

Digital Leadership Competencies of School Heads and Their Influence on Technology Integration in Teaching and Learning

Elleomar R. Dubduban¹, Rudy Frederick C. Mata², Carlos D. Robledo Jr.³, Mariannie V. Maghinay⁴, Joy P. Suminguit⁵

¹Teacher 1, Sta. Lucia National High School, SDO Pagadian City, Philippines

²Private Teacher, Our Lady of Triumph Institute of Technology, INC., Pagadian City, Zamboanga del Sur, Philippines

³Teacher VI, Guipos National High School, Guipos, Zamboanga del Sur, SDO Zamboanga del Sur, Philippines

⁴Teacher I, Lala National High School, Maranding Lala Lanao del Norte, Division of Lanao del Norte, Province of Lanao del Norte, Region X, Philippines

⁵Teacher I, Lala National High School, Maranding Lala Lanao del Norte, Division of Lanao del Norte, Province of Lanao del Norte, Region X, Philippines

Email: elleomardubdubanreyes@gmail.com

Abstract

This study assessed the digital leadership competencies of school heads and their influence on technology integration in teaching and learning in the Schools Division of Pagadian City. Specifically, it determined the level of digital leadership competencies in terms of digital vision and strategic leadership, technology management and resource utilization, professional development and capacity building, digital communication and collaboration, and ethical and responsible use of digital technologies. It also examined the level of technology integration in terms of instructional planning and preparation, classroom instruction, and student engagement, assessment and feedback, learning resource utilization, and professional collaboration and continuous improvement. The study further determined the significant relationship and influence of digital leadership competencies on technology integration and developed a proposed Digital Leadership Enhancement Program. A descriptive – correlational quantitative research design was employed. The respondents consisted of 82 school heads, comprising 61 elementary and 21 secondary school heads, selected through total enumeration. A researcher – made questionnaire, validated by the three experts with a validation rating of 4.23 and a Cronbach's alpha coefficient of 0.84, served as the primary data collection instrument. Weighted mean, Pearson's Product – Moment Correlation, and simple linear regression were used to analyze the data. The findings revealed that the respondents strongly agreed that they demonstrated high digital leadership competencies and that technology integration was implemented to a high extent. Moreover, a very high positive significant relationship existed between digital leadership competencies and technology integration, explaining 71.7% of its variance. Based on the findings, a Digital Leadership Enhancement Program was proposed to further strengthen school heads' digital leadership and promote effective technology integration in teaching and learning.

Keywords

digital leadership competencies, school heads, technology integration, teaching and learning, descriptive–correlational study, educational leadership

1. Introduction

The rapid advancement of digital technologies has transformed the educational landscape, compelling schools to adopt innovative approaches that enhance teaching, learning, and administrative processes. Digital transformation in education extends beyond the acquisition of technological tools; it requires school leaders who possess the knowledge, skills, and strategic vision to foster a culture that embraces technology integration. School heads play a pivotal role in terms of creating an environment where teachers are encouraged and supported to utilize digital technologies effectively, ensuring that instructional practices remain relevant to the demands of twenty-first-century education. As educational systems continue to emphasize digital learning, the competencies of school leaders have become increasingly important in guiding schools through technological change and innovation. Acebuche (2023) emphasized that digital leadership enables school administrators to promote innovation, strengthen technology integration, support teacher professional development, and establish collaborative school cultures necessary for effective digital transformation. Similarly, Okunlola (2025), concluded that digitally competent school leaders significantly improve school effectiveness by fostering instructional innovation, organizational performance, and sustainable technology adoption.

Digital leadership competencies encompass the knowledge, skills, attitudes, and behaviors that enable school heads to lead the effective implementation of digital technologies in educational settings. These competencies include developing a shared digital vision, promoting professional development, managing digital resources, encouraging collaboration, ensuring responsible technology use, and supporting data-driven decision-making. School heads who demonstrate strong digital leadership competencies are better positioned to motivate teachers, establish technology-friendly learning environments, and facilitate the integration of digital tools into classroom instruction. Consequently, their leadership practices may also significantly influence the extent to which teachers incorporate technology into teaching and learning processes. Yang et. al (2025), reported that principals who provide a clear digital vision, sufficient technological resources, and continuous professional development significantly enhance teachers' ICT integration. Likewise, Huong and Quy (2025), identified strategic, pedagogical, technical, and ethical digital competencies as essential qualities of school leaders that strengthen teachers' professional growth and encourage the successful implementation of technology in schools.

Technology integration has become an essential component of quality education as it enhances instructional delivery, promotes learner engagement, supports differentiated instruction, and develops students' digital literacy skills. Despite substantial investments in educational technologies and digital infrastructure, many schools continue to experience varying levels of technology integration due to differences in leadership support, teacher readiness, resource availability, and organizational culture. Among these factors, the leadership exercised by school heads remains one of the most influential determinants of successful technology adoption. Understanding how digital leadership competencies affect technology integration can provide valuable insights for improving school leadership practices and strengthening digital transformation initiatives across educational institutions. Panganiban and Flores (2021) found that school heads' technology leadership significantly contributes to teachers' technology integration by creating supportive environments that encourage the effective use of digital technologies in classroom instruction. Moreover, Rayray (2024), revealed that school heads with higher

levels of technology leadership competence particularly those who actively participate in professional development activities, demonstrate stronger capacities to lead digital initiatives within their schools. Fitriani (2025) further emphasized that digital leadership enhances teachers' ICT literacy, build confidence in technology use, and minimizes resistance to digital innovation, ultimately improving instructional practices.

Given the growing importance of digital leadership in contemporary education, this study seeks to examine the digital leadership competencies of school heads and determine their influence on technology integration in teaching and learning. Specifically, the study aims to assess the level of digital leadership competencies demonstrated by school heads, evaluate the extent of technology integration implemented by teachers, and determine whether digital leadership competencies significantly influence technology integration practices. The findings of this study are expected to contribute to the educational leadership literature and provide evidence-based recommendations for policymakers, school administrators, and professional development providers in designing leadership enhancement programs that strengthen technology integration and improve the quality of teaching and learning in schools.

1.1. Specific Research Questions

This study aimed to determine the digital leadership competencies of school heads and their influence on technology integration in teaching and learning. Specifically, this study sought to answer the following questions:

1. What is the level of digital leadership competencies of school heads in terms of;
 - 1.1. Digital vision and strategic leadership;
 - 1.2. Technology management and resource utilization;
 - 1.3. Professional development and capacity building;
 - 1.4. Digital communication and collaboration; and
 - 1.5. Ethical and responsible use of digital technologies?
2. What is the level of technology integration in teaching and learning in terms of;
 - 2.1. Instructional planning and preparation;
 - 2.2. Classroom instruction and student engagement;
 - 2.3. Assessment and feedback;
 - 2.4. Learning resource utilization; and
 - 2.5. Professional collaboration and continuous improvement?
3. Is there a significant relationship between the digital leadership competencies of school heads and technology integration in teaching and learning?
4. To what extent do the digital leadership competencies of school heads significantly influence technology integration in teaching and learning?
5. Based on the findings of the study, what Digital Leadership Enhancement Program may be proposed to strengthen technology integration in teaching and learning?

1.2. Hypothesis of the Study

In order to provide a correlation analysis for this study, the following hypotheses were developed:

Null Hypotheses (Ho):

- a. There is no significant relationship between the digital leadership competencies of school heads and technology integration in teaching and learning.
- b. There is no significant influence on the digital leadership competencies of the school heads to the technology integration in teaching and learning.

2. Methods

2.1. Study Design

The study employed a descriptive – correlational quantitative research design to examine the digital leadership competencies of school heads and their influence on technology integration in teaching and learning. The descriptive component was utilized to determine the level of digital leadership competencies of school heads across identified dimensions and to assess the level of technology integration in teaching and learning as perceived by the respondents. Quantitative data were collected using a structured survey questionnaire, allowing the researcher to systematically measure the variables and summarize the findings through appropriate descriptive statistical techniques such as frequency, percentage, mean, and standard deviation. This design enabled the researcher to present an objective description of the current conditions of digital leadership and technology integration within the participating schools. According to Creswell and Creswell (2023), a descriptive-correlational quantitative research design is appropriate for describing existing conditions and examining the relationship between variables using numerical data collected through structured questionnaires. This design enables researchers to objectively analyze data using descriptive and correlational statistical techniques, making it suitable for investigating digital leadership competencies and technology integration in education.

The correlational component of the study was employed in order to determine the relationship between the digital leadership competencies and technology integration, as well as to examine the extent to which digital leadership competencies influence technology integration in teaching and learning. Inferential statistical techniques, such as Pearson's product – moment correlation coefficient and regression analysis were used to analyze the association and predictive influence of the independent variable on the dependent variable. The descriptive – correlational quantitative design was deemed appropriate as it facilitates the collection of measurable data and the examination of naturally occurring relationships among variables without manipulating the research environment. Consequently, the findings provided empirical evidence that may serve as the basis for developing a Digital Leadership Enhancement Program aimed at strengthening technology integration in schools.

2.2. Population and Sample

The respondents of this study were the school heads from public elementary and secondary schools in the Schools Division of Pagadian City. Specifically, the study included 61 elementary school heads and 21 secondary school heads, for a total population of 82 school heads. As the instructional leaders and administrators, the school heads were considered as the most appropriate respondents as they were directly responsible for leading digital transformation initiatives, managing school operations, and promoting the integration of technology in teaching and learning within their respective schools.

The study also employed total enumeration sampling, wherein all members of the target population were included as respondents. Total enumeration was deemed appropriate as the population size was

relatively small and manageable, allowing the researcher to gather data from every school head in the Schools Division of Pagadian City. This sampling technique minimized sampling error associated with selecting only a portion of the population and ensured that the findings accurately represented the digital leadership competencies of all school heads within the study area. Consequently, the use of the total enumeration enhanced the comprehensiveness, reliability, and representativeness of the study findings. Taherdoost (2022) explained that total enumeration sampling is appropriate when the target population is small and accessible, allowing researchers to include all eligible participants. This approach minimizes sampling error and improves the representativeness and reliability of the findings by ensuring that the entire population is represented.

2.3. Instrumentation

The study utilized a self-made questionnaire as the primary instrument for data collection. The questionnaire was developed by the researcher based on an extensive review of related literature and studies on digital leadership and technology integration in education. It underwent content validation by three experts in educational leadership and research to determine its clarity, relevance, and appropriateness. The instrument obtained an overall validation score of 4.23, which was verbally interpreted as Excellent, indicating that the questionnaire possessed a high degree of content validity. Moreover, the instrument underwent a reliability test to determine its internal consistency and yielded a Cronbach's alpha coefficient of 0.84, indicating good reliability and confirming that the questionnaire was suitable for use in the study.

The research questionnaire consisted of two parts. Part I assessed the level of digital leadership competencies of school heads, while Part II assessed the level of technology integration in teaching and learning. The respondents rated each statement using a 4-point Likert scale based on their level of agreement. The response options were: 4 – Strongly Agree, 3 – Agree, 2 – Slightly Agree, and 1 – Disagree. This response format enabled the researcher to quantify the respondents' perceptions and facilitated the statistical analysis of the data to determine the levels of the study variables and examine the relationship and influence between digital leadership competencies and technology integration.

2.4. Data Collection

Before the conduct of the study, the researcher secured the necessary approvals from the research adviser and the appropriate authorities to administer the survey. Upon approval, a letter requesting permission to conduct the study was submitted to the office of the schools division superintendent of the schools division of Pagadian City. After obtaining the required authorization, the researcher coordinated with the district supervisors and school heads in relation to the schedule and administration of the questionnaire. The respondents were informed of the purpose of the study, and their voluntary participation was sought. They were also assured that their responses would be treated with utmost confidentiality and used solely for academic and research purposes. Informed consent was obtained from all respondents before the distribution of the questionnaires.

The researcher personally administered the validated and reliable questionnaires to the respondents and provided sufficient time for them to accomplish the instrument. After all questionnaires had been completed, the researcher retrieved them, checked each questionnaire for completeness, and organized the responses for data processing. The collected data were encoded, tabulated, and subjected to appropriate statistical analyses based on the objectives of the study. The results also served as the basis for determining the levels of digital leadership competencies and technology integration, examining the relationship and influence between the variables, and developing the proposed Digital Leadership Enhancement Program.

2.5. Data Analysis

The data collected from the respondents were encoded, organized, and analyzed using appropriate statistical tools to answer the research questions of the study. For research questions 1 and 2, which sought to determine the level of digital leadership competencies of school heads and the level of technology integration in teaching and learning, the weighted mean was used. This statistical measure was appropriate as the responses were obtained using a 4 – point Likert scale, enabling the researcher to determine the average level of agreement for each indicator and dimension. The computed weighted mean values were interpreted using a predetermined descriptive scale to determine the corresponding levels of the variables under investigation.

For research question 3, which examined the significant relationship between digital leadership competencies and technology integration in teaching and learning, Pearson's Product – Moment Correlation Coefficient (Pearson's r) was employed to determine the direction and strength of the relationship between the two variables. Meanwhile, for Research Question 4, which sought to determine the extent to which digital leadership competencies influenced technology integration in terms of teaching and learning, simple linear regression analysis was utilized. Regression analysis was appropriate as it determined whether the digital leadership competencies significantly predicted technology integration and quantified the extent of their influence. All inferential statistical analyses were conducted at the 0.05 level of significance, which served as the basis for accepting or rejecting the null hypotheses of the study.

3. Results

3.1. Level of Digital Leadership Competencies of School Heads

Table 1. Digital Leadership Competencies – Digital Vision and Strategic Leadership

Item Statement	WM	VERBAL INTERPRETATION
I articulate a clear digital vision that guides the integration of technology in teaching and learning in my school.	3.74	Strongly Agree
I develop and implement strategic plans that promote the effective use of digital technologies to achieve school goals.	3.29	Strongly Agree
I align the school's digital initiatives with the policies and priorities of the Department of Education.	3.38	Strongly Agree
I encourage teachers, learners, and other stakeholders to actively support the school's digital transformation initiatives.	3.46	Strongly Agree
I regularly review and refine the school's digital strategies to address emerging educational needs and technological developments.	3.21	Agree
Average Weighted Mean	3.42	Strongly Agree

Table 1 shows that the respondents strongly agreed that they demonstrated digital leadership competencies in terms of Digital Vision and Strategic Leadership, as reflected by the average weighted

mean of 3.42. The highest – rated indicator was articulating a clear digital vision that guides technology integration with a weighted mean of 3.74, while the lowest – rated indicator was regularly reviewing and refining digital strategies with a weighted mean of 3.21. Overall, the findings indicate that the school heads exhibited strong strategic leadership in promoting digital transformation and technology integration in their schools. Based on the study of Sheninger (2022), who emphasized that effective digital leaders establish a clear digital vision and align strategic goals with technology integration to improve teaching, learning, and school innovation. School leaders ho continuously guide and support digital transformation create a culture that promotes sustainable technology use and organizational improvement.

Table 2. Digital Leadership Competencies – Technology Management and Resource Utilization

Item Statement	WM	VERBAL INTERPRETATION
I ensure that digital technologies and ICT resources are effectively managed to support teaching and learning.	3.57	Strongly Agree
I allocate available technological resources based on the instructional needs and priorities of the school.	3.72	Strongly Agree
I promote the efficient and responsible use of digital devices, software, and online platforms among teachers and learners.	3.84	Strongly Agree
I monitor the availability, maintenance, and functionality of technological resources to ensure their continuous use.	3.26	Strongly Agree
I seek opportunities to acquire and maximize digital resources that enhance the quality of instruction and school operations.	3.34	Strongly Agree
Average Weighted Mean	3.55	Strongly Agree

Table 2 shows that the respondents strongly agreed that they demonstrated digital leadership competencies in terms of Technology Management and Resource Utilization, with an average weighted mean of 3.55. The highest – reated indicator was promoting the efficient and responsible use of digital devices, software, and online platforms among the teachers and learners with a weighted mean of 3.84, while the lowest – rated indicator was monitoring the availability, maintenance, and functionality of technological resources with a weighted mean of 3.26. Overall, the findings indicate that the school heads effectively managed and utilized technological resources to support teaching and learning. The findings are consistent with Dexter et. al (2022), who reported that effective digital school leaders maximize the use of technological resources by ensuring their availability, proper management, and alignment with instructional goals. Strategic resource utilization enables schools to support quality teaching and enhance technology integration in the learning process.

Table 3. Digital Leadership Competencies – Professional Development and Capacity Building

Item Statement	WM	VERBAL INTERPRETATION
I provide teachers with opportunities to participate in professional development programs focused on digital technologies.	3.73	Strongly Agree

I encourage teachers to continuously enhance their digital competencies through training and lifelong learning.	3.28	Strongly Agree
I support coaching, mentoring, and collaborative learning activities that strengthen teachers' technology integration skills.	3.37	Strongly Agree
I identify the digital learning needs of teachers and facilitate appropriate capacity-building initiatives to address them.	3.45	Strongly Agree
I promote a culture of continuous professional growth that enhances the effective use of digital technologies in teaching and learning.	3.21	Agree
Average Weighted Mean	3.41	Strongly Agree

Table 3 shows that the respondents strongly agreed that they demonstrated digital leadership competencies in terms of Professional Development and Capacity Building, as reflected by the average weighted mean of 3.41. The highest – rated indicator was providing teachers with opportunities to participate in professional development programs focused on digital technologies with a weighted mean of 3.73, while the lowest – rated indicator was promoting a culture of continuous professional growth that enhances the effective use of digital technologies with a weighted mean of 3.21. Overall, the findings indicate that the school heads actively supported teachers' professional growth and capacity building to strengthen technology integration in teaching and learning. As stated by OECD (2023), which emphasized that school leaders play a vital role in promoting teachers' continuous professional development by providing opportunities to strengthen digital competencies. Sustained capacity-building initiatives enable teachers to integrate technology more effectively and improve the quality of teaching and learning.

Table 4. Digital Leadership Competencies – Digital Communication and Collaboration

Item Statement	WM	VERBAL INTERPRETATION
I use digital communication platforms to effectively disseminate information to teachers, learners, and other stakeholders.	3.57	Strongly Agree
I encourage the use of digital tools that promote collaboration among teachers in planning, teaching, and professional learning.	3.72	Strongly Agree
I facilitate effective online communication and collaboration with parents, community partners, and education officials.	3.84	Strongly Agree
I promote responsible and efficient use of digital communication technologies to support school operations and instructional activities.	3.26	Strongly Agree
I foster a collaborative digital culture by encouraging stakeholders to share ideas, resources, and best practices through appropriate digital platforms.	3.34	Strongly Agree
Average Weighted Mean	3.55	Strongly Agree

Table 4 shows that the respondents strongly agreed that they demonstrated digital leadership competencies in terms of Digital Communication and Collaboration, with an average weighted mean of 3.55. The highest – rated indicator was facilitating effective online communication and collaboration with parents, community partners, and education officials with a weighted mean of 3.84, while the

lowest – rated indicator was promoting the responsible and efficient use of digital communication technologies to support school operations and instructional activities with a weighted mean of 3.26. Overall, the findings indicate that the school heads effectively utilized digital communication and collaboration to strengthen stakeholder engagement and support teaching and learning. According to UNESCO (2023), which emphasized that effective digital leadership involves fostering digital communication and collaboration among teachers, parents, and other stakeholders. School leaders who utilize digital communication platforms effectively strengthen stakeholder engagement, support collaborative decision-making, and enhance teaching and learning outcomes.

Table 5. Digital Leadership Competencies – Ethical and Responsible Use of Digital Technologies

Item Statement	WM	VERBAL INTERPRETATION
I promote the ethical and responsible use of digital technologies among teachers, learners, and other stakeholders.	3.68	Strongly Agree
I ensure that the use of digital technologies in the school complies with data privacy, cybersecurity, and intellectual property policies.	3.27	Strongly Agree
I encourage teachers and learners to practice responsible digital citizenship when using online platforms and digital resources.	3.38	Strongly Agree
I establish and enforce guidelines that promote the safe, secure, and appropriate use of digital technologies within the school.	3.46	Strongly Agree
I model ethical behavior by using digital technologies responsibly, professionally, and in accordance with established policies and standards.	3.26	Strongly Agree
Average Weighted Mean	3.41	Strongly Agree

Table 5 shows that the respondents strongly agreed that they demonstrated digital leadership competencies in terms of Ethical and Responsible Use of Digital Technologies, as reflected by the average weighted mean of 3.41. The highest rated factor was promoting ethical and responsible use of digital technologies among teachers, learners, and other stakeholders with 3.68, while the lowest – rated was modeling ethical behavior by using digital technologies responsibly and professionally with 3.26. Overall, the findings indicate that the school heads exhibited strong commitment to promoting ethical, responsible, and secure use of digital technologies within their schools. According to International Society for Technology in Education (ISTE) (2021), emphasized that effective digital leaders promote the ethical, safe, and responsible use of technology by modeling digital citizenship and establishing policies that ensure the secure and appropriate use of digital resources in schools.

3.2. Level of Technology Integration in Teaching and Learning

Table 6. Technology Integration – Instructional Planning and Preparation

Item Statement	WM	VERBAL INTERPRETATION
----------------	----	-----------------------

Teachers in my school integrate appropriate digital technologies when planning their lessons and instructional activities.	3.71	Strongly Agree
Teachers in my school select digital resources that align with the intended learning objectives and curriculum standards.	3.29	Strongly Agree
Teachers in my school incorporate technology-based instructional strategies during lesson preparation to enhance student learning.	3.40	Strongly Agree
Teachers in my school prepare digital learning materials that address the diverse learning needs of students.	3.41	Strongly Agree
Teachers in my school effectively utilize digital tools in planning instructional activities that promote active and meaningful learning experiences.	3.22	Agree
Average Weighted Mean	3.41	Strongly Agree

Table 6 shows that the respondents strongly agreed that technology integration in terms of Instructional Planning and Preparation was evident in their schools, as indicated by the average weighted mean of 3.41. The highest – rated indicator was that teachers integrate appropriate digital technologies when planning lessons and instructional activities with 3.71, while the lowest – rated indicator was the effective utilization of digital tools in planning instructional activities that promote active and meaningful learning experiences with 3.22. Overall, the findings indicate that teachers effectively integrated digital technologies into instructional planning and preparation. As stated by Trust (2022), effective technology integration begins with instructional planning, where teachers intentionally select and incorporate digital tools that align with learning objectives and enhance student engagement.

Table 7. Technology Integration – Classroom Instruction and Student Engagement

Item Statement	WM	VERBAL INTERPRETATION
Teachers in my school effectively integrate digital technologies during classroom instruction to enhance student learning.	3.57	Strongly Agree
Teachers in my school use digital tools that actively engage students in classroom discussions and learning activities.	3.72	Strongly Agree
Teachers in my school utilize technology to promote collaboration, creativity, and critical thinking among students.	3.84	Strongly Agree
Teachers in my school employ a variety of digital instructional strategies to accommodate diverse learning styles and needs.	3.26	Strongly Agree
Teachers in my school encourage students to use digital technologies responsibly to support active participation in the learning process.	3.34	Strongly Agree
Average Weighted Mean	3.55	Strongly Agree

Table 7 shows that the respondents strongly agreed that the technology integration in terms of Classroom Instruction and Student Engagement was evident in their schools, with an average weighted mean of 3.55. The highest – rated indicator was that teachers utilize technology to promote collaboration, creativity, and critical thinking among the students with 3.84, while the lowest – rated indicator was that the teachers employ a variety of digital instructional strategies in order to accommodate diverse learning styles and needs with a weighted mean of 3.26. Overall, the findings indicate that the teachers effectively integrated digital technologies into classroom instruction to enhance student engagement and learning. According to Bond et. al (2024), who found that integrating digital technologies into classroom instruction increases student engagement by promoting collaboration, active participation, creativity, and higher-order thinking skills. their review also emphasized that teachers who effectively use a variety of digital tools are better able to address diverse learning needs and create meaningful learning experiences.

Table 8. Technology Integration – Assessment and Feedback

Item Statement	WM	VERBAL INTERPRETATION
Teachers in my school use digital assessment tools to effectively measure students' learning progress.	3.68	Strongly Agree
Teachers in my school provide timely feedback to students through digital platforms and technologies.	3.29	Strongly Agree
Teachers in my school utilize technology to monitor and analyze students' academic performance.	3.40	Strongly Agree
Teachers in my school employ digital assessment strategies that support both formative and summative evaluation.	3.46	Strongly Agree
Teachers in my school use assessment results generated through digital technologies to improve instructional practices and student learning outcomes.	3.23	Agree
Average Weighted Mean	3.41	Strongly Agree

Table 8 shows that the respondents strongly agreed that technology integration in terms of the Assessment and Feedback was evident in their schools, as reflected by the average weighted mean of 3.41. The highest – rated indicator was that teachers use digital assessment tools to effectively measure students' learning progress with 3.68, while the lowest – rated indicator was that teachers use assessment results generated through digital technologies to improve instructional practices and student learning outcomes with 3.23. Overall, the findings indicate that teachers effectively integrated digital technologies into assessment practices and feedback to support student learning. The findings are supported by Redecker and Punie (2022) emphasized that digital assessment tools enable teachers to monitor students' learning progress, provide timely feedback, and use assessment data to improve instructional practices. Effective integration of digital technologies in assessment enhances both teaching effectiveness and student learning outcomes.

Table 9. Technology Integration – Learning Resource Utilization

Item Statement	WM	VERBAL INTERPRETATION
----------------	----	-----------------------

Teachers in my school effectively utilize digital learning resources to support the attainment of instructional objectives.	3.55	Strongly Agree
Teachers in my school select appropriate digital learning materials that enhance students' understanding of lesson content.	3.68	Strongly Agree
Teachers in my school maximize the use of available online platforms and educational applications during instruction.	3.77	Strongly Agree
Teachers in my school utilize a variety of digital resources to provide learners with engaging and meaningful learning experiences.	3.26	Strongly Agree
Teachers in my school ensure that digital learning resources are relevant, accessible, and appropriate to the needs of their students.	3.33	Strongly Agree
Average Weighted Mean	3.52	Strongly Agree

Table 9 shows that the respondents strongly agreed that technology integration in terms of Learning Resource Utilization was evident in their schools, as indicated by the average weighted mean of 3.52. The highest – rated indicator was that teachers maximize the use of available online platforms and educational applications during the instruction with 3.77, while the lowest – rated indicator was that teachers utilize a variety of digital resources to provide learners with engaging and meaningful learning experiences with 3.26. Overall, the findings indicate that teachers effectively utilized digital learning resources to support and enhance teaching and learning. As stated by Haleem et. al (2022), effective utilization of digital learning resources, including online platforms and educational applications, enhances teaching effectiveness, learner engagement, and access to meaningful learning experiences.

Table 10. Technology Integration – Professional Collaboration and Continuous Improvement

Item Statement	WM	VERBAL INTERPRETATION
Teachers in my school collaborate with colleagues through digital platforms to improve instructional practices and student learning.	3.61	Strongly Agree
Teachers in my school actively participate in professional learning communities that utilize digital technologies for knowledge sharing and collaboration.	3.29	Strongly Agree
Teachers in my school engage in continuous professional development to strengthen their technology integration competencies.	3.40	Strongly Agree
Teachers in my school share digital instructional resources, strategies, and best practices to enhance the quality of teaching and learning.	3.46	Strongly Agree
Teachers in my school regularly reflect on and improve their technology integration practices based on professional learning, collaboration, and feedback.	3.23	Agree
Average Weighted Mean	3.40	Strongly Agree

Table 10 shows that the respondents strongly agreed that technology integration in terms of Professional Collaboration and Continuous Improvement was evident in their schools, as reflected by the average weighted mean of 3.40. The highest – rated indicator was that teachers collaborate with colleagues through digital platforms to improve instructional practices and student learning with a weighted mean of 3.61, while the lowest – rated indicator was that teachers regularly reflect on and improve their technology integration practices based on professional learning, collaboration, and feedback with a weighted mean of 3.23. Overall, the findings indicate that the teachers actively engaged in technology integration in teaching and learning. Based on the study of Darling-Hammond et. al (2022), teachers’ continuous professional collaboration through digital platforms enhances instructional practices, promotes reflective teaching, and strengthens technology integration. They noted that ongoing collaboration and professional learning are essential for improving teaching effectiveness and student learning outcomes.

3.3. Significant Relationship Between the Digital Leadership Competencies of School Heads and Technology Integration in Teaching and Learning

Table 11. Significant Relationship Between Digital Leadership Competencies and Technology Integration

Variables	Pearson's r	p - value	Decision	Interpretation
Digital Leadership Competencies and Technology Integration in Teaching and Learning	0.846	< .001	Reject Ho	Very High Positive Significant Relationship

The results revealed a very high positive significant relationship between the digital leadership competencies of the school heads and technology integration in teaching and learning. Since the computed probability value was less than the 0.05 level of significance, the null hypothesis was rejected. These findings indicate that higher levels of digital leadership competencies among school heads were associated with higher levels of technology integration in teaching and learning. The strong positive correlation suggests that the school heads who effectively demonstrate digital vision, technology management, professional development, digital communication, and ethical use of technology are more likely to foster an environment where technology is effectively integrated into instructional planning, classroom instruction, assessment, learning resources, and professional collaboration. According to Dexter et. al (2022), school leaders with strong digital leadership competencies significantly influence the successful integration of technology in teaching and learning. Their study emphasized that leaders who provide a clear digital vision, manage technological resources effectively, support teachers’ professional development, and foster collaboration create conditions that promote meaningful technology integration and improved instructional practices.

3.4. Significant Influence on the Digital Leadership Competencies of the School Heads to the Technology Integration in Teaching and Learning

Predictor Variable	β (Slope)	R	R ²	F	p - value	Decision
Digital Leadership Competencies	0.859	0.846	0.717	202.2	< .001	Reject Ho

Simple linear regression analysis revealed that digital leadership competencies significantly influenced technology integration in teaching and learning. The coefficient of determination indicates that approximately 71.7% of the variation in technology integration could be explained by the digital leadership competencies of school heads, while the remaining 28.3% may be attributed to other factors not included in the study. Moreover, the positive regression coefficient suggests that an increase in the level of technology integration. These findings underscore the critical role of the school heads' digital leadership in promoting and sustaining effective technology integration in teaching and learning. As stated by Fullan et. al (2022), strong digital leadership is a significant predictor of successful technology integration in schools. They explained that school leaders who establish a clear digital vision, build teachers' capacity, and create supportive learning environments are more likely to achieve sustained and effective technology integration that enhances teaching and learning.

3.5. Proposed Digital Leadership Enhancement Program

Program Title: Digital Leadership Enhancement Program (DLEP): Strengthening School Heads' Digital Leadership for Effective Technology Integration

General Objective: To enhance the digital leadership competencies of school heads in order to strengthen technology integration in teaching and learning across schools in the Schools Division of Pagadian City.

Specific Objectives	Activities/Strategies	Persons Involved	Time Frame	Success Indicator
Strengthen school heads' capability in developing and sustaining a strategic digital vision for their schools.	Conduct a seminar-workshop on Digital Leadership and Strategic Planning; preparation of School Digital Transformation Plans.	Schools Division Office, Education Program Supervisors, ICT Coordinator, School Heads	1st Quarter	100% of school heads develop or update a School Digital Transformation Plan.
Enhance competencies in technology management and effective utilization of ICT resources.	Training on ICT resource management, digital infrastructure planning, inventory management, and technology budgeting.	ICT Coordinator, School Heads, Property Custodians	1st-2nd Quarter	Improved utilization of available ICT resources and documented resource management plans.
Strengthen school heads' ability to lead teacher professional development in educational technology.	Conduct Learning Action Cells (LAC), mentoring sessions, peer coaching, and digital pedagogy workshops for teachers.	School Heads, Master Teachers, ICT Coordinators	Quarterly	Increased teacher participation in ICT-related professional development activities.

Improve digital communication and collaboration among teachers, learners, parents, and stakeholders.	Orientation and workshops on collaborative digital platforms (Google Workspace, Microsoft 365, Learning Management Systems, and communication applications).	School Heads, Teachers, Parents, ICT Coordinators	Throughout the School Year	Increased utilization of digital collaboration platforms for school communication and instructional activities.
Promote ethical, safe, and responsible use of digital technologies in schools.	Conduct seminars on Digital Citizenship, Data Privacy, Cybersecurity Awareness, Responsible AI, and Intellectual Property Rights.	School Heads, ICT Coordinators, Legal Officer, DepEd ICT Unit	3rd Quarter	Adoption and implementation of school policies on responsible digital technology use.
Strengthen technology integration in instructional planning, classroom instruction, assessment, and learning resource utilization.	Demonstration teaching, technology integration workshops, classroom observations, and sharing of best practices.	School Heads, Master Teachers, Teachers	Throughout the School Year	Increased classroom observations showing effective technology integration practices.
Institutionalize continuous monitoring and evaluation of digital leadership and technology integration initiatives.	Quarterly monitoring, classroom observations, accomplishment reports, coaching sessions, and annual program evaluation.	Schools Division Office, School Heads, District Supervisors	Quarterly and Year-End	Improved digital leadership and technology integration ratings based on annual evaluation results.

Expected Outcomes:

1. School heads demonstrate enhanced digital leadership competencies across all identified dimensions.
2. Teachers effectively integrate digital technologies into instructional planning, classroom instruction, assessment, and learning resource utilization.
3. Increased teacher participation in technology – focused professional development activities,
4. Improved collaboration and communication among school stakeholders through digital platforms.
5. Strengthened implementation of ethical, safe, and responsible digital technology practices.
6. Improved technology integration in teaching and learning, leading to enhanced instructional quality and learner engagement.
7. A sustainable culture of digital innovation and continuous improvement is established in schools.

4. Discussion

The findings of the study revealed that the school heads exhibited a high level of digital leadership competencies, as evidenced by Strongly Agree ratings across all five dimensions: digital vision and strategic leadership, technology management and resource utilization, professional development and capacity building, digital communication and collaboration, and ethical and responsible use of digital technologies. As stated by Tondeur et. al (2022), who concluded that school leaders who provide a clear digital vision, adequate technological resources, and continuous professional development create favorable conditions for effective technology integration and instructional innovation. Similarly, the respondents perceived that technology integration in teaching and learning was implemented to a high extent, with all dimensions—instructional planning and preparation, classroom instruction and student engagement, assessment and feedback, learning resource utilization, and professional collaboration and continuous improvement—also receiving Strongly Agree ratings. Likewise, Scherer et. al (2023), emphasized that supportive school leadership and organizational readiness significantly enhance teachers' adoption and effective use of digital technologies in the classroom. These findings indicate that school heads effectively demonstrated digital leadership practices that supported the integration of technology into various aspects of teaching and learning.

Moreover, the inferential analysis established a very high positive significant relationship between digital leadership competencies and technology integration in teaching and learning, indicating that stronger digital leadership was associated with higher levels of technology integration. As stated by Hallinger (2022), effective school leadership is a critical driver of school improvement and digital transformation by fostering innovation, teacher development, and strategic technology implementation. The regression analysis further showed that digital leadership competencies significantly influenced technology integration, accounting for 71.7% of its variance. Similarly, Voogt et. al (2022), reported that leadership support, teacher collaboration, and continuous professional learning are among the strongest predictors of successful technology integration in schools. Moreover, European Commission (2022) highlighted that digitally competent school leaders play a central role in promoting sustainable digital innovation by empowering teachers and creating technology-rich learning environments. These results suggest that the ability of school heads to lead digital initiatives, manage technological resources, support professional development, foster digital collaboration, and promote ethical technology use plays a substantial role in enhancing technology integration within their schools, providing a strong basis for the proposed Digital Leadership Enhancement Program.

5. Conclusion

The findings of the study led to the conclusion that the school heads demonstrated a high level of digital leadership competencies across the areas of digital vision and strategic leadership, technology management and resource utilization, professional development and capacity building, digital communication and collaboration, and ethical and responsible use of digital technologies. Also, technology integration in teaching and learning was implemented to a high extent, particularly in instructional planning and preparation, classroom instruction and student engagement, assessment and feedback, learning resource utilization, and professional collaboration and continuous improvement. These findings indicate that the respondents effectively exercised digital leadership practices that supported the meaningful integration of technology in their schools.

The study further concluded that digital leadership competencies were significantly associated with and positively influenced technology integration in teaching and learning. The very high positive correlation and substantial explanatory power of digital leadership competencies suggest that the school heads play a critical role in promoting effective technology integration through strategic planning,

resource management, capacity building, collaboration, and responsible use of digital technologies. Therefore, strengthening the digital leadership competencies of school heads may further enhance technology integration and improve teaching and learning outcomes, providing a sound basis for the development and implementation of a Digital Leadership Enhancement Program.

References

1. Acebuche, A. (2023). *Digital leadership towards effective school management: A systematic review. Psychology and Education: A Multidisciplinary Journal*, 16(2). <https://ejournals.ph/article.php?id=23206>
2. Fitriani. (2025). *Systematic literature review: The transformation of principalship: Digital leadership in improving teachers' ICT literacy. Journal of Innovation in Teaching and Instructional Media*, 6(2). <https://doi.org/10.52690/jitim.v6i2.1528>
3. Huong, V. T. M., & Quy, T. T. (2025). Digital competences of school leader: A systematic review. *HNUE Journal of Science: Educational Sciences*. <https://doi.org/10.18173/2354-1075.2025-0129>
4. Okunlola, J. O. (2025). Digital leadership: Shaping school effectiveness in the digital era—A meta-analysis. *Educational Technology Quarterly*. <https://doi.org/10.55056/etq.972>
5. Panganiban, R. V., & Flores, R. V. (2021). Technology leadership and technology integration in selected science high schools in the National Capital Region, Philippines: Basis for a proposed online training module. *International Journal of Academic Multidisciplinary Research*, 5(6), 298–330. <https://ijeais.org/wp-content/uploads/2021/6/abs/IJAMR210628.html>
6. Rayray, M. (2024). Technology leadership competence of public school heads. *The Normal Lights*. <https://ejournals.ph/article.php?id=21459>
7. Yang, Q., Alias, B. S., & Nor, M. Y. M. (2025). Principals' technology leadership and teachers' ICT integration: A systematic review on capacity building for quality improvement and sustainable education. *International Journal of Learning, Teaching and Educational Research*. <https://ijlter.org/index.php/ijlter/article/view/14193>
8. Creswell, J. W., & Creswell, J. D. (2023). *Research design: Qualitative, quantitative, and mixed methods approaches* (7th ed.). SAGE Publications.
9. Taherdoost, H. (2022). *Sampling methods in research methodology: How to choose a sampling technique for research. International Journal of Academic Research in Management*, 11(1), 18–27.
10. Sheninger, E. (2022). *Disruptive thinking in our classrooms: Preparing learners for their future* (2nd ed.). International Center for Leadership in Education. <https://leadered.com/books/disruptive-thinking-in-our-classrooms-second-edition/>
11. Dexter, S., Richardson, J. W., & Nash, J. (2022). *Leadership for IT in schools*. Springer. <https://link.springer.com/book/10.1007/978-3-030-95509-7>
12. Organisation for Economic Co-operation and Development. (2023). *Empowering educators for the digital transition: From digital competence frameworks to effective professional development*. OECD Publishing. <https://www.oecd.org/education/empowering-educators-for-the-digital-transition>.
13. United Nations Educational, Scientific and Cultural Organization. (2023). *Global education monitoring report 2023: Technology in education—A tool on whose terms?* UNESCO. <https://www.unesco.org/gem-report/en/technology>
14. International Society for Technology in Education. (2021). *ISTE Standards for Education Leaders*. <https://iste.org/standards/education-leaders>
15. Trust, T. (2022). *The 2022 National Educational Technology Plan: Preparing the future of education through technology. Journal of Digital Learning in Teacher Education*, 38(4), 203–206. <https://doi.org/10.1080/21532974.2022.2109053>

16. Bond, M., Bedenlier, S., Marín, V. I., & Händel, M. (2024). *Emergency remote and online teaching and learning in higher education: A systematic review of empirical literature*. *Computers and Education Open*, 5, 100163. <https://doi.org/10.1016/j.caeo.2024.100163>
17. Redecker, C., & Punie, Y. (2022). *European framework for the digital competence of educators: DigCompEdu*. Publications Office of the European Union. https://joint-research-centre.ec.europa.eu/digcompedu_en
18. Dexter, S., Richardson, J. W., & Nash, J. (2022). *Leadership for IT in schools*. Springer. <https://link.springer.com/book/10.1007/978-3-030-95509-7>
19. Fullan, M., Quinn, J., Drummy, M., & Gardner, M. (2022). *Education reimagined: The future of learning*. Corwin. <https://us.corwin.com/en-us/nam/education-reimagined/book280152>
20. European Commission. (2022). *Digital Education Action Plan 2021–2027*. <https://education.ec.europa.eu/focus-topics/digital-education/action-plan>
21. Hallinger, P. (2022). *Leadership and school improvement: How successful leaders create learning organizations*. Routledge. <https://www.routledge.com/Leadership-and-School-Improvement/Hallinger/p/book/9780367489622>
22. Scherer, R., Siddiq, F., & Tondeur, J. (2023). Teachers' readiness for online teaching and learning: A review of teacher competence and school support. *Computers & Education*, 191, 104648. <https://doi.org/10.1016/j.compedu.2022.104648>
23. Tondeur, J., Howard, S. K., Siddiq, F., & Scherer, R. (2022). Enhancing teachers' readiness for digital technology integration: A systematic review. *Educational Technology Research and Development*, 70(6), 2393–2417. <https://doi.org/10.1007/s11423-022-10134-4>
24. Voogt, J., Knezek, G., Christensen, R., & Lai, K. W. (2022). Developing technology integration in teacher education: A review of evidence. *Education and Information Technologies*, 27(5), 6117–6142. <https://doi.org/10.1007/s10639-021-10842-5>