Technology Integration in Kindergarten Classroom: A Boon or A Bane

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DOI: https://dx.doi.org/10.47772/IJRISS.2025.906000134

Received: 25 May 2025; Accepted: 29 May 2025; Published: 03 July 2025

ABSTRACT

This study explored the integration of technology in kindergarten classrooms and investigated whether it acts as a boon or a bane for early childhood education. Conducted at Musuan Integrated School in Bukidnon, Philippines, the research employed a qualitative, phenomenological approach, utilizing semi-structured interviews with three experienced kindergarten teachers. Findings revealed that technology such as laptops, televisions, flash drives, and educational videos were used to enhance engagement, facilitate recognition of letters, numbers, and colors, and support interactive and visual learning.

Teachers reported increased learner motivation and attentiveness when using digital tools, especially when resources were thoughtfully selected and aligned with lesson objectives. Despite infrastructural limitations, teachers demonstrated adaptability and creativity in incorporating technology meaningfully. The study concludes that technology, when integrated purposefully and contextually, can enrich the teaching-learning process in early childhood settings. However, its success depends on teacher training, access to resources, and pedagogical planning. These findings are particularly relevant for educators and policymakers in resource-constrained environments aiming to modernize early childhood education.

Keywords: technology integration, kindergarten classroom, a boon, or a bane

INTRODUCTION

Background of the study

Technology played a significant role in kindergarten classrooms, helping children learn and express themselves in creative ways. Teachers will use tools like touchscreens, digital storytelling, and other devices to encourage hands-on activities that supported problem-solving and creativity. Researchers studied how these technologies impacted learning and development, especially focusing on concerns like excessive screen time or unequal access to devices. They aimed to find ways to ensure that technology helped all children succeed while keeping their learning experiences meaningful and age appropriate (Moses, 2023). These tools matched their interests and developmental needs, making learning more interactive and meaningful (Pila et al., 2019).

Research and classroom practices aimed to integrate technology in ways that complemented traditional learning, ensuring a well-rounded approach to early childhood education. Educators and stakeholders focused on tools that promote collaboration, creativity, and communication among young learners (Rock Foundation Preschool, 2024). As technologies became available, researchers explored how they could make learning more personalized and engaging. At the same time, policies were developed to protect children's privacy and ensure technology was used safely (Pila et al., 2019). These efforts created learning environments that were fair, inclusive, and beneficial for all children. This study explored the dual aspects of technology utilization in kindergarten classrooms, examining whether it acted as a "boon" (benefit) or a "bane" (disadvantage) for young learners.

Effective technology integration happened across the curriculum in ways that research showed deepened and enhanced the learning process. Technology helped change student/teacher roles and relationships- students took responsibility for their learning outcomes, while teachers became guides and facilitators. Technology served as a multidimensional tool that assisted that process. However, technology integration also posed potential challenges. It caused both positive and negative effects on students' achievement and academic performance, such as distractions that affected their academic focus.

Research indicated that in-class multitasking with electronic devices hindered learning for both users and nearby peers. For instance, a study found that students who engaged in multitasking during lectures scored lower on tests compared to non-multitaskers. Additionally, students seated near multitaskers also experienced a decline in performance, suggesting that device use disrupted the broader learning environment (May & Elder, 2018). This led to decreased focus and a decline in academic achievement and goals. Due to a lack of knowledge and training, some teachers hesitated to embrace technology in their classrooms. Solving this issue required careful consideration to ensure that technology was used appropriately and effectively in early childhood learning environments. This research was crucial for ensuring that technology was used effectively to prepare children for a future where digital literacy was essential for success.

During the academic year 2024-2025, this research project was carried out at Musuan Integrated School. The purpose of this study was to explore the impact of technology in kindergarten settings and how it affected the degree of involvement of young learners. This academic year 2024-2025 provided an important window to observe the effects of current technological advancements in classroom instruction, aligning with global trends of increasing technology use in early childhood education.

This study explored how technology integration impacted the overall effectiveness of education through interactive multimedia, digital learning platforms, or smart classroom technologies. The researcher's conclusions were intended to be helpful to educators and policymakers, particularly in rural educational environments like those in Bukidnon, Philippines, where the use of technology in early learning was growing rapidly.

Statement of the problem

This study aimed to explore the experience of teacher on the used of technology in kindergarten classrooms specifically it sights to answer the following questions;

What are the technology used by the kindergarten teachers during the learning process?

What appropriate activities are employed using technology in teaching kindergarten class?

What are the experiences of kindergarten teachers when technology is used during class?

Objectives of the Study

This study aimed to explore the impact of technology integration in kindergarten classrooms, focusing on both its positive outcomes and challenges.

Identify the types of technology used by kindergarten teachers during the learning process

Determine the appropriate activities that are employed using technology in kindergarten classes

Explore the experiences of kindergarten teachers when using technology in the classroom, including its benefits and challenges

Significance of the Study

The findings of the study are significant to the following stakeholder;

The study would provide insights to the teachers on how to incorporate technology in a way that aligned with children developmental milestones, it would provide insights on the limitation of technology when use on the educational or teaching resources especially if it is not appropriately modified where the kindergarten learners learned best through play, exploration, it showed that when tools like educational videos, laptops and interactive visuals were used in the classroom. They made learning more exciting and easier to understand the lesson.

School leaders and Policymakers, the study provide insights in school administrators on the importance of technology in class instruction thus, appropriately benefit of technology used for instruction be given priority.

Moreover, it also explored the benefits of technology where it could help educators, administrators and parents to used technology effectively during the learning process.

Scope and Delimitation of the Study

This study explored the integration of technology in the kindergarten classroom and examined whether it served as a boon or a bane in early childhood education. The research focused on the perspectives of kindergarten teachers regarding the use of technological tools in teaching and learning. The study was limited to kindergarten teachers from Musuan Integrated School during the 2024-2025 school year.

It employed a semi-structured interview method to gather qualitative insights into how technology affected student engagement, learning experiences, and teaching strategies. The study did not include the perspectives of students, parents, or administrators, nor did it assess the long-term effects of technology integration on academic performance.

Furthermore, the research did not aim to measure the effectiveness of specific technological tools but rather gathered teachers' perceptions on their advantages, challenges, and overall impact in the kindergarten classroom setting. The findings were based solely on the responses collected during the interviews and might not be generalize to all kindergarten classrooms.

Definition of terms

Technology integration This refers to the way teachers blended digital tools into their everyday classroom activities to support and enhance learning. Technology integration also involved planning and creativity, as teachers needed to make sure that the digital materials matched the lesson's goals and were appropriate for the children's age and abilities.

Kindergarten classroom This refers a learning space designed for young learners, a place where children explored, played, and started building the basic skills they would need for future learning. The environment was often colorful, filled with books, toys, posters, and hands-on learning materials that made learning feel fun and natural.

A boon It brought meaningful improvements to how young children learned and how teachers taught. It allowed lessons to became more visual, interactive, fun especially for kindergarten learners, who learned best through play, movement, and hands-on experiences.

A bane This meant that not all teachers could use technology consistently, leading to unequal learning experiences among students. Some teachers also struggled with a lack of proper training, which made it difficult for them to use digital tools effectively or confidently. Limited access of devices, internet connectivity In some cases, too much reliance on screens reduced opportunities for hands-on play and social interaction, which were crucial for young children development.

REVIEW OF RELATED LITERATURE AND STUDIES

Technology integration is sustainable and persistent change in the social system of schools caused by the adoption of technology to help learners construct knowledge (Tosuntaş et al., 2019). Where technology has become a powerful means of communication and education due to its interactive nature, it has the potential to

meet the needs of providing practical ways of constructively directing their own learning activities and completing tasks in a way to meet their own interests and needs (Olowe & Kutelu, n.d) And now it has a significant impact on the lives of young children (Slutsky et al., 2019).

It became an Invaluable Instrument "In early years of learning because it promotes cognitive processing and imaginative thinking in young children. The implementation of technological devices as a valuable organizational asset is both innovative and stimulating for children under the age of five, allowing them to improve their educational and educational experiences (Ogegbo & Aina, 2020).

Four major themes emerged from the study by Rustan et al. (2023) that showed the use of technology in kindergarten instruction: i) Technology encourages learning; ii) Technology affects children's health; iii) Technology is an optional medium; and iv) Appropriate applications are required for improved learning. It should be a top focus when developing learning environments that employ technology authentically. It can be used freely by young learners to represent their thoughts and be used by educators to monitor and assess student learning through various types of documentation.

Drigas and Kokkalia (2014) found also that technology can help kindergarten learners learn in three ways: (a) develop behavioral characteristics for learning that run through social and emotional growth and development; (b) broaden knowledge and understanding of the world in the broadest sense of literacy, communication, and language—problem solving, reasoning, numeracy, and creative development; and (c) acquire motor/operational skills. Being able to gain allows children to use classroom technology at their level of development and be taught in a way that best accommodates their learning style, resulting in improvements in the development of independence learning, self-confidence, and fine and motor skills.

According to Gjelaj et al. (2020), technology in the learning environment draws attention to learners because it incorporates all the different kinds of intelligence that were identified by Gardener. The entirety of understanding can be approached by proper instruction, connectivity, and 12 interactions, giving children an opportunity to use classroom technology at their level of development as well as their preferred style. The use of technology has been proven useful in fostering learning for young children. Both educators and learners alike benefit greatly from educational platforms and apps. Information is readily available, and learning methods can be tailored to individual or group work.

When the device becomes operational, data and information are easily accessible; evolving information is always current and keeps the class informed of what is going on outside, thanks to increasingly innovative and timely media (Smith, 2015). When learners perceive technology as beneficial to their learning, they are more likely to adopt it to enhance their understanding of course content (Sun, Lee, Lee, & Law, 2016). It is critical to properly and effectively integrate digital technologies into the early childhood classroom because it can empower children by giving them an opportunity to speak that they didn't have historically.

At the same time, different levels of education provide methods that can be tailored to fit the learning environment and the unique needs of each learner. This helps encourage learning and gross and fine motor skills development through various approaches, including learners with special needs. Technology provides more resources to work with and often helps us achieve our goals more efficiently and effectively (Smith, 2015).

Moreover, it is also indicating that the use of ICT tools modifies the instructional between students and teachers and creates new avenues for alternative interactions with others (Luna Scott 2015). According to Mouza (2019), most educators believe that digital tools can benefit students' education, and they are more at ease and involved with technology (Carstens et al., 2021) These technologies share the potential to facilitate a constructivist approach to education, which emphasizes active knowledge discovery through reflection on experiences with one's surroundings, connecting new information to existing knowledge, and interacting with others (Clements, 2015). And digital technologies are vital for their development (Syed et al., 2021). Because students felt that technology improved their understanding of the content, helped them receive better marks, and prepared them for future education and careers (Schindler, Burkholder, Morad & Marsh., 2017).

According to Lacka and Wong (2021), these facilitate quick access to information, easy retention of information, greater storage of information, and improved presentation of information. They also make education more participatory, facilitate knowledge exchange, and boost excitement for learning. Additionally, it helps to give students personalized learning experiences, increases their academic performance overall, and boosts their academic achievement in writing, reading, and expression (Adebisi et al., 2015).

Over time, technological involvement in educational curricula has evolved and improved, and its position in the educational system has grown to become a vital source of information and assistance (Gatchalian, 2019). Avoid avoiding the teacher's main responsibility, which is to help students develop their learning style, interpret what they are seeing, and apply teachings to real- world situations (Smith, 2015). Early childhood is a critical stage in children's development, and their experiences have long-term implications. (Chordia et al., 2019). And because of that, there is a need therefore to provide technology- learning experiences that can aid their holistic development. To do this, early childhood professionals must be positive about the roles of technology in children's development. (Olowe & Kutelu, n.d.)

IMPACT OF TECHNOLOGY

The integration of technology in early childhood education has been a topic of interest due to its potential to transform learning experiences and outcomes. Research has consistently examined both the positive and negative effects of technology on young learners' development and overall learning. In integrating technology, children and teachers face barriers such as poverty, lack of materials, poor knowledge, and lack of practical training on the use of developmentally appropriate technology for children. (Ogegbo & Aina, 2020).

Addressing these issues is crucial, especially to teachers, parents and learners. Ertmer (1999), who described two categories of obstacles to technology integration, offered a tenable explanation for this deficiency and inefficient use of technology. Teachers are prevented from utilizing technology by first-order extrinsic hurdles, which include limited access to technology, insufficient time to understand and utilize it, a lack of professional development opportunities, and training and support.

On the other hand, instructors' use of technology is restricted by second- order intrinsic obstacles, which stem from their teaching philosophies, degree of experience with it, and opinions about how beneficial it is for students' learning. This distinction has been supported by others. However, we know little about how much teachers use technology and media to support their teaching compared to letting learners use it as their own because they must be proficient in ICT, educators play a crucial role. For instance, studies have shown that many "educational" apps aren't based on solid research about how children learn best (Hirsh-Pasek et al., 2015) and often lack important features like helpful feedback (Callaghan and Reich, 2018).

They come naturally to them because kids watch when a teacher, who is a digital immigrant, displays weaknesses in front of students, who are digital natives and have a very fluid grasp of technology. This puts the teacher at a disadvantage and causes them to lose their leadership (Smith, 2015). Regretfully, teachers lack the information necessary to address the needs of the students (Smith, 2015).

Even though many educators feel they have been given the right instructions and are at ease using technology, teachers are not always given the proper professional development (PD) and technological tools to integrate technology consistently and effectively within their classroom (Bailey, 2023) There is just not enough time dedicated to teaching learners how to use technological advancements effectively. The perceived lack of tech skills, training, and guidance with a kindergarten focus are the factors that prevent teachers in various parts of the world from authentically integrating technology into their kindergarten programs. These factors affect their perception of the technology's usefulness and ease of use (Ihmeideh & Al-Maadadi, 2018). Students limited technological proficiency, a lack of financing, their sense of isolation during class, their incapacity to form relationships with their peers, and distraction from other apps are further obstacles to incorporating technology into the classroom (Sun et al., 2016).

This shift is likely due to our growing awareness of how technology affects kids and the potential long-term impacts it might have on their development (Vadonovich, Ning-Shen, & Sundraram, 2015). Comprehending the

increasing frequency and importance of classroom media and digital technology use becomes essential because these activities may interfere with the learning environment (Dore & Dynia, 2020). Researchers believe that digital media use may be causing damage to children's development because it takes the place of other educational experiences such as shared reading and caregiver-child interaction. Communication and innovations in technology can be presented as a fun or stimulating activity, as well as acknowledged. Pila et al., 2019), resulting in less time for classroom instruction.

Despite these worries, there are also advocates who believe that a strong technology program for young children can be beneficial. They argue that when used correctly, technology can help kids better understand the world around them and enhance their learning experiences (Vadonovich et al., 2015). Additionally, compared to other forms of modification, teaching supplied by media and information technology could be of lower quality. By offering new terminology and discussion topics, teachers who frequently employ technology and media in teacher-supported environments may help students learn (Lavigne et al., 2015).

Even if media and technology use do not take the place of instruction, it may happen during center or free choice time, which may limit possibilities for social-emotional skill development by reducing social connections with teachers and classmates. Furthermore, a child's ability to learn socialization skills including acceptable speech and in-person interactions is negatively impacted by extended usage of technology (Gibson & Obiaker, 2017) and they can get distracted easily (Piotrowski, 2015). Research has shown that educational software and digital tools can significantly enhance collaborative and active learning in early childhood education. A study by Reeves, Gunter, and Lacey (2017) highlights how integrating mobile devices, like iPads, into pre-kindergarten classrooms led to higher achievements in emergent literacy and early math skills compared to traditional methods. This was achieved through guided instruction and informal student feedback, demonstrating the effectiveness of technology in fostering engagement and learning outcomes in young learners (Reeves et al., 2017)

Additionally, the Department of Education emphasizes that appropriate use of technology in early learning can increase access to educational opportunities, foster collaborative relationships among students, and engage families in the learning process. However, it also stresses the importance of interaction with adults and peers to maximize active learning benefits and ensure technology use is not passive (ASTATE Online, 2022). These findings align with the broader observation that while technology holds significant potential for improving education, more empirical research is needed in resource-constrained and unique settings, such as those in Bukidnon. Technology integration in early childhood education fosters transformative learning experiences by enhancing engagement, promoting cognitive and motor development, and supporting individualized learning styles (Tosuntaş et al., 2019). It enables young learners to construct knowledge actively while addressing various intelligence and developmental stages (Gjelaj et al., 2020).

Research highlights that technology, when used appropriately, facilitates literacy, numeracy, and problem-solving skills while fostering social emotional growth (Ogegbo & Aina, 2020; Rustan et al., 2023). However, the quality of educational technology tools is paramount, as poorly designed apps may lack meaningful feedback and hinder learning (Hirsh-Pasek et al., 2015).

Educators' proficiency and perceptions of technology significantly influence its effective integration (Ihmeideh & Al Maadadi, 2018), and professional development remains a critical need (Bailey, 2023). Although potential challenges such as reduced social interaction and distraction exist (Gibson & Obiaker, 2017), empirical studies demonstrate that technology, used as part of a balanced pedagogical approach, can empower learners, encourage independence, and improve learning outcomes (Reeves et al., 2017). This underscores the importance of context-sensitive, evidence-based strategies for integrating technology, particularly in resource-constrained settings like Bukidnon.

Synthesis of Related Literature

The integration of technology in early childhood education has significantly transformed learning experiences, fostering cognitive, social, and motor skill development among young learners (Tosuntaş et al., 2019). Technology serves as a dynamic tool that enhances communication, encourages interactive learning, and provides practical ways for children to direct their own learning activities (Olowe & Kutelu, n.d). It supports

knowledge construction and imaginative thinking, making it a valuable asset in early education (Ogegbo & Aina, 2020). Key themes identified in research emphasize both the benefits and challenges of technology in kindergarten instruction. Technology encourages learning, necessitates appropriate applications, and influences children's health (Rustan et al., 2023). It facilitates personalized learning experiences, fosters engagement, and supports multiple intelligences in alignment with Gardner's theory (Gjelaj et al., 2020). Additionally, it aids in literacy, numeracy, problem- solving, and social-emotional growth when applied appropriately (Drigas & Kokkalia, 2014).

Despite its benefits, challenges persist in integrating technology into early education. Barriers such as poverty, lack of access to resources, inadequate training, and teachers' perceptions impact its effectiveness (Ogegbo & Aina, 2020; Ihmeideh & Al-Maadadi, 2018). Teachers face extrinsic obstacles like limited access and time constraints, as well as intrinsic barriers related to their experience and attitudes toward technology (Ertmer, 1999). Additionally, concerns regarding reduced social interactions, potential distractions, and the quality of educational apps further complicate technology adoption (Hirsh-Pasek et al., 2015; Gibson & Obiaker, 2017).

However, evidence suggests that when integrated effectively, technology enhances student engagement, supports diverse learning styles, and improves academic performance (Schindler et al., 2017). Empirical studies demonstrate that mobile devices, such as iPads, positively impact literacy and numeracy skills through guided instruction and interactive feedback (Reeves, Gunter, & Lacey, 2017). Furthermore, technology fosters collaboration, facilitates knowledge sharing, and prepares learners for future educational opportunities (Adebisi et al., 2015).

For successful integration, professional development for educators is crucial, as it directly influences their proficiency and perception of technology use in classrooms (Bailey, 2023). The Department of Education highlights that while technology expands educational access, it should complement—rather than replace—teacher-guided instruction and peer interactions (ASTATE Online, 2022).

In the context of resource-constrained settings like Bukidnon, technology holds great potential for enhancing early childhood education. However, its implementation must be evidence-based, developmentally appropriate, and balanced to ensure it fosters meaningful learning experiences while addressing existing barriers (Tosuntaş et al., 2019; Reeves et al., 2017).

Conceptual framework

One foundational theory supporting this study is Vygotsky's Sociocultural Theory, which emphasizes that learning occurs through social interaction and is mediated by tools, including digital technology (Vygotsky, 1978). Digital tools, when appropriately integrated, serve as scaffolds that help young learners construct knowledge and engage in meaningful learning experiences. Another relevant theory is Constructivism, as proposed by Piaget (1952), which suggests that children actively construct their knowledge through exploration and interaction with their environment. When kindergarten teachers integrate technology, such as interactive applications and digital storytelling, they provide an immersive learning environment that supports cognitive development.

Additionally, the Technological Pedagogical Content Knowledge (TPACK) framework (Mishra & Koehler, 2006) explains how teachers must effectively blend technology with pedagogy and content knowledge to enhance student learning. Teachers' experiences with technology integration can be influenced by their technological proficiency, access to resources, and professional training (Bailey, 2023). Meanwhile, Ertmer's (1999) First- and Second-Order Barriers Model identifies the challenges teachers face, such as lack of access, training, and personal beliefs about technology, which can either support or hinder its effective use in kindergarten classrooms.

These theories and frameworks provide a comprehensive lens for analyzing the role of technology in kindergarten education—whether it acts as a boon by enhancing engagement and learning or as a bane due to challenges like distraction, limited social interaction, and teacher difficulties in integration (Ihmeideh & Al-Maadadi, 2018). Understanding these perspectives will help determine whether technology serves as an effective tool for early childhood instruction or presents barriers that need to be addressed for successful implementation.

METHODOLOGY

This chapter presents the methods and procedures employed in the study, which included the research design, research setting, participants of the study, research instrument, data gathering procedure, analysis of data and ethical consideration.

Research Design

This study used a qualitative design to explore the impact of technology integration in kindergarten classrooms. Qualitative research was appropriate because it allowed for an in-depth look into the participants' experiences, perceptions, and insights regarding the use of technology in early education.

A phenomenological approach was employed to explore the lived experiences of teachers as they integrated technology into their classrooms. This approach was particularly suitable, as the study aimed to understand how individuals perceived and made sense of their experiences with technology in an educational setting. By focusing on personal reflections and real-life classroom situations, the study sought to uncover the essence of how technology was used and how it affected both teaching practices and student learning at the kindergarten level.

Research Setting

This study was conducted at Musuan Integrated School, located in Maramag, Bukidnon, Philippines. Musuan Integrated School is a public institution that catered to learners from kindergarten to high school, providing accessible and quality education to students within the community and nearby areas.

The school is known for its commitment to fostering academic growth and holistic development among its learners. It was equipped with basic educational facilities, including classrooms, a library, and some technological tools, such as computers which were utilized to enhance teaching and learning experience. These young learners were taught by a dedicated teacher who integrated various strategies and tools to promote engagement and active participation in the classroom.

The selection of Musuan Integrated School as the setting for this study was based on its willingness to participate and its alignment with the objectives of this research. The school's growing interest in integrating technology into classroom instruction made it an ideal setting for exploring the impact of technology on kindergarten classrooms.

Participants

This study involved three kindergarten teachers who were carefully chosen to share their experiences with using technology in the classroom. Each of these teachers had at least five years of experience in early childhood education, giving them a deep understanding of how young children learn and what works best in a kindergarten setting. More importantly, all three were already using technology as part of their daily teaching, so they could speak directly about both the benefits and challenges they faced.

The researchers selected these teachers on purpose—not randomly—because they had qualities that matched the goals of the study. They were not only experienced educators, but also active users of digital tools like laptops, televisions, flash drives, and educational apps. This made them well-suited to offer meaningful insights into how technology fits into real-world classroom environments.

Research Instruments

In this qualitative study, the primary research instrument used to gather data was a semi-structured interview. Semi-structured interviews were a type of interview where the interviewer had a set of prepared questions, but there was flexibility to ask follow-up questions based on the participant's responses. It was well-suited for the study because it allowed for in-depth exploration of participants' personal experiences, insights, and perceptions regarding the use of technology in the classroom.

The interview consisted of six open-ended questions, designed to capture in-depth responses from kindergarten teachers. These questions were crafted to explore various aspects of technology use in the classroom, including benefits, challenges, and the overall impact on student learning.

Data Gathering Procedure

This study adopted a qualitative research approach, focusing on open-ended interviews with kindergarten teachers to explore their perceptions of technology integration in the classroom. The research examined teachers' insights into how technology influenced learner engagement, the benefits and challenges of its use, and any observed changes in teaching practices.

To proceed ethically, the researcher sought approval from relevant authorities, including the school administration, and obtained informed consent from participating teachers. The primary data collection phase involved in-depth, semi-structured interviews with kindergarten teachers, allowing for flexibility in responses while ensuring that key topics were covered. These interviews focused on teachers' experiences with technology, its perceived impact on student engagement, instructional strategies used, and any difficulties encountered in implementation. With participants' consent, the interviews were audio-recorded to ensure accuracy and later transcribed for analysis.

The collected data were analyzed using thematic analysis, where responses were coded to identify patterns and emerging themes related to technology's role in early childhood education. This approach allowed for a comprehensive understanding of whether technology served as a boon or a bane in kindergarten classrooms, providing valuable insights into its effectiveness and challenges in early learning environments.

Analysis of Data

The collected data were treated with careful attention to ethical standards and rigorous qualitative analysis. After conducting in-depth interviews with kindergarten teachers, the audio recordings were transcribed verbatim to capture every detail of the participants' responses. To ensure confidentiality, all identifying information about the teachers was removed from the data. Pseudonyms were assigned to each participant, and only anonymized data were used in the study.

The data analysis followed a systematic coding process. Initially, open coding was conducted by carefully reviewing the transcripts to identify key phrases, patterns, and concepts related to the teachers' experiences with technology integration. This was followed by axial coding, which was used to categorize related codes into broader themes, such as "Utilization of Available Technological Tools," "Classroom Activities Where the Teacher Uses Technology," and "Pedagogical Impact of Technology Integration." This structured approach allowed for a refined and meaningful interpretation of the data.

Selective coding was then used to identify core themes and recurring patterns that emerged from the interviews. Thematic analysis was employed to interpret the findings, highlighting teachers' perspectives on how technology affected their teaching methods, classroom dynamics, and student interaction. The analysis focused on both the perceived benefits and challenges of technology integration in early childhood education.

Finally, the findings were synthesized into a comprehensive report. Results were presented with illustrative quotes from participants to provide deeper insight into their lived experiences. This study ensured high qualitative rigor and ethical integrity by maintaining transparency, protecting confidentiality, and systematically analyzing the data.

Ethical Considerations

Ethical considerations in the study "Technology Integration in Kindergarten Classrooms: A Boon or a Bane" were crucial to ensuring the protection of participants, the validity of the data, and the integrity of the research. First, informed consent was obtained from the school principal and participating teachers, ensuring they fully understood the purpose, scope, and potential implications of the study (Mertens, 2020). This consent process

emphasized voluntary participation and the right to withdraw at any stage without consequences (Creswell & Poth, 2018).

Confidentiality and anonymity were also strictly maintained. All collected data, including interview responses, were anonymized, with pseudonyms or numerical codes assigned to teachers to prevent the identification of individuals or institutions (Bryman, 2016). No personal or sensitive information beyond the scope of the research was disclosed.

Additionally, the study upheld ethical principles by ensuring that technology use in classrooms was examined responsibly, without disrupting learning or influencing teaching practices in a way that could negatively affect students (Tracy, 2020). Researchers remained objective and non-intrusive during data collection, ensuring that the study aimed to understand teachers' experiences rather than interfere with instructional methods.

RESULTS AND DISCUSSION

This chapter presents the qualitative findings of the study focused on the integration of technology in the kindergarten classroom. Drawing from the interviews with selected participants, the chapter explores three primary aspects: the technologies used by kindergarten teachers during the learning process, the most prevalently used technology during instruction, and the experiences of kindergarten teachers in using technology in their classrooms. Each research question is discussed using a structured format, including matrices summarizing the themes, followed by detailed discussions supported by participant quotes, integration of related literature, and theoretical frameworks.

The technologies used by the kindergarten teacher during the learning process

Table 1. Technologies Used by Kindergarten Teachers

Theme	Categories	Sample Codes
Utilization of Available Technological Tools	Common Devices	Television, laptop, flash drive, blackboard, HDMI
	Purpose and Method of Use	Downloaded videos, YouTube educational videos, PowerPoint presentations, interactive activities

The participants commonly mentioned using televisions, laptops, flash drives, and blackboards during instruction. Participant 1 noted, "The technologies that we commonly use in the classroom are televisions, laptops, YouTube educational videos, blackboards, and HDMI." Participant 2 added, "I used technology through television using a flash drive and laptop. We can view educational videos and PowerPoint presentations and short stories." Participant 3 highlighted the accessibility of internet resources, stating, "Since my classroom is near the Wi-Fi router, I can easily let my students watch videos like educational videos."

These responses indicate that teachers rely on a mix of traditional (e.g., blackboards) and digital tools (e.g., laptops, educational videos) that align with their school's infrastructure. The proximity to Wi-Fi routers enhances access to online content, while challenges like unstable internet are managed by downloading materials in advance. The use of flash drives, HDMI cables, and offline videos reflects a deliberate choice of practical tools that match classroom realities.

The integration of these tools reveals more than just access—it shows intentional planning to make lessons engaging and appropriate for young learners. The educators' strategies support multisensory learning, aligning with Gjelaj et al. (2020), who emphasize that technology appeals to multiple intelligences. Likewise, Ogegbo and Aina (2020) identify the creative use of technology as a way to support cognitive development, particularly in resource-limited settings.

These practices reflect the Technological Pedagogical Content Knowledge (TPACK) framework (Mishra & Koehler, 2017), showing that teachers consider the interplay between content, pedagogy, and available technology. Their adaptability—choosing tools that work within their constraints while maintaining educational quality—demonstrates an evolving mindset. As Drigas and Kokkalia (2015) observed, technology in early

education can promote communication, problem-solving, and literacy when used effectively. These teachers are not merely using technology out of necessity; they are thoughtfully integrating it to enhance learning, demonstrating that effective, developmentally appropriate instruction can thrive even amid infrastructural challenges.

The classroom activities where the teacher uses technology

Table 2. Classroom Activities with Technology Integration

Themes	Categories	Sample Codes
Classroom Activities Where the Teacher Uses Technology	Frequently Used technology	YouTube, TV, laptops, flash drives, PowerPoint, HDMI, ABC Mouse, Endless Alphabet

Kindergarten teachers frequently integrate technology into various classroom activities to boost engagement and understanding among young learners. Commonly used technologies include televisions, laptops, flash drives, PowerPoint presentations, and digital educational apps like YouTube Kids, ABC Mouse, and Endless Alphabet. Participant 2 detailed the use of these tools in teaching "letter recognition, number recognition, color recognition, comparing numbers, storytelling time, problem-solving, differentiating big and small, tall or short, reading paragraphs, and identifying shapes." Participant 1 highlighted using "educational websites that offer interactive learning activities such as ABC's, games, and puzzles," and emphasized the importance of age-appropriate platforms. Participant 3 added that educational videos on laptops and televisions effectively supported lessons on basic recognition skills, and noted that students were more attentive and engaged during tech-enhanced lessons.

The responses show that technology is integrated not just for instruction but as a medium to make abstract concepts tangible through visual and interactive elements. The consistent use of platforms like YouTube Kids and ABC Mouse points to a preference for familiar, child-friendly digital tools. Teachers are leveraging these resources for a variety of subjects, including early math, literacy, and cognitive development tasks. The interactivity and multimedia nature of the tools keep students engaged, as shown by the positive behavioral changes (like increased attentiveness) mentioned by participants.

These classroom practices reflect a strong understanding of how technology can support developmental learning goals in early childhood. The visual, auditory, and interactive elements of digital tools cater to young children's learning styles and support cognitive and language development. The participants' responses echo Drigas and Kokkalia's (2015) findings that technology can enhance communication, reasoning, and literacy skills. Additionally, the use of these tools aligns with Piaget's theory, in which young children benefit from concrete, sensory-based learning. Bandura's Social Learning Theory is also evident, as students imitate behaviors and language they observe in digital media, further enhancing engagement and internalization.

Overall, the integration of technology in kindergarten instruction functions as both a pedagogical strategy and a developmental support system. Teachers select tools not just for convenience but for their effectiveness in translating abstract concepts into child-friendly experiences. The alignment with educational theories such as Piaget's and Bandura's underscores the thoughtful, research-based application of digital resources in the classroom. These practices illustrate a maturing digital pedagogy where teachers are not only technologically adept but developmentally aware, crafting lessons that are both engaging and meaningful for young learners.

The experiences of kindergarten teachers when technology is used during class

Table 3. Experiences of Kindergarten Teachers Using Technology

Theme	Categories	Sample Codes
Pedagogical Impact of Technology Integration	Increased Learner Engagement	Attention, participation, motivation
	Teacher Facilitation Strategies	Clear objectives, preparation, instruction

Kindergarten teachers reported overwhelmingly positive experiences with technology integration in their classrooms. Participant 1 shared, "My experiences as a kindergarten teacher are, it really captures my learners' attention, engagement, and motivation to participate." Participant 2 echoed this, noting, "My experiences really help my students to participate more and be attentive during our class especially in activities." Teachers also highlighted the importance of strategic preparation. Participant 1 explained their process: "I will set clear objectives on what the purpose of it is; I will also choose suitable technologies and prepare devices and materials." Participant 3 added, "I facilitate my class by explaining to them the content and why we use these technologies and educational videos. After that, I give them proper instructions."

These insights reveal that technology is used not passively but as an intentional and structured part of classroom planning. Teachers do not rely on technology to replace instruction but to enhance traditional methods, making lessons more interactive and engaging. The preparation process includes selecting appropriate tools, setting objectives, and explaining the relevance of each resource to students. This shows a deliberate pedagogical approach, combining clear planning with purposeful use of technology to increase student attentiveness and participation.

This approach reflects broader research findings. Studies like Ogegbo & Aina (2020) and Wang (2018) indicate that digital tools in early childhood settings boost engagement, motivation, and cognitive development. Teachers' focus on interactivity and repeated exposure through visuals aligns with constructivist learning theory, where children build understanding through interaction and sensory experiences (Clements, 2015). The emphasis on structured guidance and repetition reflects Vygotsky's Zone of Proximal Development (ZPD), with technology serving as a scaffold to make abstract concepts more accessible. The use of ICT tools is also consistent with Bandura's Social Learning Theory, encouraging observational learning through multimedia.

The teachers' experiences and strategies align with the Engagement Theory (Kearsley & Shneiderman, 2020), which posits that learners must be actively involved through meaningful tasks. In this context, technology becomes a vehicle for engagement, transforming the learning environment into one where participation, focus, and motivation thrive. These practices support the idea that digital tools, when purposefully integrated, promote behavioral, cognitive, and motor development (Drigas & Kokkalia, 2015; Gjelaj et al., 2020). The Department of Education (ASTATE Online, 2022) similarly emphasizes the importance of intentional technology use in early childhood, supporting collaboration, access, and reinforcement. Ultimately, these findings affirm that kindergarten teachers are not just adopting technology—they are reshaping their instructional approaches to meet young learners' developmental needs in a digital age.

CONCLUSION

Summary

In this study, researcher explored how kindergarten teachers use technology in their classrooms. We focused on three main areas: the types of tools they use, how they include technology in their daily classroom activities, and what their experiences have been like when using these tools. The key findings are grouped into three themes:

Tools Used by Kindergarten Teachers

Researcher found that kindergarten teachers combine both old and new tools in their teaching. They often mentioned using televisions, laptops, flash drives, HDMI cables, and even traditional blackboards. Because internet connections aren't always reliable, many teachers prepare ahead by downloading videos from YouTube and using PowerPoint presentations. They save these materials on flash drives so they can still teach effectively without needing to be online.

What stood out was how thoughtful teachers are in choosing the tools that suit their classroom setup. For example, some teachers take advantage of their classroom's location near a Wi-Fi router to stream educational videos. These choices show careful planning and reflect an understanding of how to keep lessons interesting and engaging, even with limited resources. Their approach aligns with the TPACK framework, which highlights the importance of combining content knowledge, teaching methods, and technology use.

Classroom Activities Involving Technology

Technology is not just used for showing videos—it plays a big role in everyday classroom activities. Teachers mentioned using tools like YouTube Kids, ABC Mouse, Endless Alphabet, and PowerPoint to teach basic concepts such as letters, numbers, colors, shapes, storytelling, and comparing sizes.

These digital tools are age-appropriate and interactive, which makes it easier for young learners to understand abstract ideas. Teachers said that their students are more focused and interested when technology is part of the lesson. This supports educational theories like Piaget's idea that children learn best through hands-on, sensory-rich experiences, and Bandura's theory that children learn by observing others—including characters in educational videos.

Teachers' Experiences Using Technology

Overall, teachers had very positive experiences using technology in their classrooms. They noticed that their students were more engaged, motivated, and willing to participate in class activities. But what's even more important is that the teachers didn't just rely on technology for the sake of it—they made sure it had a clear purpose. They set learning goals, carefully chose which tools to use, and explained to students why they were using them.

This thoughtful approach to technology use reflects good teaching practices. It also connects to learning theories like Vygotsky's Zone of Proximal Development, where teachers guide students through new concepts with the right support. Technology, in this case, acts as a helpful tool that makes learning easier and more fun. The teachers' methods also reflect the Engagement Theory, which emphasizes learning through meaningful and interactive experiences.

This study shows that kindergarten teachers are not just using technology to follow trends—they are making smart and intentional choices to improve their teaching and better support young learners. Even when faced with limited resources or internet access, they find creative ways to make lessons engaging and developmentally appropriate. Their practices show a deep understanding of both the technology they're using and the needs of their students. This points to a growing confidence and skill among early childhood educators in using digital tools to support learning in meaningful ways.

CONCLUSION

This study explored how kindergarten teachers use technology in their classrooms, focusing on the tools they use, the classroom activities they apply them to, and their experiences in doing so. The findings show that technology is not only present in early education but is being used thoughtfully and purposefully. Teachers integrate digital tools such as laptops, televisions, flash drives, PowerPoint, and educational apps like YouTube Kids and ABC Mouse to enhance lessons and keep young learners engaged. These tools help make learning more interactive, fun, and suitable for the developmental needs of young children.

Teachers shared that technology boosts children's attention, participation, and motivation. However, they also highlighted the importance of preparation—choosing the right tools, setting clear goals, and giving proper instructions. This shows that technology is not used as a replacement for teaching, but as a support to make lessons more effective and meaningful. Despite challenges like internet instability, teachers find ways to use technology wisely and creatively, often downloading materials in advance and selecting tools that suit their classroom environments.

The results reflect that technology integration, when done with care and planning, is more of a boon than a bane. It helps teachers meet educational goals, supports different learning styles, and aligns with well-known child development theories such as those by Piaget, Vygotsky, and Bandura. Technology becomes a tool not just for teaching, but for building communication, problem-solving, and literacy skills in a way that young learners understand and enjoy.

The study affirms that when kindergarten teachers use technology with intention and purpose, it becomes a powerful part of early education. It shows that with the right mindset and strategies, even limited resources can lead to rich and meaningful learning experiences for young children.

RECOMMENDATION

Based on the findings, kindergarten teachers are making thoughtful and strategic use of technology to enhance learning. However, many of these efforts are limited by the availability and reliability of resources. To support and expand the positive impact of technology in early childhood education, a strong and collaborative partnership between local government units and schools is essential.

Local governments play a vital role in providing necessary infrastructure and support. We recommend that they work closely with schools to assess their technological needs, such as access to reliable internet, updated digital devices, and age-appropriate educational software. Providing schools with essential tools—like laptops, projectors, smart TVs, and Wi-Fi routers—can significantly improve the learning experience. In return, schools can offer regular updates and feedback on how these tools are being used to improve student engagement and development.

Training and support for teachers should also be prioritized. Local government can help fund professional development programs that equip teachers with skills to use technology effectively and creatively. These training sessions should include both technical know-how and practical strategies for classroom integration, especially in low-resource settings.

Moreover, creating a shared resource system within districts can help schools maximize what is available. For example, schools can share access to high-quality educational platforms or rotate mobile tech units (such as tech carts with tablets or portable projectors). This kind of resource-sharing can be especially helpful in areas with limited budgets.

Lastly, communication between local governments, school administrators, and teachers must be open and ongoing. Regular meetings or forums can help ensure that decisions are based on actual classroom experiences and that resources are allocated where they are needed most.

In summary, researcher recommend a collaborative approach where local governments provide infrastructure, training, and ongoing support, while schools continue to design engaging and developmentally appropriate learning experiences. This partnership will help ensure that every child—regardless of location or school resources—can benefit from the power of technology in early education.

Approval Sheet

The Undergraduate Research Proposal Attached Hereto Entitled, “Technology Integration in Kindergarten Classroom: A Boon or A Bane”, Prepared and Submitted by Juliet Adaya, Jesica Boquila, Jecel Jerusalem and Bethel Mae Kilat, in Partial Fulfillment of The Requirements for the Degree Bachelor of Early Childhood Education is Hereby Endorsed. Gladys S. Escarlos, Phd Date

Research Adviser

ACKNOWLEDGEMENT

With sincere gratitude and deep appreciation, we humbly offer our heartfelt thanks to our Almighty God, the source of all wisdom, strength, and perseverance. It is through His divine guidance and boundless grace that we were able to begin, continue, and complete this research journey.

To our beloved Ma’am Gladys, our research adviser, we are deeply thankful for your unwavering support, expert guidance, and constant patience. Your belief in our abilities gave us the confidence to face every challenge with courage. You were not just an adviser, but a mentor who truly cared about our growth, both as students and as

individuals. Every word of encouragement you gave, every correction you made, and every moment you spent with us left a lasting impact. You taught us the value of discipline, commitment, and compassion in the field of research. Your wisdom was our light in times of confusion, and your support was our anchor in moments of doubt.

To Ma'am Yen, our adviser, thank you for being a remarkable partner on this journey. Your insights, enthusiasm, and dedication brought so much depth and clarity to this study. You stood with us through the difficulties and shared in our small victories along the way. Working with you has been a true blessing, and your contributions to this research were both invaluable and inspiring. Your positive energy and collaborative spirit made every step of this process lighter and more meaningful.

To our research participants, we extend our deepest gratitude. Thank you for generously sharing your time, thoughts, and experiences with us. Your honesty and willingness to open your hearts gave this study the soul it needed. Each story you shared enriched our understanding and brought life to our research. Your participation was a gift we will always value and remember with gratitude.

We would also like to express our thanks to our families, whose love, support, and prayers sustained us during the entire research process. Their patience and understanding allowed us to focus and continue, even during the most demanding moments. To our classmates and friends who stood by us, offered words of encouragement, and reminded us of our strength when we were close to giving up—thank you for being our quiet source of strength.

And above all, we give glory and honor to our Lord God. Without Him, none of this would have been possible. He gave us the wisdom to think, the courage to act, and the strength to endure. Through every sleepless night, every moment of doubt, and every difficulty, it was His presence that comforted and sustained us. His divine timing, unfailing love, and endless grace carried us through.

This research is not just a product of effort, but of faith—faith in our mentors, in each other, in our participants, and above all, in God. We dedicate this work to Him, our ever-faithful guide. Thank You, Lord, for being the center of it all. May this work serve not only as an academic accomplishment but also as a humble offering to Your glory.

DEDICATION

This research is lovingly and humbly dedicated to our dearest parents/guardian—Mrs. Felinda Boquila, Mercelyn G. Ayawan, Lotis Joy Pesisano and Airene J. Bakilid—who have been our first teachers, our silent heroes, and our constant source of strength. From the very beginning, you have given us everything—your time, your energy, your wisdom, and your unconditional love. You have stood by us through every high and low, often without recognition, but always with unwavering faith.

To our mothers/guardians, thank you for the sleepless nights you spent praying for our success. For the gentle reminders to keep going, even when we wanted to give up. For the meals you prepared when we were too tired to care for ourselves, and for the quiet strength you offered when we felt weak. You may not have written a single word of this paper, but every word was made possible because of you. You gave us the freedom to chase our dreams and the courage to face the challenges along the way.

When we doubted ourselves, you reminded us of our worth. When we made mistakes, you offered forgiveness and grace. You have always believed in our potential, even when we couldn't see it ourselves. You have taught us what it means to be strong, to be kind, to work hard, and to be grateful. Those values shaped who we are and guided us throughout this entire journey.

In every late night we spent writing, and every early morning we rose to study, your love was the force that pushed us forward. Your sacrifices did not go unnoticed—they are deeply felt and forever appreciated. We saw how you quietly bore the weight of our needs, never asking for anything in return. You gave your all so we could

have the chance to learn, grow, and succeed. You may not wear medals or hold titles, but to us, you are our greatest champions. Everything we have achieved is because of the foundation you built beneath us.

This milestone is not ours alone—it belongs to you. It reflects your hard work, your faith, and your endless giving. Even when life was hard, you never stopped giving us hope. You kept believing, even when we wanted to quit. You never let us walk alone. You reminded us that success is not about perfection but perseverance. And that love, when given freely and fully, can move mountains. We are proud to call you our mothers. We are proud to dedicate this work to you.

Every page of this research carries your love between the lines. Every accomplishment we celebrate is one we share with you. This is more than an academic paper it is a symbol of your sacrifice, your dreams for us, and the legacy of strength you've passed down.

To Mrs. Felinda Boquila, Mercelyn G. Ayawan, Lotis Joy Pesisano and Airene J. Bakilid thank you for being our pillars. This work is for you. We hope to make you proud, not just through this research, but through the lives we live and the love we carry forward.

With all our hearts, and with endless love and gratitude thank you.

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APPENDICES

Appendix A. Letter to the School Principal

Republic of the Philippines
CENTRAL MINDANAO UNIVERSITY

College of Education
Department of Professional Education

February 13, 2025

MR. WEENKIE JHON A. MARCELO
Musuan, Maramag, Bukidnon
Musuan Integrated School

Dear Mr. Marcelo,

Greetings of peace and goodwill!

We, the third-year students of the Bachelor in Early Childhood Education at the College of Education, Central Mindanao University, are currently working on the research study entitled **"TECHNOLOGY INTEGRATION IN KINDERGARTEN CLASSROOM: A BOON OR A BANE"** as part of the requirements for Educ. 95.2 (Research in Early Childhood Education). In view of this, we are formally requesting permission to conduct the study in your school, specifically with the kindergarten teachers. We will ensure that we observe ethical conduct during the data-gathering period and the data gathered will be kept strictly confidential.

Thank you very much, and I hope for your favorable response.

Respectfully yours,

BETHEL MAE KILAT
GROUP REPRESENTATIVE

Noted by:

GLADYS S. ESCARLOS, PhD
Adviser

Approved:

MR. WEENKIE JHON A. MARCELO
Date: 2/13/2025

MUSUAN INTEGRATED SCHOOL
RECEIVED BY:
DATE: 02-13-2025

Email: cedprofed@cmu.edu.ph *The Academic Paradise of the South* Contact Number: 09177027928

Appendix B. Consent letter

Republic of the Philippines
CENTRAL MINDANAO UNIVERSITY

College of Education
Department of Professional Education

February 11, 2025

Musuan, Maramag, Bukidnon
Musuan Integrated School

Dear,

Greetings of peace and good will!

We, the third-year students of the Bachelor in Early Childhood Education at the College of Education, Central Mindanao University, are currently working on the research study entitled **"Technology Integration: A Boon or A Bane"** as part of the requirements for Educ. 95.2 (Research in Early Childhood Education). This study aims to examine the impact of technology integration on the engagement of kindergarten learners. We believe that the findings will provide valuable insights into effective teaching strategies that can benefit both educators and students.

In line with this, we respectfully seek your consent to participate in the study, which will involve an in depth-interview about your experiences in using technology in the classroom. The interview will be scheduled at your convenience and will be conducted with minimal disruption to your teaching responsibilities.

Please be assured of the following:

1. Participation in this study is entirely voluntary, and you may withdraw at any time without any consequences.
2. All information gathered will be treated with the utmost confidentiality and used solely for academic purposes.
3. No personally identifiable information will be included in the research report.

Your cooperation and insights as an educator are highly valuable to this study, and we sincerely hope for your support. Should you have any questions or require further information, please feel free to contact us at 09757120266.

Thank you very much for your time and consideration.

Email: cedprofed@cmu.edu.ph *The Academic Paradise of the South* Contact Number: 09177027928

Appendix C. Questionnaire

The purpose of this study is to explore the teachers' experiences in integrating technology, the positive and negative of it. Your insights will help the researchers better understand the challenges, strategies, and opportunities teachers encounter in integrating technology in kindergarten classrooms.

This interview is semi-structured; The researchers prepared questions to guide the discussion, but you are free to share additional thoughts or elaborate your answers. Your response will remain confidential and will only be used for research purposes. If at any point you feel uncomfortable answering a question, you may skip it. Your participation is highly valued, and we appreciate your time and effort in contributing to this study.

What are the technologies (e.g., tablets, interactive whiteboards, educational apps) used by the kindergarten teacher during the teaching- learning process?

What types of technologies (e.g., tablets, interactive whiteboards, educational apps) are commonly used by the Kindergarten teacher during the teaching-learning process?

Why do you use these technologies (e.g., tablets, interactive whiteboards, educational apps) are commonly used by Kindergarten teacher during the teaching-learning process?

How do you use these technologies (e.g., tablets, interactive whiteboards, educational apps) are commonly used by Kindergarten teacher during the teaching-learning process?

What are the classroom activities where the teacher uses technology?

Can you share examples of classroom activities where you use technology?

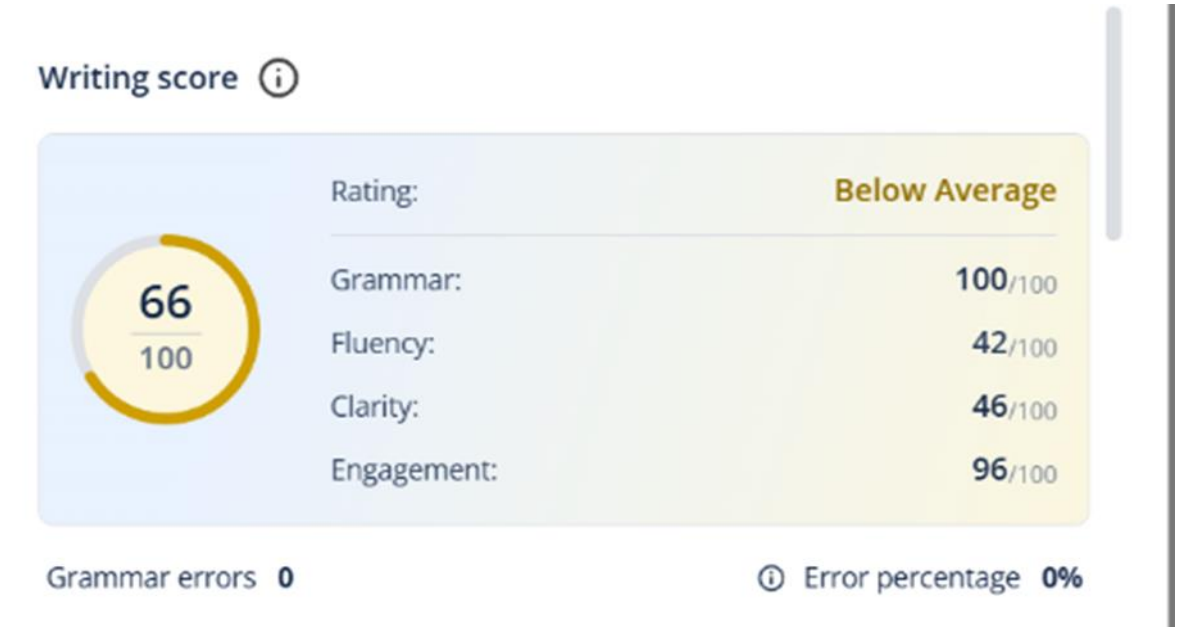
Are there any particular apps, software, or devices that you find most effective for teaching Kindergarten udents?

What are the experiences of Kindergarten teachers when technology is used during class?

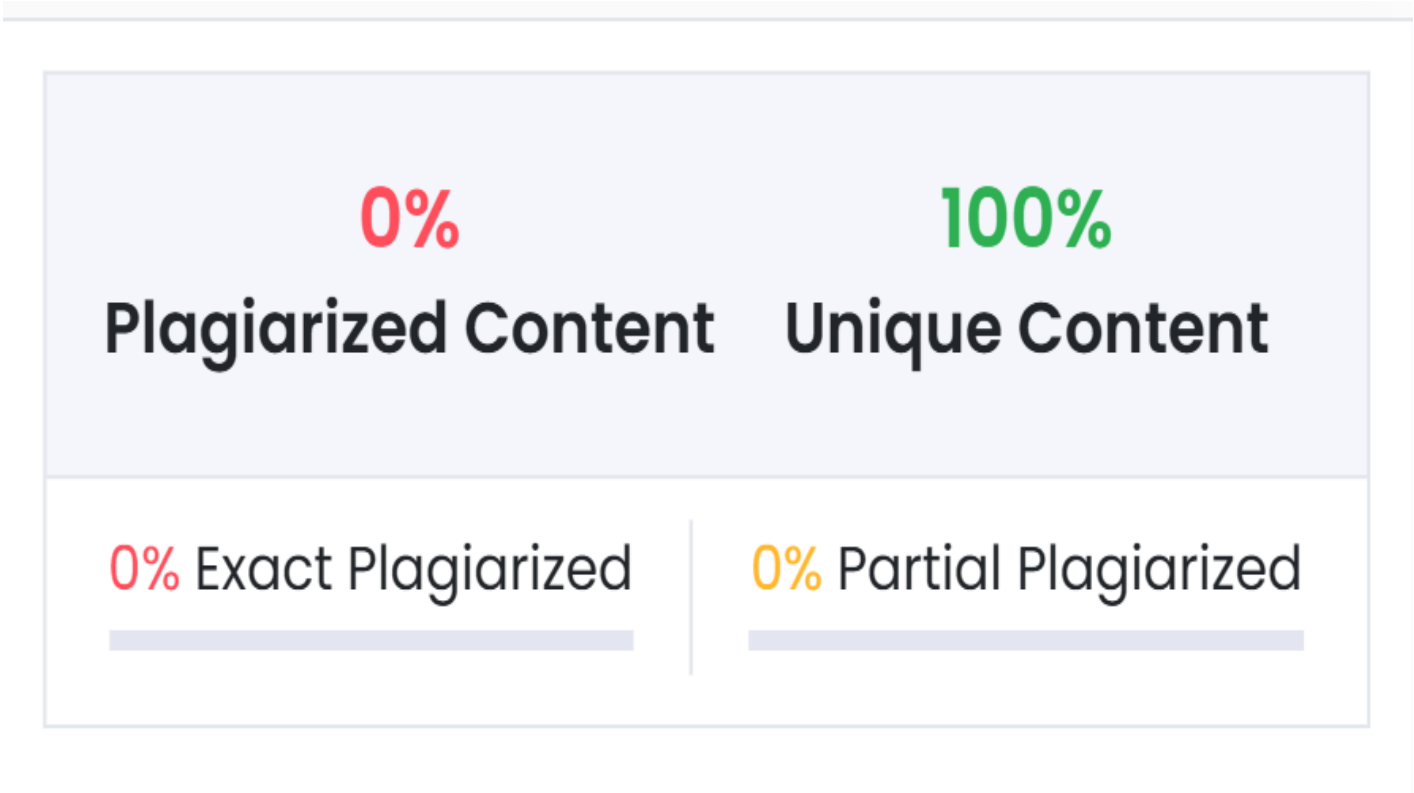
When do you use technology in your class?

How do you facilitate your class during the integration of technology?hat are the behaviors of the learners that you observe during the integration of technology?

Appendix D. Grammar Check



Appendix E. Plagiarism Check



Appendix F. Documentation

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS | Volume IX Issue VI June 2025