

Classroom Digital Integration and Technology Adaptation in Lupon East District

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Abstract. The study aimed to determine the Classroom Digital Integration and Teaching Experiences of teachers in Lupon Davao Oriental with the quantitative, non-experimental research approach to examine the relationship and research participants were 100 hundred out of 134 teachers by the used of the Raosoft calculator. The two theories of Diffusion of Innovations by Rogers and the Technology Acceptance Model (TAM) by Davis serve as the foundation for this investigation. The results of this study could be published in a reputable scholarly publication. Furthermore, it was suggested that researchers investigate different approaches and frameworks to maximize the use of classroom digital integration in the classroom while making sure they satisfy the various needs of students. The findings revealed that the Extent of Classroom Digital Integration in Lupon Davao Oriental, in terms of Connectivity, Self-efficacy and Students learning is extensive, while the extent of Technology Adaptation of Teachers, in terms of Self-awareness, Focus on Students, and acting responsively, were also extensive or oftentimes observed. A significant relationship existed between the Classroom Digital Integration and Technology Adaptation of Teachers. Moreover, Domains of management that influence Classroom Digital Integration, such as connectivity, and Self efficacy, significantly impact Technology Adaptation of Teachers. While student learning only is insignificant. Students' positive participation in class can be encouraged by using digital tools.

KEY WORDS

1. Classroom digital integration
2. technology adaptation of teachers in Lupon East District
3. Self-efficacy

Date Received: April 05, 2025 — Date Reviewed: May 15, 2025 — Date Published: June 18, 2025

1. Introduction

The increasing dependence on technology for sharing knowledge has fundamentally transformed societal operations, influencing how people live, work, and think. Consequently, schools and other educational institutions must embed technology into their teaching practices to equip learners with the competencies required in a knowledge-based society. Integrating digital tools in the classroom is vital for updating educational approaches, boosting student participation, and preparing learners for a technologically advanced future. This integration brings several advantages, such as heightened engagement, easier resource access, and the development of crucial skills for the modern era. In the global context, ICT integration in education refers to embedding computer-assisted communication into classroom teaching. Teachers play

a key role in utilizing ICT tools to prepare students for the digital age and create dynamic and interactive learning environments. The networking of learning communities through ICT offers several advantages, including improved instructional quality, increased accessibility, and cost efficiencies, all of which address the demands of globalization. Information, communication and technology enrich teaching and learning across disciplines through various methods, such as educational videos, simulations, data handling, mind mapping, directed research, collaborative idea generation, music, and internet resources. These tools provide students access to a broader range of learning materials and hands-on experiences, fostering more profound understanding. Furthermore, ICT enables educators to design engaging, innovative, and practical lessons that motivate students (Jogezai et al., 2021). The influence of ICT extends beyond education, transforming sectors like agriculture, healthcare, engineering, and business. Over the past decade, ICT tools have reshaped thinking, business practices, and communication. In education, the integration of ICT supports new approaches to teaching and learning, with teachers and students playing active roles in the process (Azhar et al., 2022). However, while ICT enhances instruction, it should supplement, not replace, quality teaching. Its importance has also been highlighted by the ability to facilitate remote learning, making education possible even when teachers and students are not physically together, and fostering ongoing innovation in teaching practices (Thaheem et al., 2021). Despite its benefits, ICT integration poses challenges. Effective use requires teachers to be ICT literate, adapt to digitally adept students, select suitable instructional strategies, and develop and implement digital resources for teaching and assessment. Moreover, updating ICT practices demands time and additional effort, and limitations in infrastructure—such as insufficient electricity, devices, or internet access can

hinder implementation (Hafifah, 2020). Technical difficulties in schools can also disrupt the learning process, causing annoyance for pupils as well as for teachers. Questions regarding equipment failure, poor connectivity, malware, or malfunctioning peripherals can discourage educators from using technology. Nevertheless, some countries, like the Netherlands, the United Kingdom, and Malta, have recognized the importance of technical support in helping teachers effectively use ICT in the classroom. Still, challenges persist, including the need for ICT literacy among educators, appropriate resources, and time and support to stay current with technology (Asad et al., 2020). Given these challenges and the limited ICT infrastructure in many schools, not all teachers possess the necessary ICT skills, even as students become more technologically savvy. This gap presents difficulties specifically for educators attempting to integrate technology into their classrooms. Consequently, there was a need to explore how educators in the Lupon East District of Davao Oriental adapt to and incorporate technology in their approaches to instruction. Furthermore, classroom digital integration in teaching within Lupon, Davao Oriental, is hampered by declining digital proficiency, insufficient resources, and gaps in teacher competency related to digital exposure. These factors impede teachers' ability to develop skills in digital connectivity. Therefore, this research investigates whether the classroom digital integration tools can meaningfully improve instruction and learning in the district, potentially leading to a more engaging and practical educational experience.

1.1. Theoretical/Conceptual Framework of the Study—This research is guided by two key theoretical frameworks: Rogers' Diffusion of Innovations Theory (2003) and Davis' Technology Acceptance Model (TAM) (1989). Rogers' theory suggests that innovations spread through specific communication channels among social system members over

time. The process starts when individuals become aware of the innovation, which is influenced by their perceptions and characteristics relevant to decision-making. The process culminates when users confirm their acceptance and fully integrate the technology into their practice. The Technology Acceptance Model (TAM) outlines several factors related to technology adoption, such as behavioral intention, perceived usefulness, and perceived ease of use. Perceived usefulness denotes a user's conviction that employing a specific technology would improve their job performance, while perceived ease of use relates to how user-friendly the technology appears. The Technology Acceptance Model (TAM) functions as a framework for assessing a technological system's acceptance, efficacy, and worth. The conceptual framework developed for this study incorporates factors that directly relate to the main objective—understanding how knowledge, perceptions, and other variables influence the perceived usefulness and ease of ICT integration in the classroom. These factors have been carefully selected to reflect their interconnected influence on teachers' successful integration of ICT. A central aspect of the framework is teachers' intention to integrate technology, which is influenced by perceptions of ease of use, functionality, flexibility, accessibility, and the integration process itself. Teachers' intentions are shaped by how beneficial and accessible they find the technology, which in turn impacts their actual use of ICT. This frame-

work guides the research in identifying elements that affect digital integration among educators. Additionally, Kickert (1979) highlights that the effectiveness of organizational structures is influenced by contextual factors, such as the environment's complexity, the nature of core technologies, and the organizational climate. In schools, these contextual elements include relationships among principals, teachers, students, and other stakeholders. A culture of trust within an organization fosters a sense of belonging and higher levels of engagement among its members. When parents and stakeholders feel valued in educational settings, they are more likely to support school initiatives. Schools that prioritize student achievement tend to make optimal use of available resources to reach their goals. In the same vein, educators who facilitate student learning. Teaching quality and student learning outcomes are frequently improved when instructors maintain a positive outlook. The conceptual framework for this research is depicted in Figure 1. The framework focuses on two primary variables: Classroom Digital Integration in Lupon, Davao Oriental which is evaluated through aspects such as connectivity, teachers' self-efficacy, and student learning—and Teaching Experience, which is measured by indicators like self-awareness, attention to students, and responsive instructional practices. The diagram visually represents how these variables are interconnected.

2. Methodology

This chapter outlines the methodological approach, including ethical considerations, procedures for selecting participants, the research tools employed, steps for data collection, analysis techniques, and data management methods. Together, these components facilitate a clear understanding of and response to the research problem.

2.1. Research Design—This study employed a quantitative, non-experimental approach to investigate how digital integration in classroom settings relates to technology adoption, with motivation to read considered as a potential mediating factor. The non-experimental

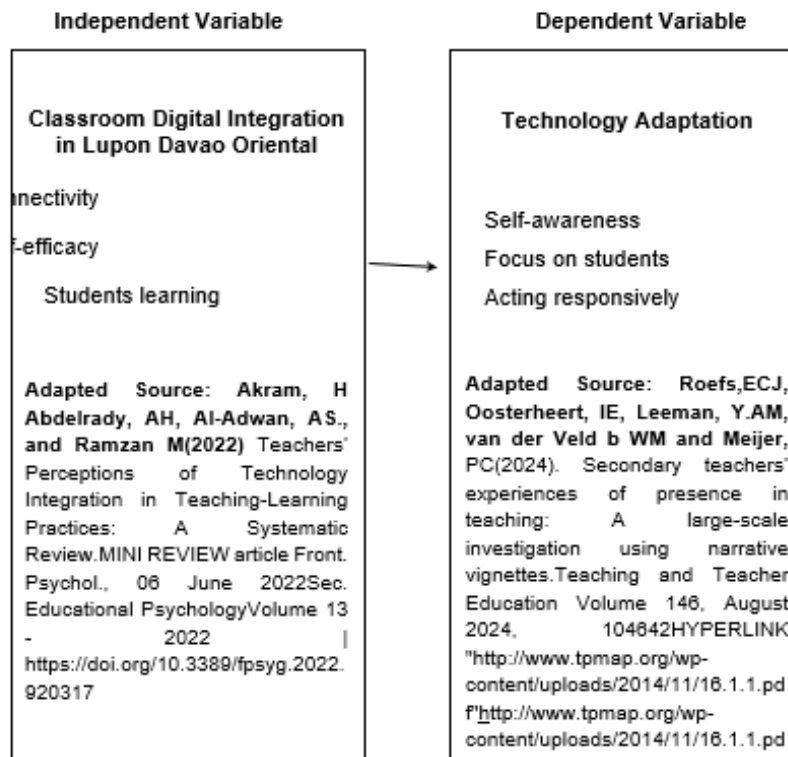


Fig. 1. Theoretical/Conceptual Framework

approach was deemed appropriate because the aim was to observe and analyze how these factors interact within real educational settings, rather than manipulating variables or assigning participants randomly. This method is consistent with educational research that seeks to understand natural phenomena without the constraints of experimental manipulation cited by Creswell, J. W., Creswell, J. D. (2018). Through this approach, the study offers an unbiased examination of how teachers' integration of ICT relates to their professional experiences. Within this framework, both descriptive and correlational research methods were employed to examine the key variables. Descriptive statistics provided an overview of the data, highlighting teachers' experiences with adopting technology, while correlational analysis explored the strength and direction of the relationships among these variables. This combination of methods was appropriate for uncovering meaningful patterns and associations, as well as gaining insight into how digital tools and motivation interrelate, ultimately supporting the enhancement of critical thinking skills (Lim, 2020). In summary, this research design offers a comprehensive understanding of the factors that influence successful digital integration and technology adaptation in educational settings.

2.2. Ethical Consideration—This section outlines the ethical guidelines followed to protect and respect the rights and well-being of student participants in the study. Key principles included maintaining confidentiality, securing informed consent, ensuring voluntary participation, and conducting the research with honesty and respect for all individuals involved. The study utilized a descriptive survey approach, collecting quantitative data to examine the identified phenomenon. Data collection was scheduled appropriately and centered on obtaining responses from the selected participants using questionnaires. The research focused on classroom digital integration and technology adapta-

tion within the Lupon East District, Davao Oriental, for the academic year 2024-2025. The investigator adhered to established protocols and standards throughout the research process, especially in managing participant information and data. Survey instruments and references were submitted for review and approval by the Ethics Committee before proceeding with the next phase of the study. Upholding these ethical standards was crucial to making responsible decisions, safeguarding the rights and welfare of participants and communities, and fostering a culture of integrity and trust with all stakeholders.

2.3. Research Respondents—In this research, the participants comprised public elementary school teachers from the Lupon East District in Davao Oriental for the 2024-2025 academic year, totaling 134 educators. The sample size was determined using the Raosoft calculator, with a 5A straightforward random sampling method was used to choose participants from different schools, ensuring that every teacher had an equal chance of being selected. This approach minimized selection bias and contributed to a sample that accurately reflected the population, thereby enhancing the validity and reliability of the results, in line with standard educational research methodologies. The chosen sample size was suitable for mediation analysis and descriptive-correlational techniques, providing enough statistical power to identify significant associations between variables, such as the impact of AI-powered study tools on reading motivation and critical thinking skills (Hayes, 2022). Additionally, this sample size made data collection manageable within the study's scope, ensuring robust and meaningful findings. By focusing on teachers' experiences in Lupon East District for the 2024-2025 school year, the research aimed to inform the development of educational strategies and policies that promote critical thinking, reading motivation, and effective digital integration. The insights obtained

would help prepare future educators to adopt digital integration practices, fostering innovation and a culture of lifelong learning in Lupon, Davao Oriental.

2.4. Research Instrument—The survey questionnaire used in this study was adapted and refined from previous research by Akram, A. et.al.,(2022) and Roefs,E. et. al., (2024), to suit better the current study’s context and the perspectives of teachers regarding ICT integration and their experiences. It underwent content validation and reliability testing to ensure the instrument’s appropriateness for the local set-

ting. The scale used offers a detailed structure for assessing Classroom Digital Integration in Lupon, Davao Oriental, making it well-suited for this research. It enabled collecting in-depth data on the benefits and challenges of adapting digital and AI tools in the classroom, as perceived by teachers. This approach provided valuable insights into how these tools contribute to skill development and academic outcomes. Responses were gathered using a 5-point Likert scale, with results interpreted according to defined categories stated below:

Range of Mean, Descriptive Level, and Interpretation

Range of Mean	Descriptive Level	Interpretation
4.20 – 5.00	Very Extensive	The classroom digital integration in Lupon, Davao Oriental, is always manifested through ICT integration.
3.40 – 4.19	Extensive	The Digital Integration in Classrooms in Lupon, Davao Oriental, is often evident.
2.60 – 3.39	Moderately Extensive	The Digital Integration in the Classroom in Lupon, Davao Oriental, is sometimes evident.
1.80 – 2.59	Less Extensive	The teacher’s perception of ICT integration is seldom manifested.
1.00 – 1.79	Not Extensive	The Digital Integration in the Classroom in Lupon, Davao Oriental, is not yet evident.

The survey instrument for teaching experience evaluated three key areas: self-awareness, student focus, and responsive action. Its purpose was to assess participants’ reflective thinking, their skill in identifying underlying assumptions, and their ability to differentiate relevant

from irrelevant details all in relation to their effectiveness with Classroom Digital Integration in Lupon, Davao Oriental. Responses were measured on a 5-point Likert scale, with results interpreted according to specific categories stated below:

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o confirm the accuracy and consistency of the instruments, a pilot test was carried out prior to the main data collection. A subset of students from the target population participated in this

preliminary testing, which helped to identify any ambiguities or issues within the questionnaire items and to verify that the scales effectively measured the intended constructs. Feed-

Range of Mean, Descriptive Level, and Interpretation

Range of Mean	Descriptive Level	Interpretation
4.20 – 5.00	Very Extensive	Adaptation of technology is always manifested.
3.40 – 4.19	Extensive	Adaptation of technology is often manifested.
2.60 – 3.39	Moderately Extensive	Adaptation of technology is sometimes manifested.
1.80 – 2.59	Less Extensive	Adaptation of technology is seldom manifested.
1.00 – 1.79	Not Extensive	Adaptation of technology is never manifested.

back from the pilot test was used to refine and enhance the questionnaires, ensuring they were clear and effective for collecting the necessary information. The data collected through these instruments were analyzed to explore the relationship between Classroom Digital Integration

and technology adaptation in Lupon, Davao Oriental. By employing validated measurement tools and categorizing the results clearly, the study offered an in-depth understanding of the key factors that impact educational outcomes for teachers in Davao Oriental.

2.5. Data Gathering Procedure—After confirming the validity of the research questionnaire, the researcher followed a structured data collection process, beginning with securing the required approvals to carry out the study.

Securing Permission to Conduct the Study

The first step involved obtaining formal authorization, beginning with an endorsement from the Dean of the Graduate School at Rizal Memorial Colleges, Inc. in Davao City. Along with this endorsement, permission letters were sent to the college deans of selected private higher education institutions in Davao Oriental. The researcher personally delivered these documents to the deans' offices, clearly explaining the study's objectives and requesting their support and participation.

Distribution and Retrieval of the Questionnaire Once the graduate school dean granted approval, the researcher distributed the survey instruments to the selected participants. This

stage was planned for the second quarter of the 2024-2025 academic year. The researcher personally managed the distribution, offering a brief overview to participants about the study's purpose and relevance to ensure they understood the survey's context and the value of their candid responses. The questionnaires were handed out simultaneously, ensuring that all participants had sufficient time to complete them in an environment with minimal distractions. Upon completion, the researcher collected the questionnaires promptly to preserve the accuracy and reliability of the data.

Collation and Statistical Treatment of Data After collecting the completed questionnaires, the researcher systematically compiled and statistically analyzed the data. Individual responses were organized based on the relevant indicators being measured. The data were then entered into the Statistical Package for the Social Sciences (SPSS) for thorough analysis and

interpretation. Descriptive and inferential statistical techniques were utilized to determine the relationships between digital integration in classrooms and the teachers' technology adaptation in Lupon, Davao Oriental. This careful and methodical approach ensured the accuracy and relevance of the results, offering meaningful insights into the study's research questions.

Social Value

The researcher emphasizes the broader social significance of this study, particularly by incorporating teachers' viewpoints and experiences in advancing scientific understanding through blended learning. The study's objectives are aligned with addressing the community's needs, including those of educators and parents, by providing insights that can inform and improve their perspectives, attitudes, and approaches to overcoming challenges related to blended science education. The findings may also assist school leaders and faculty design effective instructional strategies that cater to all students, thereby supporting academic achievement and fostering motivation for successful learning.

Informed Consent

An essential principle of research ethics was that participants were involved voluntarily and fully informed about their participation, which was achieved through informed consent. In this study, securing informed consent was a priority to make certain that all participants were thoroughly briefed about the research and could make a conscious decision regarding their involvement. The Graduate Studies Department at Rizal Memorial College Inc. adhered to established protocols and guidelines to guarantee that the consent process met ethical standards. Written consent was obtained from every participant after providing them with comprehensive information about the study's purpose and procedures, ensuring they understood what was required of them. This approach was fundamental to protecting participants' rights, fostering

ethical conduct, building trust, and enhancing the credibility of the research. Participation was strictly voluntary; individuals were free to decline without any pressure. The researcher also took care to safeguard the psychological well-being of all respondents. Participants were informed that the study aimed to examine factors affecting students' learning interests concerning teaching methods, with the broader goal of contributing to educational improvement.

Vulnerability of Research Participants

Since all participants in this study were adult teachers, they were not classified as a vulnerable age group. However, attention was still given to their potential psychological vulnerability. The researcher ensured that participation in the survey was arranged at the respondents' convenience and that all shared information was kept strictly confidential. This approach helped maintain ethical standards and guaranteed respect and benefits for everyone involved. Furthermore, the researcher ensured that participants' personal details would not be shared without their explicit permission. Access to sensitive data was limited, and after gathering the required information, all survey responses were permanently erased to eliminate any chance of linking the data to specific individuals. This approach protected the confidentiality and security of all contributors involved in the research.

Risks, Benefits, and Safety During the survey process, the researcher provided participants with a clear explanation of their role, the goals of the study, and the potential advantages of taking part. Participants were assured that their responses would be kept confidential, as detailed in the instructions provided with the online survey. They were also invited to ask any questions they might have about the study without any restrictions. Additionally, the researcher took measures to prevent any possible harm to participants. The survey and interview materials were carefully reviewed to ensure they did not contain any language that could be deemed

offensive or inappropriate. This study focused solely on gathering academic information relevant to the research topic, and participants were not required to provide any personal details. To minimize any inconvenience, respondents were given sufficient time to complete the survey. They were also informed that they could skip any questions that made them uncomfortable or withdraw from the study at any time if they felt unable to continue. The researcher placed a strong emphasis on respecting participants' well-being and valued their contribution to the study. Additionally, participants were assured that their involvement in the research would not pose any foreseeable risks to their health or safety. If any respondent experienced distress while completing the survey, the researcher was prepared to assist them in accessing support from a qualified professional. Alternative arrangements would be made to ensure data collection could proceed without compromising the participants' welfare. Justice The researcher took care to ensure impartiality in the selection of respondents, treating all eligible participants with equal consideration. There was no bias in the respondent selection process, with only duly enrolled Grade 10 students at the chosen schools who could participate. Throughout the study, the researcher minimized disruptions to participants' daily routines. To acknowledge the time and effort of the respondents, tokens of appreciation—consisting of small souvenirs—were provided. These tokens were sanitized and securely packaged before being sent to recipients via courier. Transparency was maintained at every stage of the research. All interactions with the research team were conducted openly and honestly. The researcher followed the outlined procedures to protect the well-being of all participants. Supporting documentation for data analysis was included, and the researcher detailed the scope of participant involvement and described how objectivity was ensured in data analysis and reporting of results, and the

research process aimed to foster trust and reliability in quantitative studies by prioritizing transparency and integrity.

Qualification of the Researcher

This study aimed to minimize external factors, such as conflicts of interest, from influencing the participants' answers. The results were provided to parents and school officials from the participating schools, on the condition that they adhered to confidentiality guidelines to ensure the anonymity of respondents. The researcher also expressed gratitude to everyone who contributed to the completion of the study, including the participants from the Lupon Division of Davao Oriental for the 2024-2025 academic year. Additionally, copies of the research findings were shared with the respondents so they could review the information and utilize it for their educational development and future reference.

Adequacy of Facilities

The researcher created a supportive environment for the participants and made use of adequate and accessible learning resources throughout the study, all within the established timeline. To ensure accuracy in data collection, responses were carefully recorded at times when the researcher was alert, reducing the risk of errors. Moreover, the analysis was conducted meticulously, ensuring the findings were comprehensive and closely matched the data, supporting the study's overall validity. Plagiarism Plagiarism was a violation of academic honesty and reflects poor scholarly practice. Whether intentional or not, plagiarism can negatively affect one's future career. Students and researchers must ensure their work is original and properly cited. In this study, sources were appropriately referenced to acknowledge the origins of information, highlighting the value of sound research practices, time management, and personal accountability in learning. The researcher also paraphrased content properly, used direct quotations with appropriate citation, and avoided

copying and pasting from multiple sources without proper acknowledgment.

Fabrication and Falsification

The researcher diligently upheld standards related to honesty and avoided conflicts of interest throughout the study. Participants were assured that the research was conducted with integrity and transparency. According to Creswell (2019), the ethical considerations of transparency generally outweigh any potential risks associated with participant deception. The researcher provided thorough support to respondents, explaining the study's objectives, procedures, and the reasons for conducting the research. Participants were informed about their roles and the significance of their involvement. Additionally, the study followed the guidelines of the APA 7th edition for citations to ensure proper acknowledgment of sources and to prevent any misrepresentation or alteration of the data (Miles-Cohen et al., 2020). All information was reported as accurately as possible.

Community involvement This research emphasized the importance of involving the community throughout all phases, from the early planning stages to the completion and dissemination of the findings. This is intended to actively involve community members, giving them a significant role in shaping the research agenda, selecting suitable methodologies, and determining how the findings would be applied. The results of this study were to be communicated to the community through meetings, forums, and conferences, ensuring that stakeholders were informed and included in the discussion of outcomes.

Conflict of Interest

2.6. Data Analysis—The researcher applied a range of statistical techniques to analyze the data collected, with the goal of identifying patterns, relationships, and insights that could support informed decision-making and

The researcher implemented thorough measures to manage possible conflicts of interest throughout this study. Under no circumstances did secondary influences, such as financial benefits, academic recognition, or other incentives, compromise professional judgment related to the main goals such as safeguarding participant well-being or maintaining research integrity. The research was carried out with complete honesty, ensuring that no harm was inflicted upon any participants. All data and findings were meticulously examined and validated by a panel of experts (Lakey Cohen, 2020). Permission From the Organization/Location Before starting the research, the investigator obtained an endorsement letter signed by the Dean of the Graduate School. This letter was then submitted to the Superintendent of the Davao Oriental school division. Once approval was granted by the superintendent's office, the researcher sent the authorization to the school principals where the study would be conducted.

Authorship

Once the final version of the study was approved for publication, the researcher ensured that authorship was attributed not only to the adviser but also to colleagues who made significant contributions to the study's design, data collection, analysis, or to drafting and revising the manuscript. Participants were informed that they could reach the researcher via the contact details provided on the informed consent form should they have any questions, concerns, or feedback regarding the study. Additionally, the researcher committed to sharing the study's key findings and benefits with stakeholders during meetings and conferences.

contribute to meaningful findings. To summarize data related to classroom digital integration and technology adaptation addressing the first two research aims the mean was calculated. To explore the connection between the indepen-

dent variable (digital integration in classrooms) and the dependent variable (technology adaptation), the Pearson correlation coefficient was used. This method, indicated by "r," assesses the strength and direction of linear relationships between two variables and was employed to meet

the third research objective. Furthermore, multiple linear regression analysis was performed to evaluate how digital integration influences technology adaptation, providing answers to the corresponding research question.

3. Results and Discussion

This chapter provides a structured presentation, analysis, and interpretation of the collected data. Using both tables and descriptive summaries improves the clarity and comprehensibility of the analysis, facilitating the extraction of meaningful conclusions. Presenting the data in multiple formats deepens the reader's understanding and strengthens the evidence supporting the study's hypotheses. This comprehensive approach ensures the findings are accessible and persuasive, supporting the study's original claims.

3.1. Classroom Digital Integration in Lupon East District—Table 1 summarizes the Classroom Digital Integration in Lupon, Davao Oriental. The results focus on the highest and lowest mean ratings of indicators, which are as follows: Connectivity (3.91), Connectivity (4.01), and Student learning (3.94). These indicators are often manifested. The overall mean rating of 3.95 indicates that the extent of the Classroom Digital Integration in Lupon, Davao Oriental, is extensive and, thus, evident. Through initiatives by the Department of Information and Communications Technology (DICT) and programs like Tech4ED, Lupon, Davao Oriental is actively incorporating digital technologies into classrooms. Ultimately, this integration prepares students for the digital economy by improving student learning, empowering educators, and closing the digital divide. Technology-enhanced learning makes instruction more interesting and individualized for each student. Initiatives like free WiFi are aimed at bridging the digital divide, particularly in remote areas, by empowering teachers to enhance their teaching abilities and assisting students in developing critical digital literacy skills. However, there are obstacles like adequate teacher training, dependable infrastruc-

ture, expenses, and educating students about responsible digital citizenship. Furthermore, the degree of digital integration in the classroom affects how well students learn, how innovative the classroom is, and how well-prepared they are for a technologically advanced future. AI is a valuable teaching tool that automates administrative tasks like grading, allowing teachers to focus on interactive, individualized instruction. By meeting each student's needs and offering tailored feedback, digital integration in the classroom enhances the learning process. Mousavinasab et al. (2021), as cited in Janson and Janke 2024) and Hickey et al. (2020) agreed that the development and implementation of learning platforms and e-learning software are meant to benefit learners in striving for knowledge and their ability to perform well in learning assignments. One unique form of software is intelligent tutoring systems, which provide learners with skill-level-appropriate exercises and repetition material. Past research has shown those tools to bolster learning outcomes and to be as effective as human tutoring. Moreover, intelligent tutoring systems can reduce achievement gaps bound to a lack of learning opportunities as they are highly accessible. As such tools are accessible through one's

own devices and do not require students to be present in an actual classroom, the effective use of intelligent tutoring systems requires students' willingness to engage in self-regulated learning. In this regard, little is known about why and how students use intelligent tutoring systems and how differences in usage explain differences in the effectiveness of these systems. In particular, the interpretation of logfile data derived from such tools is a current research interest that oftentimes raises more questions than answers (Baker et al., 2020). The utilization of ICT in education to enhance the effectiveness of instructional practices has been considered crucial for several decades worldwide. Several studies have also highlighted the significance of ICT-integrated instructional approaches in meeting the educational needs of learners by enhancing their critical thinking and maintaining student motivation, which is viewed as a significant predictor of students' educational growth

(Xu et al., 2021). Liu et al. (2022) also found that technology-integrated learning enhances students' cognitive understanding and learning achievements. In addition, ICT-incorporated teaching-learning practices also enable learners to stay connected with their instructors and peers via various social media platforms, help students resolve their academic challenges, and encourage them to participate actively in learning activities (Liu Z. et al., 2021). Recognizing the importance of students' active involvement in learning activities, Liu S. et al. (2021) also suggested that teachers design collaborative activities using the computer-supported collaborative concept mapping (CSCCM) technique to develop a collaborative classroom environment, enhancing students' interest. To put it briefly, ICT-integrated teaching and learning is a time requirement, allowing learners to satisfy their learning needs and helping teachers align their teaching approaches with global standards.

Table 1. Summary of the Classroom Digital Integration in Lupon, Davao Oriental

No	Statement	Mean	Descriptive Equivalent
1	Connectivity	3.91	Extensive
2	Self-efficacy	4.01	Extensive
3	Students learning	3.94	Extensive
Overall Mean		3.95	Extensive

3.2. Technology Adaptation in terms of Self-awareness—The extent of technology adaptation is summarized in Table 9. The indicators' greatest and lowest mean ratings are the primary focus of the results. Self-awareness (3.85), Focus on Students (3.97), and responsiveness (4.22). These indicators are oftentimes manifested. The results suggest that Technology Adaptation is crucial in the learning process because it affects student engagement, accessibility, and the capacity to acquire various 21st-century skills; the degree of technologi-

cal adaptation is critical to the educational process. Technology integration in education is a potent instrument for educational advancement because it can foster critical thinking, improve collaboration, and personalize learning. Technology not only enhances accessibility and promotes equity by providing resources tailored to the diverse needs of students—including those from disadvantaged backgrounds or with disabilities—but also increases student engagement and motivation through interactive features like games and multimedia. It offers stu-

dents greater flexibility and autonomy in their learning while supporting the development of essential 21st-century skills such as collaboration, problem-solving, and digital literacy. Online platforms encourage both independent learning and teamwork by streamlining communication and collaboration. Additionally, technology allows for real-time monitoring and assessment, helping teachers identify areas where students need support and deliver targeted feedback to improve understanding. The availability of varied and cost-effective educational resources broadens access, making learning more inclusive, efficient, and responsive to the evolving demands of modern education. These findings are consistent with the research of Alam and Murad (2020), who noted that technology adoption has a substantial impact on a nation's economy by enabling engagement with goods and services and contributing to community wealth. The extent of technology adoption is often used as a benchmark for economic advancement and, in the context of rapid global technological growth, serves as a tool for enhancing performance and efficiency. Numerous studies have underscored the role of technology as a catalyst for economic development. To stimulate growth and capitalize on emerg-

ing opportunities, many developed countries have implemented policies to support the integration of technology-driven sectors and advanced technologies (Zheng Xingwu Wang et al., 2021; Baishya et al., 2020). Despite the risks and costs associated with developing and adopting new technologies, significant financial benefits and savings are possible, especially for those who embrace innovation early. In the educational context, as highlighted by Ulfa et al. (2022), teachers' performance is fundamental to the quality of education, given their direct interactions with students. Teaching experience is another critical factor that supports the effective delivery of instruction and learning activities. The amount of time teachers dedicate to their profession directly influences student achievement, making teaching experience a key determinant of educational outcomes. Experienced teachers are better equipped to support students' understanding, address instructional challenges, and foster enthusiasm for learning, while less experienced teachers may struggle to achieve the same results. Maximizing teacher empowerment and student engagement is facilitated by the depth of experience that educators bring to the classroom.

Table 2. The Summarizes of the Extent of Technology Adaptation of Teachers

No	Statement	Mean	Descriptive Equivalent
1	Self-awareness	3.85	Extensive
2	Focus on Students	3.97	Extensive
3	Acting Responsively	4.22	Very Extensive
Overall Mean		4.01	Extensive

3.3. Significant Relationship Between Classroom Digital Integration And Technology Adaptation of Teachers in Lupon, Davao Oriental—Table 10 demonstrated a substantial correlation between the technology adaptation of instructors in Lupon, Davao Oriental, and the in-

tegration of digital technology in the classroom. It offers empirical evidence that the null hypothesis put forth must be rejected, as it asserts that there is no correlation. Pearson's Correlation established a robust, positive, and statistically significant correlation between the technology

adaptation of teachers and their engagement in classroom digital integration ($r = .870$; $p < .000$). In the contemporary digital era, the integration of digital technology in the classroom is essential for the adaptation of technology to the high-quality learning experiences of teachers. It is imperative to incorporate digital technology into the classroom in order to facilitate the adaptation of instructors to new technologies and to develop high-quality learning experiences. It enables educators to enhance their teaching strategies, provides students with access to supplementary resources, and equips them for a world that is technologically driven. These findings align with Mardiana's (2020) research. Individual well-being, societal progress, and personal development depend on online education. It encourages flexibility, critical thinking, and a feeling of direction. It contributes significantly to personal development by assisting people in gaining the abilities, know-how, comprehension, and values necessary to pursue their objectives successfully. Ongoing education keeps the brain active and involved, which may prevent cognitive deterioration as we age. Crucially, in our fast-changing environment, people need the tools to adapt to new conditions and change,

according to Bodjan-Martin (2019). Learning boosts confidence and self-esteem since learning more knowledge and abilities results in more success. Beyond classroom instruction, a robust collaborative atmosphere can welcome professionals to provide expertise and analysis of learning theories. For online professional development, professors can easily distribute ideas and be heard by their students. It can inspire future cooperation and help them to keep studying throughout their life. Using universities' collaborative capabilities, teachers and students can project onto the screen, share papers online, and modify them in real time. This also shows students how to create ideas and document their work using text and photos on collaborative platforms. Furthermore, technology and features let professors interact with other lecturers or students, enabling them to exchange teaching strategies and instructional resources, and expand and add more in-depth knowledge (Dalkir, as cited by Mardiana, 2020). Training helps instructors also learn how to distribute materials to others. Learning resources with great pedagogical potential will help many teachers; their knowledge and teaching skills will develop confidently (Killion, as quoted by Mardiana, 2020).

Table 3. Significant Relationship Between Classroom Digital Integration and Technology Adaptation of Teachers in Lupon, Davao Oriental

Variables	r-value	p-value	Interpretation	Decision
Technology Adaptation of Teachers in Lupon, Davao Oriental	.870****	<0.000	Significant	Reject H_0

*Significant at $p < 0.05$.

3.4. Domains of Classroom Digital Integration that Significantly Influence Technology Adaptation of Teachers in Lupon East District, Davao Oriental—Table 11 presents the simple regression coefficient analysis of domains related to the significant relationship between

classroom digital integration and the significant effect of technology adaptation on teachers in Lupon, Davao Oriental. The results of the analysis of the influences of the domain of the classroom digital integration on the technology adaptation of teachers in Lupon, Davao Oriental, are

presented. Linear regression analysis was applied to determine the influences of each domain on the endogenous variable. Between the three determinants namely: connectivity ($b=.759$, p value is $p<.05$) and Self efficacy ($b=.226$, p -value $=.020$), both of these domains are less than probability values of $<.05$, are the better determinants or influencers since for every unit increase of this indicator, a corresponding increase of $.759$ for unit is realized for connectivity and $.226$ for self-efficacy. At the same time, the indicator of student learning is insignificant, the probability is greater than $p<.05$ level of significance, which is $.168$. Meanwhile, the R^2 value of $.757$ suggests that learners' study habits account for 75.70% of teachers' variance in Technology Adaptation. This provides empirical evidence that the classroom digital integration system domain can account for and explain the variability of teachers' technology adaptation. Furthermore, the direct path from school innovation climate to technology integration suggests that environmental factors can also directly enhance teachers' motivation and efficacy, reinforcing SDT's assertion that contextual support is essential for internalizing behaviors. These results validate that professional development engagement is a meaningful mediator in the relationship between innovation climate and technology integration. However, the persistence of a substantial direct effect suggests that school innovation drives technological adoption, reinforcing the importance of structural and individual capacity-building in educational reform. Furthermore, the mediation model supports a multi-layered framework in which a supportive innovation climate fosters development engagement and independently drives technology use. These findings underscore the need for school leaders to invest in both cultivating an innovative culture and providing structured, accessible professional development to ensure that effective technology integration has the potential to transform personalized learning and student en-

agement by tailoring educational experiences to individual needs and learning styles. Through data-driven insights, AI can provide real-time feedback on student performance, emotions, and engagement levels, enabling educators to customize teaching methods and interventions. This A personalized approach not only enhances student motivation but also supports more effective learning outcomes, addressing The unique challenges faced by each learner in a sustainable education system [7] AI has the potential to transform personalized learning and student engagement by tailoring educational experiences to individual needs and learning styles. Through data-driven insights, AI can provide real-time feedback on student performance, emotions, and engagement levels, enabling educators to customize teaching methods and interventions. This A personalized approach not only enhances student motivation but also supports more effective learning outcomes, addressing The unique challenges faced by each learner in a sustainable education system [7] These findings are consistent with the work of Abid et al. (2022), who describe digital classrooms as environments where electronic devices and platforms such as social media, multimedia, and mobile phones are used for instructional purposes. The integration of digital technology has transformed the educational landscape, enhancing the learning process. Digital learning employs technology to cover the curriculum and allows students to progress at their own pace. In these classrooms, technology is central to teaching, with students frequently using devices like laptops, tablets, and Chromebooks. Rather than relying solely on traditional note-taking, much of the curriculum is delivered online through interactive platforms. Education, at its core, remains a form of communication, and the internet has expanded the ways in which educational content can be shared and accessed (Turgut Aslan, 2021). Similarly, Baog et al. (2025) found that integrating technology into

teaching strategies improves student learning experiences and helps educators enhance their instructional methods. Using various technologies in the classroom gives students opportunities to explore and apply new tools, fostering creativity and active participation in achieving educational objectives. Technology integration also supports personalized learning, allowing instruction to be tailored to the unique needs of each student within a group setting. Despite these benefits, educators often encounter challenges when incorporating technology. Teachers lack the necessary skills and confidence to effectively use technology, and although access to digital tools is increasing, some educators remain hesitant to adopt them. Transitioning from traditional methods to new technologies can be frustrating, leading some teachers to avoid using modern devices altogether. In Punjab, India, a study revealed that while teachers are eager to use technology, they often struggle to do so effectively. The research showed that 38% of schools use ICT for academic planning, content delivery, and projects. However, in 37% of schools, fewer than 40% of teachers are motivated to integrate ICT into their teaching. Additionally, 26% of schools had no teachers interested in using technology. The study attributed these challenges to insufficient training, techni-

cal support, and teachers' limited time to familiarize themselves with evolving technologies (Kundu, 2018). In the Philippines, Hero (2019) found that many teachers' lack of technological proficiency prevents them from using digital tools in the classroom, resulting in underutilized technology resources. Teachers often need training in the basic use of technology and how to incorporate it into their curricula. Del Mundo (2022) further identified obstacles such as unreliable internet connections, lack of support systems for students, limited access to electronic materials and equipment, and insufficient technical support from schools. A similar situation was observed in Davao del Sur, where teachers expressed reluctance to integrate technology due to the additional preparation required, low confidence in their tech skills, and limited training opportunities. Many of them considered themselves beginners in technology use. This observation led the researcher to explore how digital competence among teachers influences their willingness to incorporate technology in their teaching. Additionally, there appeared to be a lack of local research examining the current status of teachers' digital competence, its relationship to technology integration, and the connection between these factors (Camarillo, 2024).

4. Conclusions and Recommendations

This chapter outlines the study's findings, conclusions, and recommendations, all derived from the analysis of the collected data, subsequent discussion, and identified implications. The findings address the stated research questions, conclusions are formulated from these results, and recommendations are offered based on the insights gained from the discussions.

4.1. Findings—The results, analysis, and discussions presented the study's findings. The Extent of Classroom Digital Integration in Lupon, Davao Oriental, in terms of Connectivity (3.91), has consistently been extensive. Self-efficacy (4.01) has been observed at times, and Students learn with a mean rating of 3.94

or extensive. The overall mean rating of 3.95 denotes the extent to which Classroom Digital Integration in Lupon, Davao Oriental, was often manifested and thus extensive. The Extent of Technology Adaptation of Teachers, in terms of Self-awareness (3.85), focus on Students (3.97), and acting responsively (4.22), was

Table 4. Domains of Classroom Digital Integration that Significantly Influence Technology Adaptation of Teachers in Lupon East District, Davao Oriental

Variables	Unstandardized B	Std. Error	Standardized Beta	t	Sig.	Interpretation	Decision
Constant	-0.169	0.340	—	-0.497	0.620	Not Significant	Accept H_0
Connectivity	0.759	0.078	0.713	9.775	<.001	Significant	Reject H_0
Self-efficacy	0.226	0.095	0.177	2.375	.020	Significant	Reject H_0
Student Learning	0.106	0.076	0.073	1.389	.168	Not Significant	Accept H_0

Model Summary: $R = .870$, $R^2 = .757$

*Significant at $p < 0.05$

often observed. The overall mean rating of 4.01 denotes that the extent of technology adaptation of teachers is often manifested, thus being extensive. Pearson's correlation generated a significant correlation between Classroom Digital Integration ($r = 0.870^{**}$; $p < .000$) and Technology Adaptation of Teachers. Domain on the Classroom Digital Integration namely: connectivity ($b=.759$, p value is $p < .05$) and Self efficacy ($b=.226$, p -value $=.020$), both of these domains are less than probability values of $<.05$, are the better determinants or influencers since for every unit increase of this indicator, a corresponding increase of .759 for unit is realized for connectivity and .226 for self-efficacy. At the same time, the indicator of student learning is insignificant, since the probability is greater than the $p < .05$ level of significance, which is .168. Meanwhile, the R^2 value of .757 suggests that learners' study habits account for 75.70% of teachers' variance in Technology Adaptation. This provides empirical evidence that the classroom digital integration system domain can account for and explain the variability of teachers' technology adaptation.

4.2. Conclusions—The following conclusions were drawn based on the findings of the study: The extent of classroom digital integra-

tion in Lupon, Davao Oriental, in terms of students' learning, self-efficacy, and connectivity, is extensive. In terms of self-awareness, focus on students, and responsiveness, the extent of technology adaptation by teachers was extensive or frequently observed. The integration of digital technology in the classroom and the adaptation of technology by teachers were significantly correlated. Educators' adaptation to technology within classroom digital integration is substantially influenced by key aspects of digital classroom management, such as connectivity and teachers' self-efficacy. Conversely, the influence of student learning seems to be less significant. Digital tools have the potential to increase student engagement by providing flexible, accessible educational opportunities and making learning more pleasurable. The foundation of this investigation is Rogers' (2003) Diffusion of Innovations Theory and Davis' (1989) Technology Acceptance Model (TAM). According to Rogers' theory, innovations are disseminated among members of a social system through specific channels and over time, starting with initial awareness and culminating in the adoption and integration of the technology by users. Behavioral intention, perceived usefulness, and perceived ease of use are identi-

fied as fundamental to the adoption of new technologies by the TAM framework. The degree to which an individual believes that utilizing a technology will improve their performance is measured by perceived usefulness, while perceived simplicity of use is related to the technology's user-friendliness. In general, TAM was created to evaluate the efficacy and value of technology in meeting the requirements of users.

4.3. Recommendations—The subsequent suggestions may be implemented in accordance with the findings of the investigation: Teacher. Educators can facilitate digital integration and technology adaptation in the classroom by offering training, fostering a positive environment, and coordinating technology use with learning goals. In addition, they ought to balance screen time, promote digital citizenship, and use technology to differentiate instruction and boost student engagement. To gain confidence in utilizing new technologies, teachers might need continual professional development, which includes instruction on particular platforms and integration techniques. Educator collaboration and experience sharing are encouraged when a supportive environment is established. Technology tools should align with learning objectives to increase student engagement and encourage active learning. While differentiating instruction helps meet the needs of diverse students, interactive technology creates engaging experiences. Teaching responsible technology use requires instruction in digital citizenship. Considering various age groups and learning styles, balancing screen time is critical. Teachers should adopt cutting-edge technologies like AI, VR, and AR for more individualized learning experiences. Technology can also help with data collection to enhance instructional approaches. It contributes significantly to personal development by assisting people in gaining the abilities, know-how, comprehension, and values necessary to pursue their objectives successfully.

Ongoing education keeps the brain active and involved, which may prevent cognitive deterioration as we age. Moreover, it equips individuals to adapt to change and navigate new situations, which is increasingly important in our rapidly evolving world. Learning also boosts confidence and self-esteem, as achieving new knowledge and skills contributes to greater accomplishment. Public School District Supervisor. May provide enough funds to enable the deployment and upkeep of strong digital integration of teachers. This covers funding technology infrastructure, connectivity, self-efficacy, and student learning engagement. Local primary schools could also use these tools concurrently and modify them to fit their needs. Training teachers on integrating digital tools, configuring technical support for teachers and students, and providing technological equipment and internet connection make up this support. School systems could provide funds for internet infrastructure, software subscriptions, and technology equipment to enhance instructional tools. They also provide teachers' professional growth, guiding them in effective technology integration, assessment techniques, and team methods. Districts could form specialist support teams or work with surrounding businesses to address technical concerns. Emphasizing copyright and data privacy, policies and guidelines also help ensure technology's ethical and safe use. Elementary school teachers make use of these tools to meet their curricula by including technology into their lesson plans for internet research, interactive presentations, and individualized learning opportunities. School Principal. The school may always allow teachers to improve their digital engagement and online skills. Workshops, training sessions, and cooperation with specialists in educational technology were used to accomplish this. Additionally, by offering direction and assistance in data analysis, principals helped teachers pinpoint areas needing development and make well-informed decisions about

their lessons. This involved identifying and applauding instructional strategies that produced favorable results, promoting data-driven conversations, and routinely reviewing data during staff meetings.

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