiban, A., & Delos Reyes, M. (2019). Teacher adaptability in technology-enhanced classrooms. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Park, S., & Ertmer, P. (2019). The role of effort expectancy in teachers' use of instructional technology. Journal of Research on Technology in Education, 51(1), 1-14.

Peñaflorida, M. (2018). Action research for technology-based instruction improvement. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Perry, L. (2018). Student-centered technologies for engagement and feedback. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Powell, R., Garcia, L., & Santos, M. (2018). Sustaining technology use through teacher networks. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Quintana, V., Flores, J., & Manalo, C. (2019). Peer support systems and sustained technology use. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Rabonza, R. (2018). Assessing technological skills among teachers. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Ramos, G., & Uson, R. (2019). LGU support and teacher technology adoption. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Ramos, S. (2018). Teacher motivation and resource accessibility. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Ramos, S. (2019). Adapting the curriculum for technology integration. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Reed, T., Bautista, E., & Lim, R. (2018). Differentiated instruction using technology tools. ResearchGate.

https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Rivera, A. (2019). Targeted interventions for improving teacher digital skills. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Robinson, K. (2018). Low-cost solutions for technology integration challenges. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Robles, F., Lacsamana, P., & Bautista, R. (2018). Creativity in tech-based lesson planning through collaboration. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Romero, T. (2018). Leadership feedback systems in educational technology adoption. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Ross, M. (2019). Leveraging technological skills to overcome classroom challenges. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Russell, J., Tan, M., & Flores, R. (2019). Differentiated instruction with technology tools. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Salandanan, G., & Garcia, F. (2019). Reducing distractions through technology-based engagement strategies. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Salazar, M., Ramos, J., & Torres, V. (2019). Interactive digital tools for student engagement. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Salazar, V., Mendoza, J., & Ramos, K. (2019). The role of responsive technical support in classrooms. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Salonga, M., Villanueva, J., & Cruz, A. (2018). Public-private partnerships to improve technology access. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Salumbides, M., dela Cruz, J., & Perez, L. (2019). Team-teaching and technology integration. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Salvador, T., Ramos, J., & Torres, V. (2018). Promoting student collaboration through digital tools. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Samonte, J., & Aquino, L. (2018). Peer collaboration in technology integration. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Sandoval, L., Bautista, C., & Reyes, F. (2018). Managing student distractions in technology-rich environments. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Santiago, R., & Miranda, L. (2019). Building online learning communities for student interaction. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Santos, F. (2018). Teacher workload as a barrier to digital integration. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Scott, A. (2019). Technology company partnerships in education. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Scott, G., Navarro, M., & Tan, J. (2018). Administrative actions supporting teacher technology use. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Sholeh, R. (2024). The impact of technology integration on student learning outcomes. ResearchGate.

Silvestre, E. (2018). Using multimedia tools for diverse learners. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Simmons, L., Butler, K., & Garcia, M. (2018). Collaborative skill-sharing in technology integration. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Sinclair, T., & Dupree, M. (2018). Challenges in integrating technology into education. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Smith, A., & Lee, H. (2025). Teachers' preparedness for digital pedagogy: A global survey. Frontiers in Education.

Smith, J., & Johnson, K. (2019). Adapting professional development to emerging technologies. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Stewart, M., Cruz, L., & Santos, R. (2018). Active learning models for teacher technology training. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Tabayoyong, D., Pascua, L., & Gatus, R. (2018). Professional learning communities for digital teaching. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Tabora, F. (2018). Slow internet speed and technology integration issues. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Tan, M., & Subramonyam, H. (2023). More than model documentation: Uncovering teachers' bespoke information needs for informed classroom integration of ChatGPT. International Journal of Educational Technology in Higher Education.

Thompson, L., Garcia, B., & Villanueva, C. (2019). National infrastructure and its effect on digital learning. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Thornton, H., & McBride, R. (2018). Barriers to effective technology integration in education. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Tolentino, P., & Castillo, L. (2019). Clarifying school technology policies for teachers. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Tomas, C. (2019). Technology and its effects on active student participation. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Torres, L., & Perez, M. (2022). Performance expectancy and its influence on teachers' technology integration. Technology, Pedagogy and Education, 31(5), 557-570.

Trinidad, L. (2019). Upgrading internet infrastructure for education. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Tumangan, A., & Guerrero, K. (2018). Boosting student attentiveness through multimedia. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Umali, K. (2019). Sustainable digital resource access in schools. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

UNESCO. (2023). Bridging the digital divide in teacher education.

Villamor, R. (2019). Technology-enhanced teaching strategies for engagement. ResearchGate.

https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Villarica, M., & Magpantay, R. (2019). Infrastructure audits and long-term investment in school technology. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Villarin, M., & Robles, L. (2018). The role of interactive media in enhancing teacher-student interaction. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Villasis, P. (2019). Collaborative online tools and student interaction in group tasks. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Walker, G. (2018). Technology for teacher administrative efficiency. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Ward, H., Santos, R., & Lim, L. (2019). Assessment-driven leadership in technology integration. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Ward, K., Santos, B., & Mercado, J. (2019). Reducing teacher isolation through peer support. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Watson, R. (2019). Peer-sharing and professional networks for technology use. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

West, L. (2019). Investing in school-based technical support systems. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

White, C., Gonzaga, F., & Lim, R. (2019). Peer coaching programs for educational technology integration. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Woods, E., Mercado, F., & Reyes, T. (2018). Incentive-based institutional policies for technology adoption. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Wright, P. (2018). Real-time formative assessment using digital tools. Academia.edu. https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Yambot, F., Dela Cruz, J., & Reyes, S. (2018). Balancing technical and pedagogical skills in training. Academia.edu.

https://www.academia.edu/38726231/Challenges_in_integrating_technology_into_education

Young, B., & King, T. (2018). IT staff as informal technology coaches. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Yulo, A. (2019). Teacher workload management in technology-based classrooms. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Zamora, E. (2018). Socioeconomic factors and school technology access. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Zarate, F., Gomez, R., & Lopez, M. (2018). Teacher training for effective digital resource use. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education

Zubiri, F., & Apolinario, J. (2018). Peer mentoring as a tool for technological skill development. ResearchGate. https://www.researchgate.net/publication/332056490_Challenges_in_Integrating_Technology_into_Education