

Examining The Implementation Of Technology Integration In Classroom Teaching: Basis For An Extention Program

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Abstract

This study examined the level of implementation of technology integration in classroom teaching among teachers from San Mariano National High School and Benito Soliven National High School, Isabela, as the basis for developing an extension program. A quantitative descriptive-survey research design was employed involving 163 teacher-respondents selected through total enumeration sampling. Data were gathered using a validated and reliable adapted questionnaire measuring technology integration in terms of instruction, organization, communication, and creation. Descriptive statistics, Mann-Whitney U Test, and Kruskal-Wallis Test were utilized for data analysis using SPSS. Results revealed that teachers demonstrated a Very High Implementation of technology integration ($M = 3.79$, $SD = 0.37$), with communication obtaining the highest mean score ($M = 3.88$). No significant differences were found when grouped according to sex, age, educational attainment, internet connectivity, and years of teaching. However, significant differences were observed according to school location and training on technology integration. The findings highlight the importance of continuous professional development and contextual support, particularly for teachers in rural schools. Based on the results, the TECH-TEACH Extension Program was proposed to further strengthen teachers' competencies in technology integration.

Keywords: *Technology Integration, Classroom Teaching, Extension Program, Teachers, Professional Development,*

1. Introduction

Background of the Study

Technology integration has become one of the essential components of quality education in the 21st century. The increasing use of digital technologies in education has transformed teaching strategies by enhancing classroom instruction, learner engagement, communication, and instructional resource development. The Department of Education (DepEd) continuously promotes technology integration through the DepEd Computerization Program to improve teaching and learning outcomes. However, despite government initiatives, differences in technological resources, teacher competencies, and school contexts continue to influence the successful implementation of technology integration. This study examined the level of implementation of technology integration in classroom teaching among teachers from San Mariano National High School and Benito Soliven National High School, serving as the basis for an extension program.

Review of Related Literature

Previous studies have established that technology integration improves student motivation, engagement, collaboration, and academic achievement when effectively implemented. Teachers' pedagogical competence, digital literacy, professional development, and access to technological resources significantly influence successful classroom technology integration (Ghavifekr et al., 2012; DeCoito & Estaiteyeh, 2022; Corazon et al., 2022; Bice & Tang, 2022; Consoli et al., 2023; Forsythe, 2021). Moreover, DepEd policies support equitable access to educational technologies to prepare learners for the demands of the digital society. These studies emphasize that continuous teacher training and institutional support remain essential for effective technology integration.

Statement of the Problem

This study aimed to examine the level of implementation of technology integration in classroom teaching as the basis for an extension program. Specifically, it sought to determine:

1. The demographic profile of the respondents in terms of:
 - a. Age
 - b. Sex
 - c. Educational attainment
 - d. School location
 - e. Internet connectivity
 - f. Years of teaching
 - g. Technology training
2. The level of implementation of technology integration in terms of:
 - a. Instruction
 - b. Organization
 - c. Communication

- d. Creation
3. Is there a significant differences between the respondent's level of implementation of technology integration in classroom teaching when grouped as to demographic profile?
4. What extension program can be proposed to DepEd schools?

Objectives of the Study

To determined the level of implementation of technology integration in classroom teaching and develop an extension program for DepEd schools.

Specifically, it aimed to:

1. describe the demographic profile of the respondents.
2. determine the level of implementation of technology integration in instruction, organization, communication, and creation.
3. determine the significant differences the respondent's level of implementation of technology integration in classroom teaching when grouped as to demographic profile.
4. develop a technology integration extension program based on the results.

Hypothesis of the Study

There is no significant differences between the respondent's level of implementation of technology integration in classroom teaching when grouped as to demographic profile.

2. Materials and Methods

Research Design

The study employed a quantitative descriptive-survey research design to determine the level of implementation of technology integration in classroom teaching among teachers. This design was appropriate because it systematically described the current status of technology integration and analyzed differences across respondents' demographic characteristics.

Participants

The respondents consisted of 163 teachers from San Mariano National High School and Benito Soliven National High School during School Year 2025–2026. Total enumeration sampling was employed, allowing every teacher in the target population to participate in the study.

Instruments

Data were collected using an adapted and validated questionnaire from Celeste and Nimfa (2024). The instrument consisted of two parts:

- Part I – Demographic profile
- Part II – Level of implementation of technology integration in classroom teaching

The questionnaire underwent pilot testing and yielded acceptable validity and reliability with Cronbach's Alpha values greater than 0.70.

Procedure

Permission to conduct the study was obtained from the Graduate School, the Schools Division Office, and the participating school administrators. After approval, questionnaires were personally distributed to respondents. Participation was voluntary, and informed consent was secured. Completed questionnaires were collected after one week, organized, encoded, and subjected to statistical analysis while maintaining confidentiality throughout the research process.

Data Analysis

The collected data were analyzed using Statistical Package for the Social Sciences (SPSS). Frequency counts, percentages, means, and standard deviations described respondents' profiles and technology integration levels. Mann–Whitney U Test and Kruskal–Wallis Test determined significant differences among groups. Cronbach's Alpha established the reliability of the instrument, while a four-point Likert scale interpreted implementation levels.

3. Results

Demographic Profile of the Respondents

The respondents were predominantly female (62%), aged 30–39 years (35%), possessed master's degrees (50.9%), were assigned in rural schools (61.3%), had stable internet connectivity (47.2%), possessed 5–10 years of teaching experience (34.4%), and had attended formal technology integration training (58.9%).

Table 1

Descriptive Statistics on the Level of Implementation of Technology Integration in Classroom Teaching

Area	<i>M</i>	<i>SD</i>	Verbal Interpretation
Instruction	3.70	0.46	Very High Implementation
Organization	3.78	0.38	Very High Implementation
Communication	3.88	0.29	Very High Implementation
Creation	3.78	0.44	Very High Implementation

Note. M = 3.79, SD=0.37, VI= Very High Implementation.

Communication obtained the highest mean (3.88), while Instruction recorded the lowest mean (3.70), although all dimensions were interpreted as Very High Implementation.

Significant Difference in the Level of Implementation of Technology Integration When Grouped as to Profile

Table 2

Significant Difference in the Level of Implementation of Technology Integration When Grouped According to Sex

Variable	Sex	<i>Mdn</i>	<i>U</i>	<i>p</i>	Rank-Biserial <i>r</i>	Decision
Instruction	Female	3.00	2931	0.444	0.06388	Not Significant
	Male	3.00				
Organization	Female	4.00	3084	0.854	0.01501	Not Significant
	Male	4.00				
Communication	Female	4.00	3045	0.707	0.02747	Not Significant
	Male	4.00				
Creation	Female	4.00	3121	0.968	0.00335	Not Significant
	Male	4.00				

Note: $N = 163$. The overall test of technology integration according to sex was not significant at the 0.05 level, $U = 3006.50$, $p = .664$

There were no significant differences in technology integration based on sex across Instruction ($U = 2931$, $p = .444$), Organization ($U = 3084$, $p = .854$), Communication ($U = 3045$, $p = .707$), and Creation ($U = 3121$, $p = .968$). This indicates that male and female teachers demonstrated comparable levels of technology integration across all variables.

Table 3

Significant Difference in the Level of Implementation of Technology Integration When Grouped According to Location

Variable	Location	<i>Mdn</i>	<i>U</i>	<i>p</i>	Rank-Biserial <i>r</i>	Decision
Instruction	Rural	3.00	2653	0.058	0.1578	Not Significant
	Urban	3.00				
Organization	Rural	4.00	2581	0.025	0.1806	Significant
	Urban	4.00				
Communication	Rural	4.00	2884	0.244	0.0846	Not Significant
	Urban	4.00				
Creation	Rural	4.00	2496	0.010	0.2078	Significant
	Urban	4.00				

Note: $N = 163$. The overall test of technology integration according to location was significant at the 0.05 level, $U = 2488$, $p = .021$, rank-biserial $r = 0.2103$

There were significant differences in technology integration based on school location for Organization ($U = 2581$, $p = .025$) and Creation ($U = 2496$, $p = .010$), but no significant differences were found in Instruction ($U = 2653$, $p = .058$) and Communication ($U = 2884$, $p = .244$). This suggests that school location influenced teachers' technology integration in Organization and Creation solely.

Table 4

Significant Difference in the Level of Implementation of Technology Integration When Grouped According to Age

Variable	Age	Mdn	H	p	ϵ^2	Decision
Instruction	20-29	3	0.757	0.860	0.00467	Not Significant
	30-39	3				
	40-49	3				
	50 and above	3				
Organization	20-29	4	1.973	0.578	0.01218	Not Significant
	30-39	4				
	40-49	4				
	50 and above	4				
Communication	20-29	4	1.233	0.745	0.00761	Not Significant
	30-39	4				
	40-49	4				
	50 and above	4				
Creation	20-29	4	1.568	0.667	0.00968	Not Significant
	30-39	4				
	40-49	4				
	50 and above	4				

Note: N= 163. The overall test of technology integration according to age was not significant at the 0.05 level, $H=1.118$, $p=.773$.

There were no significant differences in technology integration across age groups in Instruction ($H = 0.757$, $p = .860$), Organization ($H = 1.973$, $p = .578$), Communication ($H = 1.233$, $p = .745$), and Creation ($H = 1.568$, $p = .667$). This indicates that teachers' age did not significantly influence their level of technology integration across all aspects.

Table 5

Significant Difference in the Level of Implementation of Technology Integration When Grouped According to Education Level

Variable	Education Level	Mdn	H	p	ϵ^2	Decision
Instruction	Bachelor's Degree	3.00	3.23	0.358	0.0199	Not Significant
	Master's Degree	3.00				
	Doctorate	3.00				
	Others (Masters On-going)	4.00				
Organization	Bachelor's Degree	4.00	3.14	0.370	0.0194	Not Significant
	Master's Degree	4.00				
	Doctorate	3.00				
	Others (Masters On-going)	4.00				
Communication	Bachelor's Degree	4.00	1.74	0.628	0.0107	Not Significant
	Master's Degree	4.00				
	Doctorate	4.00				
	Others (Masters On-going)	4.00				
Creation	Bachelor's Degree	4.00	2.57	0.370	0.0194	Not Significant
	Master's Degree	4.00				
	Doctorate	3.50				
	Others (Masters On-going)	4.00				

Note: N= 163. The overall test of technology integration according to education was not significant at the 0.05 level, $H=3.15$, $p=0.370$.

There were no significant differences in technology integration based on educational attainment in Instruction ($H = 3.23$, $p = .358$), Organization ($H = 3.14$, $p = .370$), Communication ($H = 1.74$, $p = .628$), and Creation ($H = 2.57$, $p = .370$). This indicates that teachers' educational attainment did not significantly influence their technology integration across all categories.

Table 6

Significant Difference in the Level of Implementation of Technology Integration When Grouped According to Internet Access/Connectivity

Variable	Internet Access	Mdn	H	p	ϵ^2	Decision
Instruction	No regular internet connection	3	4.12	0.128	0.025	Not Significant
	Intermittent/unstable connection	3				
	Strong and stable connection	3				
Organization	No regular internet connection	4	1.28	0.528	0.008	Not Significant
	Intermittent/unstable connection	4				
	Strong and stable connection	4				
Communication	No regular internet connection	4	4.22	0.121	0.026	Not Significant
	Intermittent/unstable connection	4				
	Strong and stable connection	4				
Creation	No regular internet connection	4	2.52	0.283	0.016	Not Significant
	Intermittent/unstable connection	4				
	Strong and stable connection	4				

Note: N= 163. The overall test of technology integration according to Internet Access/Connectivity was not significant at the 0.05 level, $H=2.29$, $p=0.319$.

There were no significant differences in technology integration based on internet access in Instruction ($H = 4.12$, $p = .128$), Organization ($H = 1.28$, $p = .528$), Communication ($H = 4.22$, $p = .121$), and Creation ($H = 2.52$, $p = .283$). This indicates that teachers' level of internet access did not significantly influence their technology integration across all domains.

Table 7

Significant Difference in the Level of Implementation of Technology Integration When Grouped According to Years of Teaching

Variable	Years of Teaching	Mdn	H	p	ϵ^2	Decision
Instruction	Less than 5 years	3.00	1.0	0.801	0.006	Not Significant
	5-10 years	3.00				
	11-20 years	3.00				
	More than 20 years	3.00				
Organization	Less than 5 years	4.00	3.86	0.277	0.024	Not Significant
	5-10 years	4.00				
	11-20 years	4.00				
	More than 20 years	4.00				
Communication	Less than 5 years	4.00	3.21	0.361	0.020	Not Significant
	5-10 years	4.00				
	11-20 years	4.00				
	More than 20 years	4.00				
Creation	Less than 5 years	4.00	3.49	0.322	0.022	Not Significant
	5-10 years	4.00				
	11-20 years	4.00				
	More than 20 years	4.00				

Note: N= 163. The overall test of technology integration according to years of teaching was not significant at the 0.05 level, $H=2.87$, $p=.412$.

There were no significant differences in technology integration based on years of teaching experience in Instruction ($H = 1.00$, $p = .801$), Organization ($H = 3.86$, $p = .277$), Communication ($H = 3.21$, $p = .361$), and Creation ($H = 3.49$, $p = .322$). This indicates that teaching experience did not significantly influence teachers' technology integration across all components.

Table 8

Significant Difference in the Level of Implementation of Technology Integration When Grouped According to Training on Technology Integration

Variable	Training on Technology Integration	Mdn	H	p	ϵ^2	Decision
Instruction	No training yet	3	7.57	0.023	0.0467	Significant
	Self-taught	3.00				
	Attended formal training/seminar/workshops	3.00				
Organization	No training yet	3	10.49	0.005	0.0648	Significant
	Self-taught	4.00				
	Attended formal training/seminar/workshops	4.00				
Communication	No training yet	3	15.54	<.001	0.0959	Significant
	Self-taught	4.00				
	Attended formal training/seminar/workshops	4.00				
Creation	No training yet	3	14.79	<.001	0.0913	Significant
	Self-taught	4.00				
	Attended formal training/seminar/workshops	4.00				

Note: N= 163. The overall test of technology integration according to training on technology integration was significant at the 0.05 level, $H = 15.54$, $p < .001$, $\epsilon^2 = 0.0959$, indicating significant differences among respondents based on their training in technology integration.

There were significant differences in technology integration based on training on technology integration in Instruction ($H = 7.57$, $p = .023$), Organization ($H = 10.49$, $p = .005$), Communication ($H = 15.54$, $p < .001$), and Creation ($H = 14.79$, $p < .001$). This indicates that teachers with technology integration training demonstrated higher levels of technology integration than those without training across all aspects.

Implications for practice and policy

The results highlight the need for sustained professional development programs focused on technology-enhanced pedagogy, particularly for teachers in rural schools. DepEd and school

administrators should continue investing in teacher training, digital infrastructure, and equitable access to educational technologies to support effective classroom integration.

Study Limitations

The study was limited to teachers from two public secondary schools in Isabela and employed a descriptive survey design, restricting the generalizability of findings. Data were based on self-reported responses, which may be influenced by respondent perceptions.

4. Discussion

The demographic profile showed that the majority of the 163 teacher-respondents were female (62.0%), aged 30–39 years (35.0%), master's degree holders (50.9%), assigned in rural schools (61.3%), had stable internet connectivity (47.2%), possessed 5–10 years of teaching experience (34.4%), and had attended formal training on technology integration (58.9%). These characteristics indicate that most respondents were professionally qualified and had received training relevant to technology integration, which may have contributed to their effective use of educational technologies.

Overall, teachers demonstrated a Very High level of technology integration in classroom teaching ($M = 3.79$, $SD = 0.37$). Among the four dimensions, Communication obtained the highest mean ($M = 3.88$), followed by Organization ($M = 3.78$), Creation ($M = 3.78$), and Instruction ($M = 3.70$), all interpreted as Very High Implementation. These findings indicate that teachers effectively utilized technology for communication, instructional management, lesson preparation, and the development of learning materials. Similar findings were reported by Caoile et al. (2025), who concluded that teachers extensively integrated digital technologies into classroom instruction, while Deep et al. (2024) emphasized that technology enhances communication, collaboration, and learner engagement in educational settings.

Analysis of differences according to demographic variables revealed no significant differences in the level of technology integration when respondents were grouped according to sex, age, educational attainment, internet connectivity, and years of teaching experience. However, significant differences were observed when grouped according to school location and training on technology integration, indicating that contextual factors and professional development influence teachers' implementation of educational technology. These findings support previous studies emphasizing that continuous training and institutional support are essential in strengthening teachers' technological competencies and improving classroom integration of digital tools.

The findings suggest that although technology integration among teachers is already at a very high level, continuous professional development remains necessary, particularly in strengthening instructional applications of technology and providing additional support to teachers in rural schools. These results served as the basis for the proposed TECH-TEACH Extension Program, which aims to enhance teachers' competencies through targeted training, mentoring, and technology integration activities.

Conclusion

This study examined the level of implementation of technology integration in classroom teaching among teachers of San Mariano National High School and Benito Soliven National High School as the basis for developing an extension program. The findings revealed that teachers demonstrated a Very High level of technology integration across the four dimensions of instruction, organization, communication, and creation, with communication obtaining the highest level of implementation. These results indicate that teachers have effectively incorporated technology into their instructional practices, classroom management, communication with stakeholders, and development of learning resources.

The study further established that demographic variables such as sex, age, educational attainment, internet connectivity, and years of teaching experience did not significantly influence the implementation of technology integration. However, significant differences were found according to school location and technology integration training, suggesting that contextual factors and professional development opportunities contribute to variations in teachers' technology integration practices. These findings highlight the importance of providing equitable access to technological resources and continuous capacity-building programs, particularly for teachers assigned to rural schools and those with limited formal training.

Overall, the study affirms that while teachers already exhibit strong competencies in integrating technology into classroom teaching, there remain opportunities to strengthen instructional strategies through sustained professional development, mentoring, and institutional support. The results underscore the need for extension initiatives that focus on enhancing teachers' pedagogical use of technology, promoting innovative teaching practices, and addressing contextual challenges that may limit effective technology integration. Consequently, the proposed extension program provides a practical and evidence-based framework for supporting teachers in improving technology integration and contributing to the achievement of quality, inclusive, and technology-enhanced education in DepEd schools.

Recommendations for future research or implementation

Based on the findings, the following are recommended:

1. School administrators should implement continuous professional development programs focused on innovative and student-centered technology integration strategies.
2. DepEd and partner institutions should prioritize training opportunities for teachers, particularly those assigned to rural schools and those without formal technology integration training.
3. Schools should strengthen digital infrastructure and improve internet connectivity to support effective technology-enhanced teaching and learning.
4. The proposed extension program should be implemented and regularly monitored to evaluate its effectiveness in improving teachers' technology integration competencies.
5. Future researchers may replicate this study in other schools or regions using larger samples and mixed-method or experimental research designs to further validate the findings and examine the long-term effects of technology integration initiatives.

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