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Digital Literacy Skills and Technology Integration of Learners and Teachers

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ABSTRACT: Digital literacy and effective technology integration have become essential components of elementary education in the 21st century. Schools are increasingly expected to develop learners' digital competencies while ensuring meaningful use of information and communication technology (ICT) in instruction. However, empirical evidence examining the relationship among learners' digital literacy skills, teachers' ICT integration practices, and academic performance in specific local contexts remains limited. This study examined the level of digital literacy skills of Grade 4 learners, the extent of ICT integration practices of teachers, learners' academic performance in EPP– ICT, and the significant relationships among these variables. A descriptive–correlational research design was employed involving 396 learners and 23 teachers from fourteen public elementary schools in the Ilagan South District, Division of the City of Ilagan during School Year 2024–2025. Data were collected through structured survey questionnaires and learners' academic records. Results showed that learners demonstrated a generally competent level of digital literacy, with strengths in basic computer operations (M = 4.04) and lower competency in spreadsheet software (M = 3.46). Learners achieved excellent academic performance in EPP–ICT (M = 89.51, SD = 3.56). Teachers exhibited a very high level of ICT integration in lesson development (M = 4.62). A significant relationship was found between learners' digital literacy skills and academic performance ($\chi^2 = 28.84$, $p < .05$), while no significant relationships were observed between ICT integration practices and academic performance ($\chi^2 = 7.17$, $p = .13$) or digital literacy skills ($\chi^2 = 7.41$, $p = .49$). These findings suggest the need for enhanced digital literacy instruction, learnercentered technology integration, and improved access to appropriate digital resources.

KEYWORDS: digital literacy, ICT integration, academic performance, elementary education, technology-enhanced learning

1. INTRODUCTION

The integration of digital literacy and technology in education has become an essential component of modern learning. With the rapid advancements in digital tools and online resources, it is crucial for educational systems to adapt and equip both learners and teachers with the necessary competencies to navigate the digital age. In response to this need, the Philippine Department of Education (DepEd) introduced the MATATAG Curriculum, which emphasizes the incorporation of technology into teaching and learning processes.

Digital literacy has become an essential competency in modern education systems as learners are increasingly required to navigate digital environments for communication, information processing, collaboration, and problemsolving. International frameworks emphasize that digital skills should not be treated as isolated competencies but must be meaningfully integrated across subject areas to promote deeper learning and lifelong adaptability. In technologyenhanced learning environments, the strategic integration of digital tools and platforms supports student-centered instruction, differentiated learning opportunities, and the development of key 21st-century skills such as critical thinking, creativity, collaboration, and digital problem-solving. Technology integration also enables access to diverse learning resources, multimedia content, and interactive learning experiences that can enhance engagement and motivation among learners. For teachers, effective use of educational technologies facilitates innovative pedagogical approaches, improves assessment practices through timely feedback, and supports continuous professional growth in response to evolving educational demands. Hence, meaningful technology integration plays a vital role in improving teaching effectiveness, strengthening learners' digital competencies, and enhancing overall learning outcomes in contemporary educational contexts (UNESCO, 2018; OECD, 2021; Falloon, 2020; Koehler & Mishra, 2009).

Educational reform documents increasingly promote technology integration as a pathway toward improving teaching and learning outcomes; however, important gaps remain in understanding how this vision translates into actual classroom practice. While the MATATAG curriculum framework was introduced as a response to several gaps identified in the implementation of the K–12 basic education program in the Philippines, reviews conducted by DepEd, revealed that the existing curriculum contained congested and overlapping learning competencies, making it difficult for teachers to cover all required content effectively. Also, while the curriculum correspondingly emphasizes the integration of digital literacy across learning areas, existing literature indicates that

teachers demonstrate varying levels of Information and Communication Technology (ICT) utilization due to differences in digital competence, training opportunities, and access to technological resources. At the same time, students exhibit uneven development of digital skills, influenced by contextual factors such as instructional support, learning environments, and availability of digital tools. Despite recognition of these issues, there is still limited empirical evidence examining the direct relationship between teachers' technology integration practices and learners' digital literacy outcomes within specific school settings. This lack of context-based data creates a critical research gap, highlighting the need for studies that systematically investigate how teachers' ICT integration influences the development of students' digital competencies. (Department of Education, 2024; UNESCO, 2023; OECD, 2023; Tondeur et al., 2023).

In the Grade 4 classroom setup, several concrete challenges persist that may influence the effectiveness of technology integration and digital literacy development. Many learners experience limited access to digital devices, often resulting in device sharing during classroom activities, which restricts opportunities for individual practice and skill development. Teachers also demonstrate varying levels of confidence in using ICT tools, affecting the consistency and depth of technology integration in instructional delivery. Furthermore, unstable internet connectivity remains a common issue, particularly in geographically isolated or resource-limited areas, disrupting the continuity of digital learning experiences. Also, notable disparities exist between urban and rural schools in terms of infrastructure, training opportunities, and access to digital resources, which may contribute to unequal development of digital literacy skills among Grade 4 learners. These contextual realities highlight the need for empirical investigation into how such factors influence both teachers' technology integration practices and learners' acquisition of digital competencies in specific school settings (UNESCO, 2023; OECD, 2023; Tondeur et al., 2023; Department of Education, 2024).

Furthermore, effective technology integration in education depends significantly on teachers' digital competence and pedagogical readiness. The Technological Pedagogical Content Knowledge (TPACK) framework explains that successful technology-enhanced teaching occurs when educators are able to combine subject expertise with appropriate digital tools and instructional strategies. Studies have shown that without sufficient professional development and institutional support, teachers may struggle to implement technology in ways that improve student learning outcomes. (Koehler & Mishra, 2009; European Commission, 2021).

The United Nations Sustainable Development Goals (SDGs) emphasize the importance of digital literacy and technology integration, particularly in SDG 4 (Quality Education), SDG 5 (Gender Equality), and SDG 17 (Partnerships for the Goals). These goals collectively highlight the need for inclusive and equitable access to quality education, gender-responsive learning environments, and strong collaborations between stakeholders to promote lifelong learning opportunities for all (United Nations, 2015).

This study aims to bridge the above-mentioned gaps by investigating the relationship between grade 4 pupils' digital literacy skills and the technology integration practices of their teachers. The study seeks to assess current levels of digital literacy among grade 4 learners, examine the nature and effectiveness of technology integration by teachers, and identify factors that either facilitate or hinder effective digital skill development in young learners. By focusing on both student outcomes and teacher practices, this research contributes to a more holistic understanding of digital literacy education in elementary settings, with potential implications for developing targeted strategies that can support both educators and students in adapting to an increasingly digital learning environment.

2. RELATED LITERATURE

2.1 Conceptualizing Digital Literacy

Digital literacy has evolved significantly over time, reflecting the rapid transformation of technology and its role in education and society. Early discussions of digital competence were largely confined to computer literacy, which emphasized basic operational skills such as using hardware, navigating software applications, and performing simple technological tasks. As digital media expanded, the concept gradually incorporated elements of media literacy, highlighting the ability to access, analyze, and interpret digital information. Contemporary perspectives, however, recognize digital literacy as a broader and multidimensional competence that extends beyond technical proficiency. Scholars now emphasize that being digitally literate involves critical thinking, effective communication, creativity, and the ethical use of technology in diverse contexts. This shift reflects the growing complexity of digital environments, where individuals must evaluate the credibility of online information, participate responsibly in digital spaces, and apply technological tools to support learning and problem-solving (Ilomäki et al., 2016; Bawden, 2018; Koltay, 2021).

With this expanded view, digital literacy is commonly understood as comprising interrelated cognitive, technical, and socio-emotional components. The cognitive dimension includes the ability to locate, evaluate, and synthesize information from digital sources, while the technical dimension focuses on the skills required to operate digital devices and applications effectively. Equally important is the socio-emotional dimension, which involves responsible online behavior, collaboration in virtual environments, and awareness of digital identity and safety. These dimensions are particularly relevant in contemporary learning settings where students are expected not only to consume information but also to create digital content, engage in collaborative tasks, and participate in

interactive learning experiences. Such environments require learners to apply higher-order thinking skills and develop responsible attitudes toward technology use (Ng, 2016; Buckingham, 2015).

Also, Digital literacy is increasingly recognized as a fundamental 21st-century skill necessary for meaningful participation in modern society. Educational institutions and policy frameworks emphasize the importance of equipping learners with digital competencies that support lifelong learning, innovation, and adaptability in a technology-driven world. The integration of digital literacy into curricula is viewed as essential in preparing students to navigate information-rich environments, engage in civic and social activities online, and meet the evolving demands of the workforce. As such, fostering digital literacy has become a shared priority among educators, policymakers, and researchers seeking to ensure that learners develop the skills needed to thrive in an increasingly digital global landscape (Hague & Payton, 2015; Pratolo & Solikhati, 2021).

2.2 Digital Literacy Development in Elementary Learners

The development of digital literacy skills during the elementary years is increasingly recognized as a crucial foundation for learners' academic growth and responsible participation in digital environments. Upper elementary learners, such as those in Grade 4, are at a developmental stage where they begin to demonstrate improved reading comprehension, logical reasoning, and independent learning behaviors. These cognitive advancements enable them to engage more meaningfully with digital tools and online resources. At this stage, learners can start to apply higherorder thinking skills, such as analyzing information, solving problems using technology, and making informed decisions in digital contexts. Integration of digital literacy instruction in early grades supports the gradual formation of responsible technology use and prepares learners for more complex digital learning tasks in later educational levels (Burnett & Merchant, 2015).

Despite growing exposure to digital devices among young learners, the notion that children are naturally proficient in technology simply because they are "digital natives" has been widely challenged in educational research. Familiarity with gadgets, such as smartphones, tablets, or computers, does not necessarily translate into the ability to use technology effectively for learning purposes. Many learners may demonstrate confidence in navigating entertainment-based applications but lack essential skills in information management, academic digital tasks, and critical engagement with online content. This misconception underscores the importance of structured digital literacy instruction, as learners require guidance to develop competencies that go beyond basic device operation and toward purposeful and productive use of digital tools (Yamila & El-Khayat, 2016; Raish & Rimland, 2016).

In early grade levels, digital literacy education should therefore focus on cultivating critical skills that enable learners to become responsible and informed digital participants. These skills include evaluating the credibility and relevance of online information, practicing digital citizenship, and understanding issues related to online safety, privacy, and ethical behavior. Elementary learners must also be guided in collaborative digital tasks, communication in virtual spaces, and the creation of simple digital content that supports their academic learning. Developing these competencies at an early stage helps establish positive digital habits and strengthens learners' capacity to engage constructively with technology in both educational and social contexts (Gleason & von Gillern, 2018).

2.3 Technology Integration in Teaching and Learning

Rather than merely substituting traditional teaching methods with digital alternatives, effective technology integration involves aligning technological tools with pedagogical objectives and curriculum goals. In this sense, technology serves as a means to facilitate deeper understanding, promote learner engagement, and support differentiated instruction. When appropriately implemented, digital tools can enrich classroom experiences by enabling interactive learning activities, providing access to diverse information sources, and fostering collaborative learning environments that extend beyond the physical classroom (Hew & Brush, 2017).

To guide educators in implementing technology meaningfully, several conceptual frameworks have been developed. Among the most widely recognized are the Technological Pedagogical Content Knowledge (TPACK) framework and the Substitution, Augmentation, Modification, and Redefinition (SAMR) model. The TPACK framework emphasizes the integration of technology with pedagogical strategies and subject content knowledge, highlighting the need for teachers to develop a balanced understanding of these interconnected domains to create effective learning experiences (Mishra & Koehler, 2006). Similarly, the SAMR model provides a continuum that helps educators evaluate the depth of technology use in instruction, ranging from basic substitution of traditional tools to the redefinition of learning tasks that would be otherwise inconceivable without technology. These models support teachers in moving beyond superficial use of digital tools toward transformative practices that enhance student participation and learning (Puentedura, 2014).

Despite the availability of such frameworks, the successful integration of technology in teaching and learning is strongly influenced by teachers' beliefs, confidence, and level of ICT competence. Educators who perceive technology as valuable for improving instruction are more likely to experiment with innovative practices and incorporate digital tools in meaningful ways. Conversely, limited technological skills, uncertainty about instructional benefits, and resistance to change may hinder effective implementation. School culture also plays a significant role, as supportive leadership, access to resources, and opportunities for professional development can encourage teachers to adopt and sustain technology-integrated practices. These factors highlight that technology

integration is not solely dependent on the availability of digital tools but also on the readiness and mindset of teachers within the educational environment (Ertmer & Ottenbreit-Leftwich, 2010; Tondeur et al., 2017).

2.4 Relationship Between Technology Integration and Student Digital Literacy

The relationship between technology integration and the development of students' digital literacy skills is increasingly emphasized in contemporary educational research. Structured and purposeful exposure to digital learning tasks has been shown to enhance learners' ability to use technology effectively for academic purposes. When teachers intentionally integrate digital tools into classroom instruction, learners are provided with opportunities to practice essential skills such as information searching, content creation, and online communication. In their meta-analysis, Sung, Chang, and Liu (2016) found that technology-supported instructional strategies, particularly those involving collaborative activities and interactive feedback, significantly improve student engagement and learning outcomes. Such findings suggest that guided exposure to digital tasks plays a vital role in strengthening students' functional and critical digital competencies.

Technology integration also contributes to the creation of student-centered digital learning environments that promote active participation and higher-order thinking. According to Jonassen (2000), digital technologies can function as "mindtools," enabling learners to construct knowledge through exploration, problem-solving, and collaborative learning. In these environments, students are encouraged to engage in authentic tasks that require them to analyze information, develop creative solutions, and communicate ideas using digital platforms. The integration of technology thus shifts the focus from passive reception of information to active knowledge construction, allowing learners to develop not only technical skills but also cognitive and social competencies associated with digital literacy.

Furthermore, the relationship between technology integration and digital literacy development can be understood as a cycle of mutual influence. Teacher practices in selecting and implementing digital tools directly shape learners' opportunities to build digital skills and confidence. At the same time, learners' existing levels of digital competence may influence the extent to which teachers can implement more advanced technology-based activities. Livingstone and Helsper (2017) emphasized that variations in students' access to technology and prior digital experiences contribute to differences in skill acquisition, which can either facilitate or constrain classroom integration efforts. This dynamic interaction highlights the importance of aligning technology integration practices with learners' readiness levels to ensure that digital literacy development is both inclusive and effective.

2.5 Barriers to Technology Integration in Elementary Schools

The integration of technology in elementary classrooms is often constrained by challenges related to infrastructure and access, which significantly influence the effectiveness of digital learning initiatives. Limited availability of digital devices, unreliable internet connectivity, and insufficient technological resources can restrict teachers' ability to implement technology-supported instruction. These constraints contribute to the persistence of the digital divide, particularly in under-resourced schools where learners have fewer opportunities to engage with digital tools for academic purposes. As Lai and Pratt (2017) emphasized, technological infrastructure plays a fundamental role in determining whether educators can adopt and sustain technology-integrated practices. Without adequate access to devices and stable connectivity, efforts to enhance digital literacy through classroom instruction may remain inconsistent and fragmented.

Another significant barrier to effective technology integration is the need for continuous professional development among teachers. Educators often face challenges related to limited training opportunities, insufficient technical support, and time constraints associated with heavy teaching workloads. These factors may reduce teachers' confidence in using digital tools and hinder their willingness to explore innovative instructional approaches. Sharma and Sokal (2016) highlighted that professional development programs are essential in equipping teachers with the knowledge and skills required to integrate technology meaningfully into teaching and learning processes. When such support is lacking, teachers may rely on basic or surface-level uses of technology, which may not fully support the development of students' digital literacy skills.

In addition to structural and training-related challenges, pedagogical resistance can also influence the extent of technology integration in elementary schools. Teachers' beliefs about teaching and learning play a critical role in shaping their instructional practices, including their decisions regarding the use of digital tools. Research by Tondeur et al. (2017) indicated that educators who hold traditional, teacher-centered views of instruction may perceive technology primarily as a tool for content delivery rather than as a means of transforming learning experiences. Such perspectives can limit opportunities for students to engage in collaborative, inquiry-based, and technology-enhanced learning activities. Addressing these attitudinal barriers requires supportive school leadership, targeted professional development, and the promotion of positive experiences with technology integration.

2.6 Digital Divide and Equity Issues

Digital literacy development is closely linked to issues of equity and access, particularly in contexts where socioeconomic disparities affect learners' opportunities to interact with digital technologies. Unequal access to devices, internet connectivity, and digital learning resources can result in significant variations in students' skill development and academic readiness. In the Philippine context, Ramirez and Secillano (2020) reported that learners from economically disadvantaged backgrounds often encounter

limitations in accessing digital tools both in school and at home, which may hinder their ability to build foundational digital competencies. These disparities highlight the need for targeted interventions that ensure equitable access to technology and inclusive learning opportunities for all students.

Beyond material access, home and community factors also play a crucial role in shaping learners' digital literacy experiences. Support from parents or guardians, exposure to educational digital content, and opportunities for guided technology use at home can influence how effectively students develop digital skills. Gleason and von Gillern (2018) noted that learners who receive structured guidance in navigating digital environments are more likely to demonstrate responsible online behavior and effective information management skills. Conversely, limited supervision or lack of digital awareness within the home environment may contribute to gaps in students' digital literacy development. These considerations underscore the importance of collaborative efforts among schools, families, and communities in fostering equitable and meaningful digital learning experiences.

2.7 Philippine Context of Digital Literacy and ICT Integration

In Philippine education system, digital literacy development has gained increased attention through recent curriculum reforms that emphasize the integration of 21st-century skills and digital competencies across learning areas. The implementation of the MATATAG Curriculum reflects the government's commitment to strengthening foundational learning while preparing learners to function effectively in a technology-driven society. The curriculum framework highlights the importance of equipping students with essential skills such as information literacy, media literacy, communication, critical thinking, and responsible use of digital tools. According to the Department of Education (DepEd, 2024), these competencies are intended to support learners' academic development, lifelong learning readiness, and meaningful participation in national development. As such, digital literacy is positioned not only as a technical skill but also as a key component of holistic education in the basic education sector.

Complementing curriculum reforms are national initiatives aimed at enhancing teachers' digital capacity and readiness for technology integration. One notable effort is the Digital Teachers Program implemented by the Department of Information and Communications Technology, which focuses on providing educators with training and resources necessary for effective ICT integration in classroom instruction. The program aims to improve teachers' competencies in using digital platforms, managing online learning environments, and facilitating technologyenhanced learning experiences. As highlighted by the Department of Information and Communications Technology (DICT, 2021), strengthening teacher digital skills is essential for ensuring that technological resources are used meaningfully to support student learning and digital literacy development. Such initiatives underscore the recognition that teacher preparedness plays a critical role in the successful implementation of digital learning strategies.

Despite these policy directions and capacity-building programs, several local classroom challenges continue to affect the effective integration of technology in Philippine elementary schools. Differences in resource availability between rural and urban areas often result in unequal access to digital devices, internet connectivity, and technical support. In their study on technology integration in Philippine elementary education, Garcia and Dela Cruz (2019) identified disparities in infrastructure, teacher training opportunities, and instructional practices that influence how digital literacy initiatives are implemented at the school level. These contextual challenges highlight the need for localized research that examines the interaction between teacher technology integration practices and learners' digital literacy skills. Understanding these dynamics is essential for informing policies and interventions that promote equitable and effective digital learning environments across diverse educational settings.

3. METHODOLOGY

3.1 Research Framework

Figure 1.0 provides a systematic structure for examining the relationships among the variables included in the investigation. The paradigm as shown in figure 1, presents the specific learner-related and teacher-related variables identified in the statement of the problem as inputs, the research procedures and statistical treatments used in analyzing the collected data as the process, and the resulting findings of the study as the output. Through this paradigm, the study aims to determine the level of digital literacy skills of Grade 4 learners, their academic performance in EPP–ICT, the level of ICT integration practices of teachers, and the significant relationships among these variables.

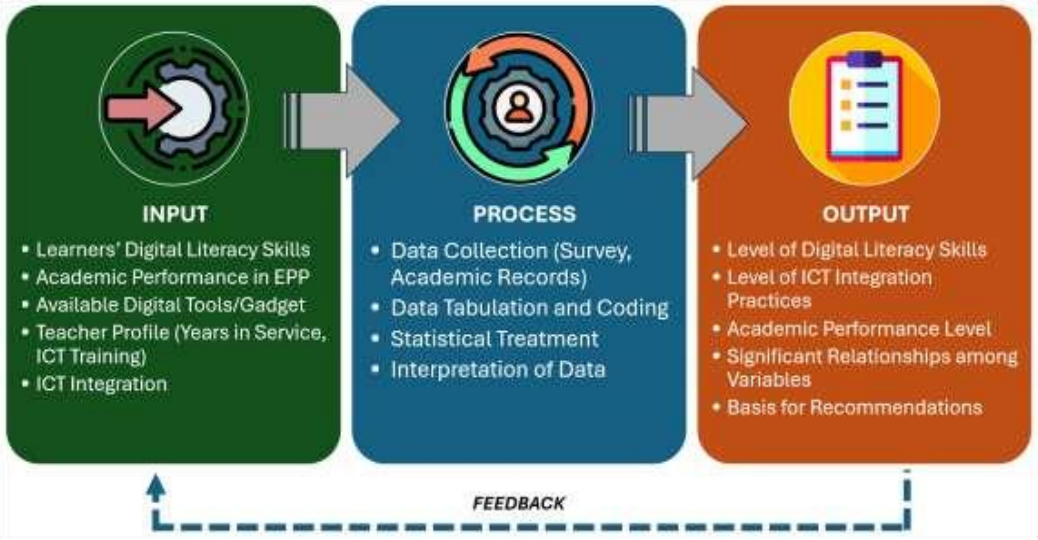


Figure 1. Conceptual framework of Digital Literacy skills and technology integration of learners and teachers

The input component consists of the specific variables identified in the statement of the problem. These include the learners' digital literacy skills, academic performance in EPP–ICT, and the availability of digital tools or electronic gadgets used in the teaching–learning process. It also includes teacher-related variables such as their profile in terms of years in service and participation in ICT-related training, as well as their level of ICT integration practices in lesson development, lesson discussion or delivery, and assessment or evaluation. These variables serve as the primary sources of data needed to describe the current status of digital literacy and technology integration in the selected schools.

The process component involves the systematic procedures undertaken by the researcher to gather and analyze the data. This includes the distribution and retrieval of survey questionnaires and the collection of learners' academic performance records. The gathered data are then organized through tabulation and coding to ensure accuracy and ease of analysis. Appropriate statistical treatments such as frequency and percentage distribution, mean, and correlation analysis are employed to determine the levels of the variables and to examine the significant relationships among them. The interpretation of data follows, allowing the researcher to derive meaningful insights from the statistical results.

The output component represents the results obtained after the data have undergone the research process. These include the determined level of learners' digital literacy skills, the level of ICT integration practices of teachers, and the level of learners' academic performance in EPP–ICT. Furthermore, the study identifies the significant relationships among digital literacy skills, ICT integration practices, and academic performance. The findings generated from these outputs serve as the basis for formulating recommendations aimed at improving technology integration practices and enhancing the development of digital literacy among Grade 4 learners.

3.2 Research Design

This study utilized a descriptive–correlational research design. The descriptive method will be used to determine and describe the level of digital literacy skills of Grade 4 learners and the extent of ICT integration practices of teachers in teaching EPP–ICT. This allows the researcher to gather factual information about the current conditions and practices without manipulating any variables.

Furthermore, the correlational approach will be employed to examine the possible relationship between learners' digital literacy skills and their academic performance in EPP–ICT, as well as the relationship between teachers' ICT integration practices and learners' digital literacy. Through this design, the study will be able to identify whether significant associations exist among the variables, which may serve as a basis for improving digital learning practices in the school.

3.3 Research Locale

The study was conducted in the schools of the identified Elementary schools in the South District of the Schools Division of the City of Ilagan, Isabela in the School Year 2024-2025 (See Appendix A).

3.4 Respondents of the Study

The learner-respondents will be selected through a simple random sampling. The respondents are pool of learners in the Schools Division of the City of Ilagan. Specifically, these students were from the identified elementary schools legally and duly registered in DepEd. Likewise, the teacher-respondents are the grade 4 teachers of same school.

Table 1. Distribution of Respondents by School

No.	Name of Schools			Number of Learners	Number of Teachers
1	Aggasian Elementary School		51		2
2	Ballacong Elementary School		14		1
3	Batong-labang Elementary School		54		3
4	Cabecera 25. Elementary School		21		1
5	Cabecera 27. Elementary School		18		1
6	Cadu Elementary School		12		1
7	Casilagan Elementary School		26		1
8	Fugu Elementary School		47		2
9	Lupigue Integrated School		62		3
10	Sindun Bayabo Integrated School		31		1
11	Sindun Highway Elementary School		23		1
12	Sindun Maride Elementary School		16		1
13	Talaytay Elementary School		8		1
14	Villa Imelda Elementary School		13		1
		Total	396		20

Table 1 shows the number of Grade 4 learners surveyed from 14 different schools in the Ilagan South District. There are 396 respondents in all, from all schools. The school with the highest number of respondents is Lupigue Integrated School (62 learners), while the school with the lowest number of respondents is Talaytay Elementary School (8 learners). This table provides a clear overview of the distribution of respondents across various schools, which is useful for understanding the sample size and representation of learners in the study.

3.5 Research Instruments

This study utilized a structured survey questionnaire as the main research instrument in gathering data on the digital literacy skills of Grade 4 learners and the ICT integration practices of teachers. The questionnaire is designed to obtain relevant information aligned with the objectives and variables of the study. It is composed of clearly stated items that are appropriate to the level of understanding of the respondents.

For the learner-respondents, Part I elicits the profile of the respondents in terms of their gender and access to gadgets. On the other hand, Part II consists of items that determines the level of digital literacy skills such as basic computer operations, digital citizenship, word processing software, presentation software, desktop publishing software and spreadsheet software. It is a checklist in a 5-point Likert-type gauge. Items are rated as follows: 5 – Highly Competent; 4 – competent; 3 – Basic; 2 – Below basic; 1 – no knowledge at all. Lastly, the academic performance will be taken from the grades as reflected in the official records of the respondents for the First quarter of the SY 20242025.

For the teacher-respondents, Part I elicits the profile of the respondents in terms of their gender, age, years in service and Professional development activities in ICT attended. Part II consist of items that determines the ICT integration practices of teachers in Introduction, Development, Generalization, Evaluation of Lesson and Assignment. It is also a checklist in a 5-point Likert-type gauge. Items are rated as follows: 5 – always; 4 – Often; 3 – Sometimes; 2 – Seldom; 1 Not at all.

The instrument consists of two major parts. The first part focuses on the digital literacy skills of learners, which includes items related to basic computer operation, use of digital devices, internet navigation, digital communication, and responsible use of technology. The second part measures the extent of ICT integration practices of teachers in teaching EPP–ICT. This includes the use of digital tools in lesson delivery, learning activities, assessment, and classroom management. The responses will be measured using a Likert scale to determine the level or extent of the identified variables.

Also, the learners' academic performance in EPP–ICT will be obtained from their official academic records, particularly their general average in the subject. This will serve as secondary data to support the analysis of the relationship between digital literacy skills and academic performance.

3.6 Data Collection Procedure

Data are collected using survey questionnaires and academic records. The results will be analyzed using appropriate statistical tools such as frequency counts, percentages, mean, and correlation analysis to ensure an objective interpretation of the gathered data. Creswell (2018) categorically defines this research design as the variables and the relationships that occur between and among them. The test of relationship details results including positive, negative, mixed, or no relationship at all but does not establish a causal effect.

The researcher will seek permission from the school authorities for the conduct of the study. Also, the consent of respondents will be obtained. They will be informed on the purposes, methodology, and expectations of the study. They will be assured that their confidentiality and identity would be maintained.

The researcher floated the questionnaire face-to-face. To ensure 100 percent retrieval of the questionnaire, the researcher will supervise carefully the data collection. Furthermore, the grades of the respondents will be taken from the official records that are kept by the respective teachers. In compliance with the Data Privacy Act, the researcher will seek first the approval of the respondents and their parents before the grades are obtained.

3.7 Statistical Tool

The data gathered in this study are analyzed using appropriate descriptive and inferential statistical tools to ensure accurate interpretation of the results. These statistical tools will help determine the level of digital literacy skills of learners, the extent of ICT integration practices of teachers, and the relationship of these variables to learners' academic performance in EPP–ICT.

Frequency Count and Percentage will be used to describe the distribution of respondents according to selected profile variables such as school and availability of digital tools or gadgets. These tools will provide a clear picture of how respondents are grouped and represented in the study. Descriptive statistics such as mean, frequency count, and percentage were used to treat the profile variables.

The Mean (Average) is utilized to determine the level of digital literacy skills of learners and the extent of ICT integration practices of teachers based on their responses to the survey questionnaire. The computed mean scores will be interpreted using a predetermined scale to classify whether the level or extent is very high, high, moderate, low, or very low.

To determine the relationship between learners' digital literacy skills and their academic performance in EPP– ICT, as well as the relationship between digital literacy skills and ICT integration practices, the Pearson Product– Moment Correlation Coefficient (Pearson r) is employed.

Descriptive statistics is utilized in identifying the level of digital literacy skills of the learner-respondents.

Table 3.2 Interpretation of the Level of Digital Literacy Skills

4.20 – 5.00	Highly Competent
3.40 – 4.19	Competent
2.60 – 3.39	Basic
1.80 – 2.59	Below Basic
1.00 – 1.79	No knowledge at all

Shown in table 3.2, is the Numerical and Adjectival rating of the Digital Literacy Skills of the Learners in this study. While Table 3.3 is the Academic Performance of the learners in EPP-ICT.

Table 3.3 Interpretation of the Academic Performance

90 – 100	Excellent
85 – 89	Very Satisfactory
80 – 84	Satisfactory
75 – 79	Fairly Satisfactory
Below 75	Did not meet expectations

In addition, descriptive statistics is utilized in identifying the ICT integration practices of teachers in Introduction, Development, Generalization, Evaluation of Lesson and Assignment.

Table 3.4 Interpretation of ICT integration practices of teachers

4.20 – 5.00	Always
3.40 – 4.19	Often
2.60 – 3.39	Sometimes
1.80 – 2.59	Seldom
1.00 – 1.79	Not at all

To determine the significant relationship among the variables in this study, the following statistical tools will be used:

3.7.1 Pearson Product–Moment Correlation Coefficient (Pearson r)

This statistical tool will be used to determine the degree and direction of relationship between two quantitative variables.

It will be applied to test the following hypotheses:

- Relationship between learners' digital literacy skills and academic performance in EPP–ICT.
- Relationship between ICT integration practices of teachers and learners' academic performance
- Relationship between learners' digital literacy skills and teachers' ICT integration practices

The p-value is used to determine statistical significance at 0.05 level of significance. If the p-value is less than 0.05, the null hypothesis will be rejected.

3.8 Ethical Considerations

The researcher made sure that during the conduct of the study, the following ethical concerns are followed to necessitate safe, anti-fraud, deliberate and careful undertakings in the study:

1. The researcher, through proper communications, will ask permission from the Division Office, and other concerned offices for the study;
2. The researcher will also acknowledge the Department of Education and the Schools Division of the City of Ilagan for allowing her to conduct the study;
3. The researcher will inform the respondents of the study through letter and short orientation to the study. Data and information to be gathered will be treated with utmost respect and confidentiality,
4. And, the researcher, will properly cite the gathered information and other relevant studies from authors, books, or any publications through proper citation.

4. RESULTS AND DISCUSSION

Table 4.1 Current Level of Digital Literacy Skills of the Learner Respondents

Indicators	Mean	Standard Deviation	Description
A. Basic Computer Operations	4.24	1.10	Highly Competent
	3.99	1.21	Competent
	3.80	1.32	Competent
	4.14	1.17	Competent
	4.05	1.22	Competent
Average	4.04	1.11	Competent
B. Word Processing Software	3.98	1.28	Competent
	3.94	1.30	Competent
	3.82	1.35	Competent
	3.67	1.37	Competent
	3.62	1.33	Competent
Average	3.81	1.27	Competent
C. Presentation Software			
	3.87	1.28	Competent
	3.81	1.31	Competent
	3.76	1.33	Competent
	3.63	1.34	Competent
	3.72	1.33	Competent
Average	3.76	1.27	Competent
D. Spreadsheet Software			
	3.64	1.35	Competent
	3.51	1.38	Competent
	3.32	1.37	Basic
	3.44	1.41	Competent
	3.41	1.39	Competent
Average	3.46	1.32	Competent
E. Publisher Software			
	3.74	1.29	Competent
	3.72	1.27	Competent
	3.58	1.31	Competent
	3.63	1.34	Competent
	3.60	1.32	Competent
Average	3.65	1.31	Competent

Digital Literacy Skills and Technology Integration of Learners and Teachers

Table 4.1 presents the current level of digital literacy skills of the learner-respondents across five key areas: Basic Computer Operations, Word Processing Software, Presentation Software, Spreadsheet Software, and Publisher Software.

In the domain of Basic Computer Operations, the respondents demonstrated the highest overall proficiency. The average mean score for this category is 4.04 (SD = 1.11), which descriptively translates to "Competent." Notably, the first indicator under this domain received a mean score of 4.24 (SD = 1.10), the only indicator across the entire table to be described as "Highly Competent." This suggests that while learners are generally capable in fundamental computer tasks, they possess exceptional confidence or skill in a specific foundational operation.

Regarding productivity software, the respondents reported a "Competent" skill level in both Word Processing Software (M = 3.81, SD = 1.27) and Presentation Software (M = 3.76, SD = 1.27). The mean scores for all individual indicators within these two categories fall within the "Competent" range, indicating a consistent and solid ability to create documents and presentations. This implies that the learners are comfortable with the basic and intermediate functions required for academic or professional tasks involving text formatting and slide creation.

A low level of self-assessed competency was observed in the area of Spreadsheet Software. The overall average for this category is 3.46 (SD = 1.32), still described as "Competent," but it is noticeably lower than the other software categories. More importantly, this is the only category containing an indicator with a "Basic" level of competency. Specifically, one indicator received a mean score of 3.32 (SD = 1.37). This finding points to a specific area of relative weakness, suggesting that while learners can navigate spreadsheets, their skills may not extend to more advanced data manipulation and analysis tasks, such as using formulas or creating charts.

The learners' level of self-assessed competency in the area of Publisher Software is generally described as Competent, with an overall mean score of approximately 3.65 (SD = 1.31). This indicates that learners are moderately confident in performing desktop publishing tasks such as creating publications, inserting text and images, using templates, modifying font styles, and organizing page layouts.

However, among the indicators, the lowest level of competency was observed in the use of templates for creating posters or flyers, which obtained a mean score of approximately 3.58 (SD = 1.31). Although still interpreted as Competent, this score is relatively lower than the other publishing skills. This suggests that while learners can perform basic publishing operations, they may experience some difficulty when tasks require independent design decisions, creativity, and manipulation of ready-made layouts.

The relatively high standard deviation values (around 1.27–1.34) indicate substantial variability in learners' skills. This implies that while some learners demonstrate high competence or even advanced familiarity with publisher software, others still possess limited knowledge or confidence, particularly in more complex layout and formatting tasks. The learner-respondents possess an overall competent level of digital literacy across all measured areas, with Basic Computer Operations emerging as their strongest skill set.

Table 4.2 Academic Performance of Learners in EPP-ICT

Minimum	Maximum	Mean	Std. Deviation	Description
81.00	99.00	89.51	3.56	Excellent

Table 4.2 presents the academic performance of the learners in EPP-ICT.

The data reveals that the learners demonstrated a generally high level of academic achievement in the subject. The minimum score obtained by the respondents is 81.00, while the maximum score reached is 99.00. This indicates that all learners performed within the upper quartile of the possible scoring range, with no student scoring below 81.

The mean score of 89.51 (SD = 3.56) further supports this observation, as it falls within the "Excellent" descriptive rating. This suggests that, on average, the learners have excelled in their EPP-ICT assessments and have successfully met or exceeded the expected learning competencies for the subject.

The standard deviation of 3.56 indicates a relatively low spread of scores around the mean. This implies that the academic performance of the learners is consistent and homogeneous, with most students scoring close to the average of 89.51. The narrow range between the minimum and maximum scores, coupled with the low standard deviation, suggests that there are no extreme outliers or significant performance gaps among the learners.

The academic performance of the learners in EPP-ICT is excellent and highly consistent. The findings indicate that the learners have collectively achieved a strong mastery of the subject matter, with minimal variation in individual performance levels. This positive outcome may be attributed to effective instructional strategies, learner engagement, or the foundational nature of the competencies taught in the subject.

Digital Literacy Skills and Technology Integration of Learners and Teachers

Table 4.3 Available Tools or Electronic Gadgets utilized by Learners

Electronic Gadget	Frequency	Percent
Television	97	35.1
Cellphone	156	56.5
Laptop	13	4.7
Desktop	2	0.7
Tablet	2	0.7
iPad	3	1.1
Others	3	1.1
Total	276	100.0

The data in Table 4.3, reveals that the most commonly utilized electronic gadget among learners is the cellphone, with 156 respondents or 56.5 percent of the total sample reporting its use. This indicates that more than half of the learner-respondents have access to and utilize mobile phones, which may serve as their primary tool for accessing educational content, communication, and learning activities related to EPP-ICT.

The second most frequently reported gadget is the television, utilized by 97 learners, representing 35.1 percent of the respondents. This suggests that a considerable portion of the learners still rely on traditional broadcast media, which may be used for educational programs, supplemental learning, or general information dissemination.

Devices more commonly associated with interactive and productive academic work such as laptops, tablets, iPads, and desktop computers are utilized by only a small fraction of the learners. Specifically, 13 respondents (4.7 percent) reported using laptops, while tablets and iPads were each utilized by less than 2 percent of the learners (0.7 percent and 1.1 percent, respectively). Desktop computers were reported by only 2 respondents (0.7 percent), indicating minimal access to stationary computer units among the learners.

A small number of respondents, 3 or 1.1 percent, reported utilizing other gadgets not specified in the list, suggesting the presence of alternative or emerging devices used for learning purposes.

The findings indicate a heavy reliance on mobile phones and televisions among learners, while access to more specialized educational tools such as laptops, tablets, and desktop computers remains limited. This disparity in gadget utilization may have implications for the design and delivery of EPP-ICT instruction, particularly in activities that require specific software or hardware capabilities beyond what basic mobile phones can offer.

Table 4.4 Available Tools or Electronic Gadgets utilized by Teachers

Tools Utilized	Frequency	Percent
Television	0	0.0
Cellphone	0	0.0
Laptop	18	78.3
Desktop	3	13.0
Tablet	1	4.3
iPad	1	4.3
Total	23	100.0

The data in table 4.4, reveals a distinct pattern of gadget utilization among teachers that differs markedly from that of the learners. The most commonly utilized electronic gadget among teachers is the laptop, with 18 respondents or 78.3 percent of the total sample reporting its use. This indicates that the vast majority of teachers have access to and utilize laptops as their primary tool for instructional preparation, teaching delivery, and other professional tasks related to EPP-ICT.

The second most frequently reported gadget among teachers is the desktop computer, utilized by 3 teachers, representing 13.0 percent of the respondents. While this percentage is considerably lower than that of laptops, it still indicates that a portion of the teaching staff relies on stationary computer units for their work.

Tablets and iPads are each utilized by 1 teacher, accounting for 4.3 percent of the respondents for each device. This suggests that while these mobile devices are available to a small number of teachers, they are not yet widely adopted as primary instructional tools in the context of EPP-ICT.

Notably, the data shows that none of the teacher-respondents reported utilizing television or cellphone as tools for instructional purposes, with both devices receiving 0.0 percent. This absence is particularly striking given that cellphones were the most utilized gadget among learners. The contrast suggests a potential disconnect between the devices teachers use for instruction and the devices learners have access to for learning.

Digital Literacy Skills and Technology Integration of Learners and Teachers

Teachers predominantly rely on laptops and desktop computers for their work in EPP-ICT, indicating a preference for or access to more robust computing devices capable of supporting a wider range of educational software and applications. However, the complete absence of cellphone and television utilization among teachers, despite these being the most common gadgets among learners, raises important considerations for aligning instructional strategies with the technological realities of the learners. This disparity may impact the effectiveness of technology-integrated lessons and highlights the need for teachers to consider how learning activities can be designed to accommodate the devices most readily available to their students.

Table 4.5 Profile of the Teachers in Terms of Years in Service

Number of Years in Teaching	Frequency	Percent
0 – 3 year	11	47.8
4 – 10 years	8	34.8
More than 10 years	4	17.4
Total	23	100.0

The data in table 4.5, reveals that the largest group of teacher-respondents falls under the 0-3 years category, with 11 teachers or 47.8 percent of the total sample. This indicates that nearly half of the teachers in EPP-ICT are relatively new to the teaching profession, possessing three years or less of teaching experience. This group can be characterized as novice or beginning teachers who are likely still in the process of developing their instructional strategies, classroom management skills, and overall professional confidence.

The second largest group consists of teachers with 4-10 years of teaching experience, comprising 8 respondents or 34.8 percent of the total. These teachers can be considered as moderately experienced professionals who have moved beyond the initial adjustment phase and have established a solid foundation in their teaching practice. They are likely more comfortable with curriculum implementation and may have begun to explore specialized areas of professional growth.

The smallest group is composed of teachers with more than 10 years of teaching experience, with 4 respondents representing 17.4 percent of the sample. These veteran teachers bring a wealth of practical knowledge, institutional memory, and accumulated expertise to the teaching of EPP-ICT. Their long-term experience may translate into more refined instructional approaches and deeper understanding of learner needs over time.

The teacher-respondents in EPP-ICT are predominantly early-career educators, with nearly half having three years or less of teaching experience. While the presence of moderately experienced and veteran teachers provides a foundation of stability and mentorship potential within the faculty, the high proportion of novice teachers suggests a need for targeted induction programs, ongoing professional support, and opportunities for collaborative learning to strengthen their effectiveness in delivering the EPP-ICT curriculum.

Table 4.6 Profile of the Teachers in Terms of Professional Development Activities in ICT Attended

	Source of Professional Development Activities in ICT Attended													
	Self- initiated		School		District/ Cluster		Division		Region		National		International	
	f	percent	f	percent	f	percent	f	percent	f	percent	f	percent	f	percent
Seminars and Trainings	2	8.7	8	34.8	8	34.8	9	39.1	10	43.5	2	8.7	2	8.7
LAC Sessions	3	13.0	18	78.3	12	52.2	3	13.0	0	0.0	0	0.0	0	0.0
In Service Trainings	5	21.7	2	8.7	10	43.5	20	87.0	0	0.0	0	0.0	0	0.0
Forum	2	8.7	19	82.6	0	0.0	2	8.7	2	8.7	0	0.0	0	0.0
Short courses	13	56.5	5	21.7	0	0.0	0	0.0	0	0.0	5	21.7	2	8.7
Tutorials	12	52.2	11	47.8	0	0.0	0	0.0	0	0.0	5	21.7	2	8.7

Table 4.6, presents the sources of professional development activities in ICT attended by the teacherrespondents.

The data reveals that seminars and trainings were most frequently attended at the regional level, with 10 teachers or 43.5 percent reporting participation. This is closely followed by division-level seminars, attended by 9 teachers (39.1 percent), and school and district/cluster levels, each with 8 teachers (34.8 percent). In contrast, participation in seminars and trainings at the national and international levels, as well as self-initiated attendance, was considerably lower, each reported by only 2 teachers (8.7 percent). This pattern suggests that professional development opportunities in the form of seminars are most accessible to teachers at the regional, division, and local levels, while higher-level or externally initiated opportunities remain limited.

Digital Literacy Skills and Technology Integration of Learners and Teachers

Learning Action Cell (LAC) sessions emerged as primarily school-based professional development activities, with 18 teachers or 78.3 percent reporting attendance at this level. District/cluster-level LAC sessions were also substantial, attended by 12 teachers (52.2 percent). Self-initiated and division-level LAC participation were each reported by 3 teachers (13.0 percent). Notably, no teachers reported attending LAC sessions at the region, national, or international levels. This indicates that LAC sessions are predominantly implemented within schools and nearby clusters, reflecting their design as localized, collaborative learning mechanisms for teachers.

In-service trainings were most heavily concentrated at the division level, with 20 teachers or 87.0 percent reporting attendance. District/cluster-level in-service trainings were attended by 10 teachers (43.5 percent), while selfinitiated participation was reported by 5 teachers (21.7 percent). School-level in-service trainings had minimal attendance, with only 2 teachers (8.7 percent). No teachers reported attending in-service trainings at the region, national, or international levels. This distribution suggests that division offices play a central role in organizing and delivering in-service training programs for teachers in EPP-ICT.

Forums were predominantly attended at the school level, with 19 teachers or 82.6 percent reporting participation. Self-initiated forums and division-level forums were each attended by only 2 teachers (8.7 percent), and regional-level forums by another 2 teachers (8.7 percent). No teachers reported attending forums at the district/cluster, national, or international levels. This indicates that forums, as a form of professional development, are largely organized and accessed within the school setting.

Short courses showed a different pattern, with self-initiated participation being the most common, reported by 13 teachers or 56.5 percent. National-level short courses were attended by 5 teachers (21.7 percent), followed by school-level (5 teachers, 21.7 percent) and international-level (2 teachers, 8.7 percent). No teachers reported attending short courses at the district/cluster, division, or regional levels. This suggests that when teachers pursue short courses, they often do so on their own initiative, seeking opportunities beyond the formal professional development ladder provided by the educational system.

Similarly, tutorials were most frequently self-initiated, with 12 teachers or 52.2 percent reporting participation. School-level tutorials were also common, attended by 11 teachers (47.8 percent). National-level tutorials were reported by 5 teachers (21.7 percent), and international-level tutorials by 2 teachers (8.7 percent). No teachers reported attending tutorials at the district/cluster, division, or regional levels. This pattern reinforces the finding that teachers often take personal responsibility for upgrading their ICT skills through self-directed learning activities such as tutorials.

In summary, the data reveals a multi-layered landscape of professional development sources for teachers in EPP-ICT. School-level activities, particularly LAC sessions and forums, are widely accessed, indicating strong localization of professional learning communities. Division and regional levels are significant sources for seminars, trainings, and in-service programs, reflecting the centralized delivery of formal professional development. Notably, self-initiated participation is prominent in short courses and tutorials, demonstrating that teachers actively seek out and engage in independent learning opportunities to enhance their ICT competencies. However, participation at the national and international levels remains limited across almost all activity types, suggesting barriers such as limited opportunities, funding constraints, or selection processes that restrict access to higher-level professional development engagements.

Table 4.7 ICT Integration Practices of Teachers as to Lesson Development

INDICATORS	Mean	SD	Description
1. I use digital tools to plan and organize my lessons.	4.91	0.29	Always
2. I incorporate educational websites or platforms when preparing lesson materials.	4.52	0.73	Always
3. I create multimedia presentations (e.g., PowerPoint, video, animations) to support lesson content.	5.00	0.00	Always
4. I design lessons that include interactive or online activities.	4.43	0.73	Always
5. I use technology to differentiate instruction based on students' needs.	4.78	0.42	Always
6. I align my lesson plans with available ICT tools in the school.	4.78	0.42	Always
7. I utilize learning management systems (e.g., Google Classroom, Moodle) in planning lessons.	4.39	0.89	Always
8. I search for and adapt online teaching resources to fit my lesson objectives.	4.57	0.51	Always
9. I collaborate with other teachers using digital platforms during lesson planning.	4.70	0.47	Always
10. I integrate ICT tools in developing student-centered learning experiences.	4.87	0.34	Always

11. I consider students' digital literacy levels when designing technology-based lessons.	4.78	0.42	Always
12. I regularly update my lesson materials using current digital tools and content.	4.70	0.47	Always
13. I use software or apps to create quizzes, worksheets, or activities for lessons.	4.30	0.88	Always
14. I incorporate ICT to integrate 21st-century skills into my lesson objectives.	4.57	0.51	Always
15. I include opportunities for students to use technology during the lesson development phase.	4.70	0.47	Always
16. I reflect on the effectiveness of digital tools used in my previous lessons before planning new ones.	4.70	0.47	Always
17. I attend webinars or trainings to enhance my ICT integration skills in lesson planning.	4.43	0.51	Always
18. I experiment with new educational technologies to improve my lessons.	4.09	0.79	Often
19. I promote collaborative learning through technologyintegrated group activities.	4.61	0.50	Always
20. I evaluate the appropriateness of digital content before including it in my lesson materials.	4.61	0.50	Always
Average	4.62	0.41	Always

The table presents the level of ICT integration practices of teacher-respondents specifically in the area of lesson development.

The overall average mean score for ICT integration practices in lesson development is 4.62 (SD = 0.41), which carries a descriptive rating of "Always." This indicates that teacher-respondents consistently and frequently integrate ICT tools and digital resources when developing their lessons for EPP-ICT.

An examination of individual indicators reveals particularly high levels of practice in specific areas. The indicator with the highest mean score is "I create multimedia presentations (e.g., PowerPoint, video, animations) to support lesson content," which obtained a perfect mean score of 5.00 (SD = 0.00). This suggests that all teacherrespondents invariably utilize multimedia presentations as part of their lesson development process, reflecting a strong commitment to enhancing lesson content through visual and interactive materials.

Other indicators with notably high mean scores include "I use digital tools to plan and organize my lessons" (M = 4.91, SD = 0.29) and "I integrate ICT tools in developing student-centered learning experiences" (M = 4.87, SD = 0.34). These findings indicate that teachers not only use technology for personal organization but also deliberately design lessons that place students at the center of the learning process through technology integration.

Several indicators related to responsiveness and alignment also received high mean scores. These include "I align my lesson plans with available ICT tools in the school" (M = 4.78, SD = 0.42), "I use technology to differentiate instruction based on students' needs" (M = 4.78, SD = 0.42), and "I consider students' digital literacy levels when designing technology-based lessons" (M = 4.78, SD = 0.42). These results demonstrate that teachers are mindful of contextual factors, including resource availability and learner characteristics, when integrating ICT into their lesson planning.

Indicators related to collaboration, reflection, and continuous improvement also scored highly. Teachers reported collaborating with colleagues using digital platforms during lesson planning (M = 4.70, SD = 0.47), reflecting on the effectiveness of digital tools used in previous lessons (M = 4.70, SD = 0.47), and regularly updating lesson materials using current digital tools and content (M = 4.70, SD = 0.47). These practices suggest a culture of reflective and collaborative professionalism among the teacher-respondents.

The lowest mean score among the indicators, while still falling within the "Often" range, is for "I experiment with new educational technologies to improve my lessons" (M = 4.09, SD = 0.79). Although this remains a positive finding, it is slightly lower than the other indicators and shows greater variability in responses, as reflected by the higher standard deviation. This may indicate that while teachers are consistent in applying familiar technologies, they may be somewhat more cautious or limited in exploring and adopting emerging or unfamiliar educational technologies.

Other indicators with relatively lower mean scores, though still within the "Always" range, include "I use software or apps to create quizzes, worksheets, or activities for lessons" (M = 4.30, SD = 0.88) and "I attend webinars or trainings to enhance my ICT integration skills in lesson planning" (M = 4.43, SD = 0.51). The higher standard deviation for the former suggests some variability in how frequently teachers create digital learning materials, possibly due to differences in access to appropriate software or personal confidence in using such tools.

In summary, teacher-respondents demonstrate an consistently high level of ICT integration in lesson development, with the vast majority of indicators rated as "Always." They excel in creating multimedia content, using digital tools for organization, designing student-centered learning experiences, and considering contextual factors such as available resources and student digital literacy. The findings suggest that teachers have deeply embedded ICT into their lesson planning routines, although there remains some room for growth in experimenting with new technologies and in creating digital assessment materials. Overall, the results reflect a teaching force that is proactive, reflective, and committed to leveraging technology for effective lesson development in EPP-ICT.

Table 4.8 ICT Integration Practices of Teachers as to Lesson Discussion or Lecture

	INDICATORS	Mean	SD	Description
1.	I use multimedia presentations (e.g., PowerPoint, videos) to support my lectures.	4.91	0.29	Always
2.	I display digital visuals (charts, images, graphs) during discussions to enhance understanding.	4.61	0.50	Always
3.	I use interactive whiteboards or smart TVs during classroom discussions.	4.91	0.29	Always
4.	I show educational videos or simulations to explain complex concepts.	4.43	0.51	Always
5.	I use online tools to deliver lectures (e.g., Zoom, Google Meet, MS Teams).	3.74	1.10	
6.	I integrate audio or video recordings in my lectures to supplement the lesson.	4.57	0.51	Always
7.	I use real-time polling or quizzes (e.g., Kahoot, Mentimeter) during discussions to check understanding.	3.70	1.02	Often
8.	I encourage students to use digital devices to access lesson-related content during lectures.	4.00	0.85	Often
9.	I use digital storytelling tools during discussions to make lessons more engaging.	3.96	0.88	Often
10.	I allow students to present using ICT tools during class discussions.	4.13	0.76	Often
11.	I use online collaborative tools (e.g., Jamboard, Padlet) for interactive discussions.	3.09	1.20	Sometimes
12.	I facilitate class discussions through online discussion boards or forums.	3.70	1.43	Often
13.	I present live demonstrations using educational apps or simulations during lectures.	3.48	1.34	Often
14.	I integrate ICT to cater to different learning styles during discussions.	4.65	0.71	Often
15.	I access online platforms or digital references in real-time to answer students' questions.	3.87	0.97	Often
16.	I provide students with digital copies of my lecture materials.	4.04	0.77	Often
17.	I guide students in using digital tools or apps to support their understanding during lectures.	4.00	0.74	Often
18.	I monitor student engagement during ICT-based lectures using available tools.	4.22	0.67	Always
19.	I encourage students to share their insights from the discussion using digital platforms (e.g., online forums, class group chats, or learning apps).	4.17	0.83	Often
20.	I use ICT to make lectures more learner-centered and interactive.	4.52	0.51	Always
	Average	4.13	0.51	Often

The table presents the level of ICT integration practices of teacher-respondents specifically in the area of lesson discussion or lecture. The overall average mean score for ICT integration practices in lesson discussion or lecture is 4.13 (SD = 0.51), which carries a descriptive rating of "Often." This indicates that teacher-respondents frequently integrate ICT tools and digital resources during their classroom discussions and lectures, although not as consistently as in the lesson development phase where the overall rating was "Always."

An examination of individual indicators reveals that certain ICT integration practices are more deeply embedded than others. The indicators with the highest mean scores are "I use multimedia presentations (e.g., PowerPoint, videos) to support my lectures" and "I use interactive whiteboards or smart TVs during classroom discussions," both obtaining a mean score of 4.91 (SD = 0.29). These findings suggest that teachers heavily rely on presentation software and interactive display technologies as core components of their instructional delivery, reflecting a strong commitment to making lectures visually engaging and technologically enhanced.

Other indicators with high mean scores include "I integrate ICT to cater to different learning styles during discussions" (M = 4.65, SD = 0.71) and "I display digital visuals (charts, images, graphs) during discussions to enhance understanding" (M = 4.61, SD = 0.50). These results indicate that teachers are conscious of learner diversity and actively use digital visuals and multimedia elements to address varying preferences and needs among students. Similarly, "I use audio or video recordings in my lectures to supplement the lesson" (M = 4.57, SD = 0.51) and "I use ICT to make lectures more learner-centered and interactive" (M = 4.52, SD = 0.51) further demonstrate the teachers' efforts to enrich lecture delivery through varied digital media.

Indicators related to student engagement and participation also received relatively high ratings. These include "I monitor student engagement during ICT-based lectures using available tools" (M = 4.22, SD = 0.67), "I encourage students to share their insights from the discussion using digital platforms" (M = 4.17, SD = 0.83), and "I allow students to present using ICT tools during class discussions" (M = 4.13, SD = 0.76). These practices suggest that teachers not only use technology for their own delivery but also create opportunities for students to actively engage with and through technology during discussions.

However, the data also reveals areas where ICT integration is less frequent or more varied among teachers. The lowest mean score is for "I use online collaborative tools (e.g., Jamboard, Padlet) for interactive discussions" (M = 3.09, SD = 1.20), which falls under the descriptive rating of "Sometimes." The relatively high standard deviation indicates considerable variability in how often teachers utilize such tools, with some teachers using them frequently and others rarely or never. This suggests that while collaborative digital platforms are available, their integration into live discussions is not yet widespread or consistently practiced.

Other indicators with lower mean scores include "I present live demonstrations using educational apps or simulations during lectures" (M = 3.48, SD = 1.34), "I use online tools to deliver lectures (e.g., Zoom, Google Meet, MS Teams)" (M = 3.74, SD = 1.10), and "I use real-time polling or quizzes (e.g., Kahoot, Mentimeter) during discussions to check understanding" (M = 3.70, SD = 1.02). These indicators also show higher standard deviations, suggesting that practices requiring more specialized tools, internet connectivity, or real-time interaction are not yet uniformly adopted by all teachers. The lower rating for online lecture delivery tools may also reflect the context of face-to-face classes where such tools are less necessary, or possible limitations in infrastructure.

Similarly, "I facilitate class discussions through online discussion boards or forums" (M = 3.70, SD = 1.43) shows both a lower mean and a high standard deviation, indicating that asynchronous online discussions are not a common practice among the teacher-respondents. This may be due to the nature of the learning environment, time constraints, or the preference for synchronous face-to-face interaction.

Indicators related to guiding students in using digital tools during lectures (M = 4.00, SD = 0.74), providing digital copies of lecture materials (M = 4.04, SD = 0.77), and encouraging students to use digital devices to access lesson-related content (M = 4.00, SD = 0.85) all fall within the "Often" range. These practices reflect a moderate level of integration where teachers are supportive of student technology use but may not have fully systematized these practices into their regular lecture routines.

Teacher-respondents demonstrate a generally high level of ICT integration during lesson discussions and lectures, with an overall rating of "Often." They consistently utilize multimedia presentations, interactive displays, digital visuals, and audio-visual materials to enhance lecture delivery and cater to diverse learning styles. They also actively monitor student engagement and provide opportunities for student participation through technology. However, the integration of more interactive, collaborative, and real-time digital tools such as online whiteboards, polling applications, and discussion forums is less frequent and more varied among teachers. This suggests that while teachers have successfully adopted foundational ICT practices in their lectures, there remains significant potential for growth in the use of more advanced and interactive technologies to further enhance student engagement and participation during classroom discussions.

Table 4.9 ICT Integration Practices of Teachers as to Assessment or Evaluation

INDICATORS	Mean	SD	Description
1. I use digital tools (e.g., Google Forms, Kahoot) to create quizzes or tests for my students.	3.48	1.16	Often
2. I provide immediate feedback on assessments using ICT tools.	4.52	0.66	Always
3. I use learning management systems (e.g., Google Classroom, Moodle) to grade assignments.	4.00	1.13	Often
4. I integrate online assessment tools (e.g., Quizizz, Socrative) to evaluate student learning.	3.43	1.38	Often
5. I allow students to submit assignments electronically (e.g., via email, Google Drive).	3.87	1.32	Often
6. I use ICT to track students' progress and performance over time.	4.39	0.72	Always
7. I use digital rubrics to assess students' projects and assignments.	4.39	0.72	Always
8. I encourage students to participate in self-assessment using online tools.	4.00	1.04	Often

9. I use multimedia presentations (e.g., videos, audio recordings) for assessment tasks.	4.61	0.50	Always
10. I assess students' collaborative work through online tools (e.g., Padlet, Google Docs).	3.26	1.60	Sometimes
11. I design online surveys to gather feedback from students about their learning.	3.48	1.38	Often
12. I provide digital platforms for peer evaluations and feedback.	3.83	1.50	Often
13. I use ICT tools to analyze and interpret student performance data.	4.52	0.51	Always
14. I integrate digital portfolios for students to track and reflect on their learning progress.	3.91	1.24	Often
15. I use educational apps to give personalized assessments based on students' individual needs.	3.96	1.26	Often
16. I incorporate formative assessments using ICT (e.g., polls, interactive quizzes).	3.83	1.19	Often
17. I share students' assessment results using digital platforms to ensure timely communication.	4.26	1.01	Always
18. I use ICT tools to create assignments that require students to demonstrate creativity (e.g., video projects).	4.26	0.69	Always
19. I provide students with digital resources to help them improve after assessment.	4.70	0.47	Always
20. I use ICT tools to involve students in setting their learning goals and evaluating their progress.	4.61	0.50	Always
Average	4.06	0.79	Often

The table presents the level of ICT integration practices of teacher-respondents specifically in the area of assessment or evaluation. The overall average mean score for ICT integration practices in assessment or evaluation is 4.06 (SD = 0.79), which carries a descriptive rating of "Often." This indicates that teacher-respondents frequently integrate ICT tools and digital resources when conducting assessments and evaluating student learning, though the higher standard deviation compared to previous categories suggests greater variability in practices among teachers.

An examination of individual indicators reveals that certain assessment practices are more consistently implemented than others. The indicator with the highest mean score is "I provide students with digital resources to help them improve after assessment," which obtained a mean of 4.70 (SD = 0.47) with a rating of "Always." This suggests that teachers prioritize the formative aspect of assessment by ensuring that learners have access to digital materials for remediation or further learning after evaluations.

Other indicators with notably high mean scores include "I use multimedia presentations (e.g., videos, audio recordings) for assessment tasks" (M = 4.61, SD = 0.50), "I use ICT tools to involve students in setting their learning goals and evaluating their progress" (M = 4.61, SD = 0.50), "I provide immediate feedback on assessments using ICT tools" (M = 4.52, SD = 0.66), and "I use ICT tools to analyze and interpret student performance data" (M = 4.52, SD = 0.51). These findings indicate that teachers are leveraging technology not only for scoring and feedback but also for more sophisticated practices such as data analysis and student involvement in goal-setting and self-evaluation.

Indicators related to tracking and reporting also received high ratings. These include "I use ICT to track students' progress and performance over time" (M = 4.39, SD = 0.72), "I use digital rubrics to assess students' projects and assignments" (M = 4.39, SD = 0.72), and "I share students' assessment results using digital platforms to ensure timely communication" (M = 4.26, SD = 1.01). These practices demonstrate that teachers are systematic in monitoring learner achievement and maintaining transparent communication with students regarding their performance.

Indicators related to creative and student-centered assessment also scored well. "I use ICT tools to create assignments that require students to demonstrate creativity (e.g., video projects)" obtained a mean of 4.26 (SD = 0.69), reflecting efforts to move beyond traditional paper-and-pencil tests toward more innovative and expressive forms of assessment.

However, the data also reveals areas where ICT integration in assessment is less frequent or more inconsistent among teachers. The lowest mean score is for "I assess students' collaborative work through online tools (e.g., Padlet, Google Docs)" (M = 3.26, SD = 1.60), which falls under the descriptive rating of "Sometimes." This indicator also has the highest standard deviation among all items, indicating wide variability in practice. This suggests that while some teachers may regularly use online tools to evaluate group work, many others do so rarely or not at all, possibly due to challenges in monitoring individual contributions in collaborative digital spaces or preferences for traditional observation-based assessment of group work.

Other indicators with relatively lower mean scores include "I use online assessment tools (e.g., Quizizz, Socrative) to evaluate student learning" (M = 3.43, SD = 1.38), "I use digital tools (e.g., Google Forms, Kahoot) to create quizzes or tests for my students"

(M = 3.48, SD = 1.16), and "I design online surveys to gather feedback from students about their learning" (M = 3.48, SD = 1.38). These indicators, all rated as "Often," nonetheless show mean scores below the category average and relatively high standard deviations, suggesting that the use of specialized assessment platforms and survey tools is not yet universal among teachers.

Indicators related to digital submission and portfolio practices also show moderate ratings with considerable variability. "I allow students to submit assignments electronically (e.g., via email, Google Drive)" (M = 3.87, SD = 1.32), "I integrate digital portfolios for students to track and reflect on their learning progress" (M = 3.91, SD = 1.24), and "I use educational apps to give personalized assessments based on students' individual needs" (M = 3.96, SD = 1.26) all fall within the "Often" range but exhibit higher standard deviations, indicating inconsistent adoption of these practices across the teacher-respondents.

Similarly, "I encourage students to participate in self-assessment using online tools" (M = 4.00, SD = 1.04), "I provide digital platforms for peer evaluations and feedback" (M = 3.83, SD = 1.50), and "I incorporate formative assessments using ICT (e.g., polls, interactive quizzes)" (M = 3.83, SD = 1.19) show moderate mean scores with varying levels of consistency. The high standard deviation for peer evaluation platforms suggests that this practice is highly variable, possibly due to concerns about the reliability of peer feedback or challenges in implementing structured peer evaluation activities through technology.

Teacher-respondents demonstrate a generally high level of ICT integration in assessment and evaluation practices, with an overall rating of "Often." They are particularly strong in providing post-assessment digital resources, using multimedia for assessment tasks, involving students in goal-setting and progress evaluation, delivering immediate feedback, and analyzing performance data using ICT tools. They also consistently use technology for tracking progress, applying digital rubrics, and communicating results. However, the integration of more specialized assessment technologies such as online quiz platforms, collaborative assessment tools, digital portfolios, and peer evaluation systems is less consistent and shows greater variability among teachers. This suggests that while teachers have successfully adopted foundational ICT practices in assessment, there remains significant potential for growth in diversifying assessment methods and fully leveraging the capabilities of digital tools to create more interactive, collaborative, and personalized assessment experiences for learners.

Table 4.10 Relationship between the academic performance and digital literacy

Chi-square-value	p-value	Comparison	Decision	Remark
28.84	0.00	p-value < 0.05	reject Ho	significant

The table presents the results of a statistical analysis examining the relationship between the academic performance of learners and their digital literacy skills.

The computed chi-square value is 28.84, with a corresponding p-value of 0.00. When compared to the standard alpha level of 0.05, the p-value is found to be less than 0.05, as indicated in the comparison column showing "p-value < 0.05."

Based on this result, the decision is to "reject Ho," which refers to the rejection of the null hypothesis. The null hypothesis typically states that there is no significant relationship between the variables under investigation. By rejecting the null hypothesis, the analysis accepts the alternative hypothesis that a significant relationship does exist.

The remark column confirms that the finding is "significant," indicating that the relationship between academic performance and digital literacy is statistically meaningful and not attributable to chance or random variation in the data.

This significant relationship suggests that learners with higher levels of digital literacy tend to demonstrate better academic performance in EPP-ICT, or conversely, that those who perform well academically also possess stronger digital literacy skills. While the chi-square test establishes that a relationship exists, it does not specify the direction or causality of this relationship. However, the finding underscores the interconnected nature of digital competence and academic achievement in the context of EPP-ICT.

The statistical analysis reveals a significant relationship between the academic performance of learners and their digital literacy skills. This finding has important implications for curriculum design and instructional practice, suggesting that efforts to enhance learners' digital literacy may contribute positively to their academic outcomes, and that integrating digital skills development into teaching and learning processes could be a valuable strategy for improving overall student achievement in EPP-ICT.

Table 4.10 Relationship between ICT integration and Academic Performance

Chi-square-value	p-value	Comparison	Decision	Remark
7.17	0.13	p-value > 0.05	accept Ho	not significant

The table presents the results of a statistical analysis examining the relationship between ICT integration practices of teachers and the academic performance of learners.

The computed chi-square value is 7.17, with a corresponding p-value of 0.13. When compared to the standard alpha level of 0.05, the p-value is found to be greater than 0.05, as indicated in the comparison column showing "pvalue > 0.05."

Based on this result, the decision is to "accept Ho," which refers to the acceptance of the null hypothesis. The null hypothesis states that there is no significant relationship between the variables under investigation. By accepting the null hypothesis, the analysis concludes that a significant relationship does not exist between ICT integration practices and academic performance.

The remark column confirms that the finding is "not significant," indicating that the relationship between ICT integration and academic performance is not statistically meaningful and may be attributed to chance or other factors not accounted for in the analysis.

This non-significant relationship suggests that the extent to which teachers integrate ICT into their instructional practices does not have a direct or detectable association with the academic performance of learners in EPP-ICT. Several possible explanations may account for this finding. It is possible that while teachers integrate ICT into their lessons, discussions, and assessments, the manner or quality of integration may not be sufficiently aligned with learning objectives to produce measurable effects on academic outcomes. Alternatively, other factors such as learner motivation, study habits, home support, or access to technology outside the classroom may play more substantial roles in determining academic performance, potentially mediating or overshadowing the influence of teacher ICT integration.

Another consideration is that ICT integration, while valuable for enhancing engagement and developing digital skills, may not directly translate to improved scores on traditional academic assessments if the assessments themselves are not designed to capture technology-enhanced learning outcomes. The finding may also reflect variability in how ICT is integrated across different classrooms, with some approaches being more effective than others, but the overall analysis capturing only the presence or frequency of integration rather than its instructional quality or appropriateness.

In summary, the statistical analysis reveals no significant relationship between ICT integration practices of teachers and the academic performance of learners in EPP-ICT. This finding suggests that while ICT integration remains an important aspect of modern teaching, its direct impact on academic achievement as measured in this context may be limited or influenced by intervening variables. The result highlights the need for further investigation into how ICT is being used in classrooms, the quality of technology-enhanced instruction, and the alignment between ICT integration practices and assessment methods. It also underscores the importance of considering multiple factors that contribute to learner academic success beyond teacher technology use alone.

Table 4.11 Relationship between ICT integration and Digital Literacy Skills

Chi-square-value	p-value	Comparison	Decision	Remark
7.41	0.49	p-value > 0.05	accept Ho	not significant

The table presents the results of a statistical analysis examining the relationship between ICT integration practices of teachers and the digital literacy skills of learners.

The computed chi-square value is 7.41, with a corresponding p-value of 0.49. When compared to the standard alpha level of 0.05, the p-value is found to be greater than 0.05, as indicated in the comparison column showing "p-value > 0.05."

Based on this result, the decision is to "accept Ho," which refers to the acceptance of the null hypothesis. The null hypothesis states that there is no significant relationship between the variables under investigation. By accepting the null hypothesis, the analysis concludes that a significant relationship does not exist between ICT integration practices and the digital literacy skills of learners.

The remark column confirms that the finding is "not significant," indicating that the relationship between ICT integration and digital literacy skills is not statistically meaningful and may be attributed to chance or other factors not accounted for in the analysis.

This non-significant relationship suggests that the extent to which teachers integrate ICT into their instructional practices does not have a direct or detectable association with the level of digital literacy skills possessed by learners in EPP-ICT. Several possible explanations may account for this finding.

One consideration is that digital literacy skills may be developed through a variety of experiences beyond the classroom, including home use of technology, access to personal devices, peer interactions, and self-directed learning. Learners in the study reported high utilization of cellphones and televisions, suggesting that much of their digital exposure may occur outside the formal learning environment. If digital literacy is primarily shaped by these external factors, the influence of teacher ICT integration within the classroom may be less pronounced.

Another possibility is that while teachers integrate ICT into their lessons, the nature of this integration may not explicitly focus on building learners' foundational digital skills. ICT integration for instructional delivery, such as presenting multimedia content or using assessment tools, may not necessarily translate into opportunities for learners to develop their own competencies in areas such as basic computer operations, word processing, spreadsheet management, or digital citizenship. If learners are primarily consumers rather than active users of technology during ICT-integrated lessons, the potential for skill development may be limited.

The finding may also reflect a misalignment between the types of ICT integration practiced by teachers and the specific digital literacy skills measured in the study. Teachers may be integrating technology in ways that enhance content delivery or engagement

but do not directly address the particular competencies assessed under digital literacy, such as operating spreadsheets or understanding digital citizenship concepts.

Additionally, the non-significant result could be influenced by variability in how ICT integration is implemented across different classrooms. The analysis captures the overall presence or frequency of integration but may not account for differences in quality, depth, or learner-centeredness of technology use. Some teachers may be using ICT in ways that actively develop student digital skills, while others may use technology more passively, and these variations could cancel out any detectable overall effect.

The statistical analysis reveals no significant relationship between ICT integration practices of teachers and the digital literacy skills of learners in EPP-ICT. This finding suggests that teacher technology use in the classroom, as currently implemented, may not be the primary driver of learner digital competence. It highlights the need for a more intentional approach to developing digital literacy skills within the curriculum, where learners are provided with direct, hands-on opportunities to build and practice their technology skills rather than merely observing or consuming technology during lessons. The result also underscores the importance of considering the broader ecosystem of digital learning, including home access, peer learning, and self-directed exploration, in understanding how learners develop digital literacy. Further research may explore specific types of ICT integration that are more effective in building student digital competencies and examine how classroom practices can be better aligned with the goal of developing digitally literate learners.

5. CONCLUSION

The study revealed that learners possess a generally competent level of digital literacy skills, with strengths in basic computer operations and commonly used productivity software, but with noticeable weaknesses in spreadsheet and publisher-related tasks. Despite these variations in digital competence, learners demonstrated excellent and consistent academic performance in EPP–ICT, indicating strong mastery of subject competencies. The findings also showed that learners rely mainly on mobile phones and television as learning tools, while teachers predominantly use laptops and desktop computers, suggesting a mismatch between the technologies available to learners and those used in instruction. Teachers were found to integrate ICT at a high level, particularly in lesson development, reflecting a strong commitment to technology-supported teaching.

Furthermore, the study established a significant relationship between learners' digital literacy skills and their academic performance, implying that improved digital competence is associated with better learning outcomes. However, no significant relationship was found between teachers' ICT integration practices and learners' academic performance, nor between ICT integration and learners' digital literacy skills. These results suggest that the frequency of ICT use alone does not guarantee improved academic achievement or digital skill development, and that learners' digital competencies may also be influenced by factors beyond classroom instruction, such as home technology exposure and independent learning experiences.

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