The Department of Education Computerization Program (DCP): Evaluating its Effectiveness and the Challenges Faced by Public Schools

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Abstract
Purpose: This study aimed to evaluate the overall impact and effectiveness of the DepEd Computerization Program (DCP) in enhancing the educational experience, identifying challenges, and understanding the factors influencing its successful implementation in schools.

Research Methodology: The study evaluated the effectiveness of the DepEd Computerization Program using a mixed-methods approach, combining quantitative survey data from school ICT coordinators with qualitative insights from interviews and focus groups, identifying areas of consensus and divergence.

Results: The DepEd Computerization Program significantly enhanced the quality of education by integrating ICT into teaching and learning and improving ICT literacy among learners, teachers, and school heads. However, challenges such as broken outlets and inadequate ventilation pose safety risks and limit the program effectiveness. To sustain and further enhance the program, continuous ICT training, skill development, and better maintenance of infrastructure are essential.

Conclusions: The DepEd Computerization Program is highly effective in improving teaching, learning, and ICT literacy. Despite minor infrastructure challenges, continuous training and maintenance are essential to sustain its long-term impact.

Limitations: The study evaluates the overall impact and effectiveness of the DepEd Computerization Program (DCP) in enhancing the educational experience, identifying challenges, and understanding the factors influencing its successful implementation, particularly in schools in Allacapan and Aparri Districts.

Contributions: Based on the study's findings and conclusions, it is recommended that the Department of Education (DepEd) and the DCP organize continuous training for educators and involve the community in fostering a supportive environment for ICT integration in the classroom. Additionally, schools should establish regular maintenance schedules for ICT equipment, enhance teaching practices with interactive approaches, and collaborate with other institutions.

Keywords: *Challenges, DCP, DepEd Computerization Program, Effectiveness, Evaluation*

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1. Introduction

The Department of Education Computerization Program (DCP) aims to improve the teaching and learning processes in public schools by providing the necessary ICT infrastructure. The program aims to improve computer literacy among students and teachers, incorporate ICT into the school system, and reduce the digital divide. Studies have shown that it has positively shaped the educational context by providing computer labs and e-classes, promoting more interactive approaches to learning and teaching. For example, Mula and Bucar (2023) explained that the implementation of DCP significantly improved school personnel's computer literacy. Moreover, student engagement and pedagogical models have been suggested to be boosted by the existence of a DCP.

Despite its known benefits, there are still areas of the DCP that require further investigation. One major unknown is the program's long-term sustainability, particularly in terms of maintaining and upgrading the provided equipment. According to Castro (2023); Pradana and Josiah (2024), the sustainability of DCP is hindered by insufficient computer units and the need for additional resources to fully integrate technology into the curriculum. There is also limited information on the program's impact on rural and remote schools, where access to technology and Internet connectivity may be more challenging. These unknowns highlight the need for comprehensive studies to evaluate the program's long-term viability and broader impact across different regions.

There are several gaps in the current research on DCP. One major gap is the lack of a consistent and systematic way to evaluate how the program is implemented in different schools for different age groups. Studies by Cassar et al. (2019); Castro (2023); Mula and Bucar (2023) noted problems like limited resources and differences in teacher skills, but these issues are not addressed in the same way across research. Musarurwa and Van Biljon (2024) also pointed out that it is unclear whether the training provided to teachers is sufficient to help them use ICT tools effectively. As highlighted by Castro (2023); (Huang, Syed-Abdullah, Zulkiflie, & Ghazali, 2024) continuous training is important for teachers to build the skills they need,. Without a standard evaluation process, reports on these challenges remain inconsistent, making it difficult to improve the program.

Another gap is the limited focus on the difficulties that teachers and students face when using ICT resources. Poor infrastructure, such as weak Internet access, adds to the problem (Karunakaran & Dhanawardana, 2023). Other issues include a lack of technical support, insufficient ongoing training, and problems with maintaining equipment. Celeste and Osias (2024) stressed that many teachers do not receive enough professional development, leaving them unprepared to use ICT in lessons. Salimath, Sah, Padhy, and Kumari (2024) confirmed that technical support is often missing, which is essential for troubleshooting and keeping tools functional. Cabunoc and Ubayubay (2024) added that while targeted training can improve teachers' ICT skills, many schools fail to provide such programs. Addressing these gaps is key to understanding the program's impact and finding ways to improve it.

Despite this, the DCP still has parts that remain unknown. One of the major unknowns is how sustainable it would be in the long run, especially in terms of the maintenance and upgrading of the provided equipment. There is also limited knowledge on the program's impact on rural and remote school systems, where accessing technology and the Internet is most difficult. The effectiveness of the training provided to teachers and its adequacy in equipping them to fully utilize ICT resources is unknown. These unknowns highlight the need for comprehensive studies to evaluate the program's long-term viability and broader impact across different regions. Thus, this study aims to evaluate the overall impact and effectiveness of the DepEd Computerization Program (DCP) in enhancing the educational experience, identifying challenges, and understanding the factors influencing its successful implementation in schools. By addressing these aspects, this research aims to provide a comprehensive evaluation of the DCP, offering insights that can guide future improvements and ensure the program's continued success in enhancing education in the Philippines.

1.1. Research Questions

This study aims to evaluate the overall impact and effectiveness of the DepEd Computerization Program (DCP) in enhancing the educational experience, identifying challenges, and understanding the factors influencing its successful implementation in schools.

Specifically, it seeks to answer the following questions.

1. How do teachers and students perceive the effectiveness of the DepEd Computerization Program in improving the teaching and learning experience?
2. What are the problems and challenges encountered by educators in utilizing the DCP Tools provided by the program?
3. What are the best practices of DCP-recipient schools?
4. What action plan can be proposed to improve, develop, and sustain the implementation of the program?

1.2. Research Hypothesis

The DepEd Computerization Program (DCP) does not significantly enhance the educational experience, and its implementation is not influenced by specific factors.

2. Literature Review and Hypothesis Development

2.1. Perception on the Effectiveness of the DepEd Computerization Program (DCP)

The DCP aims to improve teaching and learning by providing public schools with computers and other ICT tools. Research shows that the program has greatly improved computer literacy among teachers and students in rural areas. For instance, Mula and Bucar (2023) found that school personnel now have very satisfactory computer skills. Teachers also reported better teaching methods and stronger student engagement because of the program. Studies have also highlighted the positive effects on student learning. Students in schools with DCP implementation show higher engagement and better academic performance.

Mula and Bucar (2023) confirmed that the program is highly effective in improving computer literacy among staff, while Castro (2023) observed that teachers are generally competent and can integrate technology into their lessons. The availability of ICT resources has made learning more interactive and collaborative, helping students to develop essential 21st-century skills. The program has also helped bridge the digital divide by providing students from low-income families access to modern learning tools. Despite these benefits, challenges remain to be addressed. Many studies have pointed to a lack of continuous training and technical support, which limits the program's full potential.

Castro (2023); Seng (2010) recommend ongoing training for ICT coordinators and teachers to address maintenance and repair issues. Other concerns include the need for more computer units and better Internet connectivity. Intervention plans to sustain the program and improve teachers' skills are also suggested in this study. Overall, the teachers and students had a positive view of the DCP. Teachers appreciate how it makes lessons more effective and interactive, while students enjoy the multimedia-rich learning environment it provides. However, issues such as equipment maintenance and continuous professional development must be addressed to maximize the program's benefits and ensure its long-term success in the future.

2.2. DCP in the Teaching and Learning Process

The DepEd Computerization Program helps improve teaching and learning significantly, as it supplies schools with basic tools for the integration of information technology in school operations. Such computers and e-classrooms ensure that all classrooms in schools have these devices installed with digital content and more for use in the instructional setup of their teachers, helping to improve learning interest while fostering their digital literacy skills. This process also includes DCP support for teachers, which ensures that teachers utilize the tools provided to effectively enhance educational outcomes. Petar (2024) and Chachar, Ullah, Qureshi, Ujjan, and Chachar (2023) highlighted that DCP facilitates the integration of technology in teaching, allowing educators to adopt innovative methods and enhance student engagement. This was also corroborated by the study of Norveen S Campanilla (2024) and Petar (2024) which have tackled on the continuous Professional Development (CPD) programs are essential

for equipping teachers with the necessary skills to leverage DCP effectively, promoting a culture of continuous learning.

Furthermore, Mula and Bucar (2023) illustrated that the DCP has been reported to be highly effective in improving the computer literacy of school personnel, with a satisfactory level of proficiency observed. In addition, studies by Mula and Bucar (2023), Macaso and Dagohoy (2022), and Roque and Santos (2024) have shown a significant relationship between the effectiveness of DCP and the challenges faced by educators, indicating that while the program is beneficial, it also presents obstacles that need to be addressed. The ICT Retooling Program significantly improved teachers' confidence and skills in utilizing technology for educational purposes, leading to better teaching practices. Thus, continuous professional development in ICT is essential for teachers to effectively integrate technology into their pedagogy and ensure that they can adapt to evolving educational demands.

2.3. Challenges Encountered by the Educators in Utilizing DCP Tools

The DepEd Computerization Program (DCP) presents several challenges for educators, particularly in terms of training and technical support. Many teachers are not adequately trained to use the ICT tools provided, and maintenance support is often lacking, leading to frequent disruptions in classroom instructions. Infrastructural issues, such as unreliable Internet connectivity, further hinder the effective use of these technologies. Additionally, some educators struggle with resistance to change, finding it difficult to shift from traditional teaching methods to digital ones.

The integration of digital competence through DCP tools is significantly affected by factors such as technological proficiency, resource access, and institutional support. Studies by Bernadine (2019), Almagro and Edig (2024); Danao et al. (2025) highlighted that technophobia among educators limits their engagement with digital tools. Similarly, de Sousa, da Silva, and dos Santos (2024), Dzoserai, Marima, and Msipah (2025); Olayemi and Amosun (2024) found that a lack of training and familiarity with digital technologies contributes to poor integration in teaching practices. The absence of consistent support and incentives from educational authorities leads to low motivation among teachers (Bernadine, 2019; Norveen S Campanilla, 2024; Suryandari, Rokhmaniyah, & Wahyudi, 2024).

Some educators also argue that the rapid pace of technological change creates an overwhelming environment, making it difficult to keep up with the new tools and methods. This highlights the need for ongoing assistance and flexible training programs to support a smoother transition to technology-enhanced teaching. Suryandari et al. (2024) emphasize the shortage of high-quality resources, while Abbasi and Hussain (2024) recommend tailored Continuous Professional Development (CPD) programs that address educators' specific needs. These strategies are essential for overcoming barriers and ensuring the successful implementation of DCP tools in education.

2.4. Factors affecting the Implementation of DCP Tools in Classrooms

The implementation of DCP tools in classrooms depends on several, interconnected factors. First, teacher preparedness plays a crucial role; educators who receive proper training are more confident and effective in using technology. Reliable Internet access and functional equipment are also essential to support the integration of ICT tools. Without consistent technical support, classroom disruptions become more frequent, thus affecting the continuity of instruction. Additionally, the availability of engaging and relevant digital content enhances the learning experience, and the willingness of both teachers and students to embrace new technologies is vital for successful adoption. Studies by Castro (2023); Caratiquit and Caratiquit (2023); Hindeya and Endawoke (2013) emphasized that professional development tailored to teachers' needs significantly improved their ability to use DCP tools.

Norveen S. Campanilla and Mendoza (2024); Castro (2023) further support the idea that targeted training leads to better implementation outcomes. However, resistance to change and varying levels of technological familiarity among educators can slow down progress. To address this, schools must ensure access to sufficient resources, including computers and stable Internet, and maintain a favorable learner-to-computer ratio for effective learning. Institutional support plays a critical role. Pas, Waasdorp, and Bradshaw (2015) highlighted that a positive organizational climate and strong

administrative backing encourage teachers to adopt DCP tools. Involving parents and community members can further strengthen implementation efforts by creating a supportive environment for digital learning. Addressing these factors holistically is key to optimizing the impact of DCP on educational outcomes.

2.5. Theoretical Underpinnings of the Study

The DepEd Computerization Program is the major initiative of the Philippines' Department of Education toward the integration of technology in the educational system to further improve teaching and learning. In this regard, by equipping public schools with core ICT tools, such as computers and e-classrooms, the program seeks to bridge the digital divide by improving access to educational resources. The DCP also trains teachers and their students to apply these tools better, leading to a more technologically savvy educational environment. However, it has many challenges, including insufficient infrastructure, lack of technical support, and teachers' reluctance to change. This study aims to evaluate the overall impact and effectiveness of the DCP, the challenges encountered in its implementation, and the factors that influence its success in schools. More specifically, it addresses questions about perceived effectiveness, challenges, the administration's assessment, factors related to integration, and suggestions for future action.

The Technology Acceptance Model (TAM) is highly relevant to this study because it explains how users come to accept and use technology. TAM focuses on perceived usefulness and perceived ease of use, which are critical for understanding how teachers and students perceive the effectiveness of DCP in improving the teaching and learning experience. By using the TAM, this study can assess the factors that promote or hinder the adoption of DCP tools, thus providing insights into how to improve their acceptance and utilization in classrooms.

Everett Rogers' Diffusion of Innovations Theory is another relevant concept for this study. This theory describes how new ideas and technologies spread within a society or organization, highlighting the stages of adoption among various groups. The DCP theory would help explain which factors ease or impede the diffusion of ICT tools in different schools and regions. This insight will guide strategies aimed at improving the implementation of the DCP and dealing with obstacles to bringing the tools more widely into classrooms.

Finally, the Constructivist Learning Theory provides a critical assessment of the DCP's impact on the learning process. This theory posits that learners construct knowledge through experience and interaction with their environment. The DCP aims to create constructivist learning environments by integrating ICT tools that support interactive and experiential learning. By applying this theory, this study assessed how effectively DCP tools facilitate active learning, social interaction, and contextual learning, thereby enhancing student engagement and educational outcomes. These theories can be used as a broad framework for assessment, challenge identification, and understanding the factors influencing the implementation of DCP in schools.

Independent Variable

1. Perception on the Effectiveness of DepEd Computerization in improving the teaching and learning experience
2. Challenges encountered by educators and students in utilizing the DCP Tools provided by the program

Dependent Variable

Evaluation of the Department of Education Computerization Program (DCP) Effectiveness

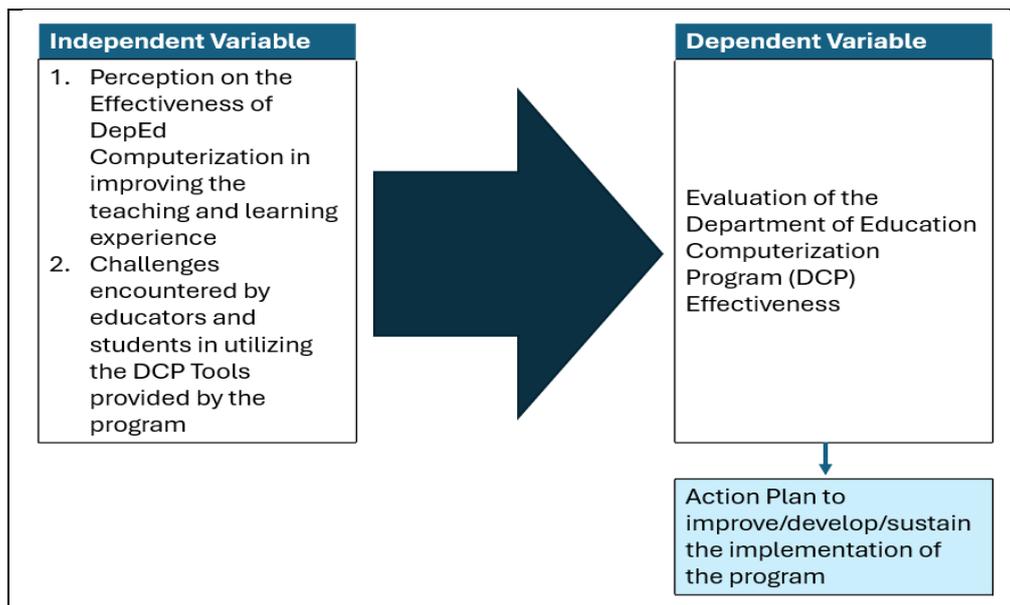Action Plan to improve/develop/sustain the implementation of the program

Figure 1. Paradigm of the study

The aforementioned literature, studies, and theoretical underpinnings provide a foundation for the conceptualization of the research paradigm presented in Figure 1. Figure 1 illustrates the study's independent and dependent variables. The independent variables are the perception of the effectiveness of the DepEd Computerization Program (DCP) in improving the teaching and learning experience and the challenges encountered by the teachers and students in utilizing the DCP tools provided by the program. Likewise, the dependent variable is the evaluation of the Department of Education Computerization Program (DCP) effectiveness. Furthermore, an action plan was crafted to improve, develop, and sustain the implementation of the program.

3. Methodology
3.1. Research Design
This study utilized a convergent parallel mixed methods design to provide a comprehensive evaluation. According to Creswell and Creswell (2017), convergent parallel design entails the conduct of quantitative and qualitative elements in the same phase of the research process, weighs the methods equally, analyzes the two components independently, and interprets the results together. Quantitative data were gathered through surveys distributed to school ICT coordinators via Google Forms, using Likert-scale questions to measure perceptions of the DCP's effectiveness, challenges faced, and overall satisfaction.

Qualitative data were collected through semi-structured interviews with a smaller, stratified random sample of participants, focus group discussions to facilitate dialogue about the DCP's implementation and impact, and classroom observations to note how DCP tools are integrated into teaching and learning activities. Quantitative data were analyzed using statistical software to perform descriptive and inferential statistics, whereas qualitative data were transcribed and coded using thematic analysis to identify key themes and patterns. After separate analyses, the findings were compared to identify convergences and divergences, providing a comprehensive understanding of the DCP's impact. The integrated results were reported clearly, highlighting how quantitative data support or contrast with qualitative insights, and actionable recommendations were proposed to improve, develop, or sustain the DCP based on these findings.

3.2. Participants
The respondents of the study were public secondary school ICT coordinators within SDO Cagayan using stratified random sampling. The study includes selected public secondary schools within the Aparri and Allacapan Districts located within the SDO Cagayan.
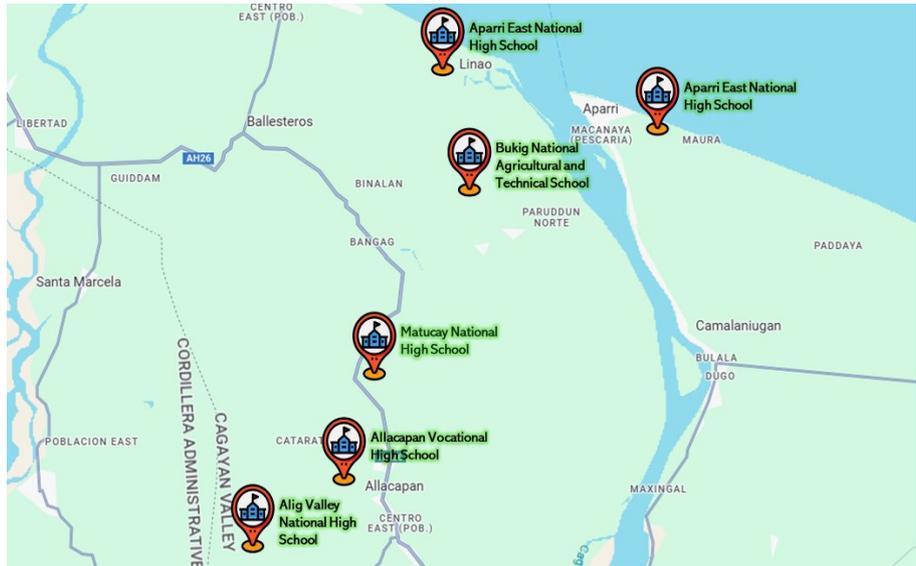
Figure 2. Aparri and Allacapan Districts located within the SDO Cagayan

3.3. Research Instrument

Written permission was obtained from the Schools Division Superintendent of the Schools Division Office of Cagayan to obtain the full cooperation of the respondents. Upon granting permission to conduct the study, the researchers administered the survey questionnaires through Google Forms and facilitated the elicitation of further reliable data. Upon completion of the Google form, obtaining the needed information and study instruments, the researchers collected and entered the data gathered in an Excel Spreadsheet for data cleaning and easier computation.

In addition, the main data-gathering instrument adopted from the study of Mula and Bucar (2023) titled "Department of Education Computerization Program (DCP): Its effectiveness and Problems Encountered in School Personnel's Computer Literacy" was used. It consisted of a survey questionnaire measuring perceptions of DCP effectiveness, challenges faced, and overall satisfaction. Furthermore, semi-structured interviews with a smaller, purposive sample of participants, focus group discussions to facilitate dialogue about the DCP's implementation and impact, and classroom observations to note how DCP tools are integrated into teaching and learning activities were conducted. Furthermore, for verification and additional inputs, triangulation was used through focus group discussions.

3.4. Data Analysis

A descriptive research method employing a survey questionnaire to measure perceptions of the DCP's effectiveness, challenges faced, and overall satisfaction was adopted in the study (Seng, 2010). The survey questionnaire consisted of four parts. The first part includes information on the school. Part 2 includes the effectiveness of DCP with a total of 30 items divided into three parts: 10 items on the integration of ICT in the teaching and learning process, 10 items on raising ICT literacy among learners, teachers, and school heads, and 10 items on ICT Package distribution. Part 3 includes 10 items on the problems and challenges encountered in the implementation of DCP, and Part 4 includes best practices. Furthermore, to measure perceptions of the DCP's effectiveness, challenges faced, and overall satisfaction, weighted means were applied using the 4-point Likert Scale. The interval and interpretation of the scale are as follows:

Table 1. Scale and interpretation of statistical response limits

Scale	Statistical Limit	Response	Interpretation
4	3.25 – 4.00	Much True	Very Effective
3	2.50 – 3.24	True	Effective
2	1.75 – 2.49	Less True	Somewhat effective
1	1.00 – 1.74	Not True	Not effective

Likewise, to measure the problems and challenges in the implementation of DCP, weighted means were applied using the 4-point Likert Scale. The interval and interpretation of the scale are as follows:

Table 2. Scale and interpretation of statistical response limits for extent of agreement

Scale	Statistical Limit	Response	Interpretation
4	3.25 – 4.00	Strongly Agree	High Extent
3	2.50 – 3.24	Agree	Moderate Extent
2	1.75 – 2.49	Disagree	Low Extent
1	1.00 – 1.74	Strongly Disagree	Lesser Extent

Moreover, a thematic analysis was used to code and transcribe the identified key themes and patterns based on the DCP's implementation and impact, and classroom observations were used to note how DCP tools were integrated into teaching and learning activities.

4. Results and Discussion
4.1. Perception/Evaluation Results
4.1.1. Integration of ICT In the Teaching-Learning Process

Table 3. Integration of ICT in teaching-learning process

No	Statements	Weighted Mean	Descriptive Value
1.	Catered the teachers' ICT development	3.67	Very Effective
2.	Contributed to the delivery of quality learning and teaching	3.83	Very Effective
3.	Contributed to universal access to and equity in education	3.67	Very Effective
4.	Contributed to the enhancement of teaching and learning	3.83	Very Effective
5.	Empowering teachers and learners.	3.67	Very Effective
6.	It helped to enhance the quality of education by increasing learner motivation and engagement, facilitating the acquisition of basic skills, and enhancing teacher training.	3.83	Very Effective
7.	It helped to increase the quality of education by facilitating the acquisition of basic skills and enhancing teacher training.	3.50	Very Effective
8.	It offers more efficient education management, governance, and administration.	3.67	Very Effective
9.	They provide newer, better, and quicker ways for people to interact, network, seek help, gain access to information, and learn.	3.33	Very Effective
10.	Transformed the teaching-and-learning processes from being highly teacher dominated to	3.50	Very Effective
	Overall weighted mean	**3.65**	**Very Effective**

Table 3 presents the integration of ICT in the teaching-learning process under the DepEd Computerization Program is perceived as "Very Effective," with a weighted mean of 3.65, where the highest-rated indicators (3.83) highlight its role in enhancing quality learning and learner engagement, while the lowest (3.33) reflects its contribution to networking and information access. These results demonstrate ICT's positive impact of ICT on instructional delivery, teacher development, and student-centered learning, supporting improved education management and governance. The findings imply a need for sustained investment in ICT infrastructure and training, aligning with studies by Osmani and Tartari (2024); Bharti, Pomal, Ahmed, and Singh (2024), which emphasize digital tools' role in boosting student motivation and academic performance.

4.1.2. Raising of the ICT Literacy Among the Learners, Teachers and School Heads

Table 4. Raising ICT Literacy among learners, teachers, and school heads

No	Statements	Weighted Mean	Descriptive Value
1.	Basic sentences and paragraphs were encoded using Microsoft Word.	3.83	Very Effective
2.	Familiarize yourself with the basic keyboard keys on a computer and laptop.	3.50	Very Effective
3.	Log in to and connect to the appropriate platforms and programs.	3.50	Very Effective
4.	Operated and utilized a projector and white screen in the teaching-learning process.	3.17	Effective
5.	Information is sent and received using data-sharing applications and cloud storage systems, such as Google Drive or Dropbox.	3.50	Very Effective
6.	Switch on and switch off the computer/laptop properly.	3.67	Very Effective
7.	A search engine (such as Google Chrome, Bing, Mozilla Firefox, Torch, and others) was used to find information.	3.50	Very Effective
8.	Use computers and the Internet safely, for example, keeping personal information private and avoiding viruses, identity theft, and other online threats.	3.50	Very Effective
9.	Use ICT hardware to scan, print, and copy documents.	3.50	Very Effective
10.	Use popular software packages, such as Microsoft Office (Word, Excel, PowerPoint, etc.) to create, edit and save documents.	3.67	Very Effective
	Overall weighted mean	**3.53**	**Very Effective**

Table 4 presents the teachers' and students' perceptions indicate that the DepEd Computerization Program is "Very Effective" in raising ICT literacy among learners, educators, and school heads, with an overall weighted mean of 3.53. The highest-rated skill was encoding basic sentences using Microsoft Word (3.83), while the lowest was operating projectors and whiteboards (3.17). These results highlight the program's success in equipping stakeholders with essential digital competencies crucial for teaching, learning, and school management. These findings support the studies of Temirkhanova, Abildinova, and Karaca (2024); Magnago et al. (2024), which emphasize that digital literacy enhances academic performance and fosters socio-emotional skills, underscoring the importance of continued investment in ICT training and resources.

4.1.3. ICT Packages Distribution

Table 5. ICT packages distribution

No	Statements	Weighted Mean	Descriptive Value
1.	All materials were installed in schools by ICT experts/professionals.	3.83	Very Effective
2.	The DCP packages were distributed in good quality.	3.67	Very Effective
3.	The delivery personnel unloaded the items in the security room provided by the school.	3.83	Very Effective
4.	The delivery truck arrived at the school, and the delivery personnel looked for school representatives to receive the items.	3.67	Very Effective
5.	The school prepared the complete counterpart requirements as described by the DepEd Central Office.	3.67	Very Effective

6.	The school property custodian or the representative inspected the boxes only for signs of tampering, mishandling and damage on the actual day	3.83	Very Effective
7.	Inspection of boxes on the actual day of delivery of delivery.	3.17	Effective
8.	The school received a call or text from the supplier's delivery partner before the actual delivery to confirm that the delivery was pushed through.	3.50	Very Effective
9.	The schools were informed of the schedule of ICT package deliveries.	3.33	Very Effective
10.	The Supplier's Authorized Service Partners called the recipient schools to schedule boxing, installation, and training dates.	3.67	Very Effective
	Overall weighted mean	**3.62**	**Very Effective**

Table 5 presents teachers and students rated the distribution of ICT packages under the DepEd Computerization Program as "Very Effective," with an overall weighted mean of 3.62. The highest-rated aspects were the installation of materials by ICT experts and the unloading of items into the security room (both 3.83), while the inspection of boxes on the actual day of delivery received the lowest rating (3.17), indicating an area for improvement. These results highlight the importance of expert involvement, timely communication, and logistical coordination to ensure smooth implementation. The findings align with Mula and Bucar (2023), who emphasized the role of ICT support and training, and noted that infrastructure quality significantly affects digital program outcomes. Continued investment in delivery planning, inspection protocols, and support systems is essential to sustain and enhance the effectiveness of ICT distribution in schools.

4.1.4. Summary

Table 6. Effectiveness of DepEd computerization program

No	Dimensions	Weighted Mean	Descriptive Value
1.	Integration of ICT in the teaching-learning process	3.65	Very Effective
2.	Raising the ICT literacy among learners, teachers and school heads	3.53	Very Effective
3.	ICT Packages distribution	3.62	Very Effective
	Composite mean	**3.60**	**Very Effective**

Table 6 presents the overall effectiveness of the DepEd Computerization Program across three key dimensions: integration of ICT in the teaching-learning process (mean = 3.65), raising ICT literacy (mean = 3.53), and ICT package distribution (mean = 3.62), all rated as "Very Effective," with a composite mean of 3.60. These results indicate that the program was well received and positively impacted instructional quality, digital competency, and administrative efficiency. These findings align with those of Osmani and Tartari (2024); Khanna et al. (2024); Butakor (2024), who emphasized ICT's role of ICT in bridging educational gaps and improving outcomes, especially in developing contexts. Basri (2024) further underscores the importance of continuous professional development in ICT integration, highlighting the need for equitable access and sustained investment to maximize long-term educational benefits.

4.1.5. Problems and Challenges Encountered in the Implementation of DCP
Table 7 reveals that the problems encountered in the implementation of the DepEd Computerization Program (DCP) are experienced to a "Lesser Extent," with an overall weighted mean of 1.73. The most notable issues included open electrical routers and poor ventilation (both 2.17), while the improper storage of computer parts received the lowest rating (1.17), indicating limited but present infrastructural and maintenance concerns. These findings suggest that while the program is largely effective, addressing these challenges is essential to ensure a safe and conducive ICT-learning environment.

Studies by Castro (2023); Owen, White, Palekahelu, Sumakul, and Sediyono (2020) recommend strategic interventions such as improved security and usage protocols, while Aline, Nadya, and Sifah (2023); Saputri and Fatmawati (2024); Siregar and Aziza (2021) emphasize the importance of well-maintained facilities in enhancing educational outcomes. Continued investment in infrastructure upgrades and regular maintenance is vital for sustaining the DCP's long-term success.

Table 7. Problems and Challenges Encountered in the Implementation of DCP

No	Statements	Weighted Mean	Descriptive Value
1.	The Computer Laboratory has open electrical routing of wires that are exposed to the teachers and students	2.17	Low Extent
2.	The electrical outlets are damaged and no protective parts	1.50	Lesser Extent
3.	Some chemicals, such as ink and computer cleaner, were not secured or properly stored.	1.67	Lesser Extent
4.	The computer units are exposed to sunlight and damage caused by open windows.	2.00	Low Extent
5.	The room was not properly ventilated. There is insufficient space for students to sit.	2.17	Low Extent
6.	The computer room was dirty and not properly maintained.	2.00	Low Extent
7.	The computer room is prone to flooding and is vulnerable to natural calamities.	1.67	Lesser Extent
8.	The computer parts and equipment are not properly stored in a storage where water cannot reach when it overflows.	1.17	Lesser Extent
9.	The wires were tangled and found on the floor.	1.33	Lesser Extent
10.	Tables and chairs are not suitable for the size of learners.	1.67	Lesser Extent
	Overall weighted mean	**1.73**	**Lesser Extent**

4.2. Theme and Sub-Theme Results

Three significant themes emerged from the data following a qualitative review of the responses from the six schools based on their best practices for receiving DCP packages. Each topic was subdivided into connected sub-themes based on the results of the subsequent thematic analysis.
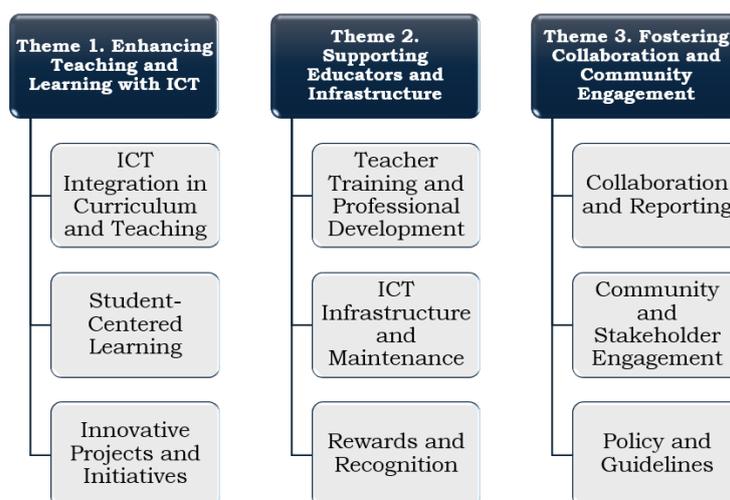

Figure 3. Themes and sub-themes

4.2.1. Theme 1. Enhancing Teaching and Learning with ICT

Three subthemes were identified from the participants' responses. Their best practices on DCP delivery according to how they enhance teaching and learning with ICT were categorized into (1) ICT Integration in Curriculum and Teaching, (2) Student-Centered Learning, and (3) Innovative Projects and Initiatives.

4.2.1.1. ICT Integration in Curriculum and Teaching

Schools A to F reported that integrating ICT into the curriculum meant embedding technology across subjects to make learning more interactive and flexible. Blended learning and e-assessment tools help track performance efficiently, while Open Educational Resources (Levak et al.) cut costs and provide adaptable content. Schools also stressed the importance of digital literacy, smart classrooms, and online resources in dynamic learning environments. These practices align with Anastasopoulou et al. (2024), who highlighted assistive technologies and adaptive platforms as key to inclusive education, reinforcing the need for accessible ICT tools and training for all learners, including those with disabilities.

4.2.1.2. Student-Centered Learning

Schools A to F emphasized student-centered learning, shifting from teacher-led instruction to active student engagement, with technology as a key tool for personalization. Strategies such as maintaining a 1:1 learner-device ratio, using hands-on activities, and implementing computer-based exams and lectures promote deeper understanding and flexibility. Technology also supports tasks such as attendance tracking, score recording, and overnight computer access, ensuring continuous learning and administrative efficiency. These approaches align with Ramandhani, Yusuf, Murdiyani, and Wulida (2024); Chaudhary (2024), who confirmed that interactive, computer-based activities improve engagement and retention, highlighting the need for accessible and dynamic digital learning environments.

4.2.1.3. Innovative Projects and Initiatives

Schools A to F showcased innovative initiatives, such as PROJECT EASE, which simplifies administrative tasks, and the use of DCP packages in journalism and science projects, demonstrating the flexibility of technology in education. They also stressed community engagement, stakeholder support, and sustainability planning as the keys to long-term success. Partnerships with local businesses strengthen these efforts by providing the necessary resources and expertise. These practices align with Grynova, Kononets, Zhdanova-Nedilko, and Pavlych (2024); Moreira et al. (2024), who emphasized collaboration, innovation networks, and supportive school cultures. Strategic partnerships and sustainability plans ensure continued ICT access and prepare students for a technology-driven future.

4.2.2. Theme 2. Supporting Education and Infrastructure

Three subthemes were identified from the participants' responses. Their best practices on DCP delivery, according to how they support education and infrastructure, were categorized into (1) Teacher Training and Professional Development, (2) ICT Infrastructure and Maintenance, and (3) Rewards and Recognition.

4.2.2.1. Teacher Training and Professional Development

Schools A–F emphasized that teacher training and support are crucial for effective ICT integration. Initiatives such as LAC sessions, INSET using DCP packages, and regular ICT training help teachers gain practical skills and stay updated. ICT support teams and peer mentoring create a collaborative environment that boosts confidence and competence among teachers. These practices align with Santos et al. (2024); Vandeyar and Adegoke (2024), who stress hands-on training and pedagogical integration, while Duque et al. (2024) highlight the need for ongoing professional development to adapt to new technologies such as AI. Continuous investment in teacher training ensures that educators are prepared to deliver engaging, technology-enhanced instruction.

4.2.2.2. ICT Infrastructure and Maintenance

Schools A to D emphasized that a strong ICT infrastructure and regular maintenance are essential for smooth technology use. Practices such as monthly equipment checks, reliable Internet in ICT rooms, and proper inventory management ensure accessibility and reliability. Equal access to ICT resources promotes inclusivity, allowing all students to benefit from technology-based learning. These findings align with Hanum, Irwin, Sari, Ardi, and Lismaryanti (2024); Abbasi and Hussain (2024), who stress the importance of consistent maintenance and fair resource distribution. Addressing ICT gaps and maintaining facilities are key to bridging educational inequalities and sustaining effective ICT programmes.

4.2.2.3. Rewards and Recognition
Schools A, B, D, and F highlighted reward systems and Technolympics as effective ways to boost motivation and engagement in ICT-based learning processes. These strategies recognize achievements, encourage healthy competition, and create supportive environments. Nadhifa, Haliah, and Nirwana (2024) found that rewards significantly increase motivation; however, Chen, Chen, and Leung (2023) warned that overuse may reduce intrinsic motivation. A balanced approach is essential to maintain long-term engagement and foster community excellence.

4.2.3. Theme 3. Fostering Collaboration and Community Engagement
Three subthemes were identified from the participants' responses. Their best practices on DCP delivery, according to how they foster collaboration and community engagement, were categorized into (1) Collaboration and Reporting, (2) Community and Stakeholder Engagement, and (3) Policy and Guidelines.

4.2.3.1. Collaboration and Reporting
Schools A, B, C, D, and F emphasized that ICT improves collaboration and reporting by enabling real-time communication and monitoring of students' progress. Schools B, C, D, and E also noted the benefits of digital repositories and cloud platforms for resource sharing, storage, and administrative tasks, such as attendance and grading. These practices enhance transparency, consistency and efficiency. This supports Anwar, Rehan, Ahmad, and Rully (2024); Mukherjee, Goon, Mukherjee, and Bhat (2024); Natividad and Jhon (2024), who confirm that ICT tools streamline communication, simplify administration, and reduce data loss, strengthening educational quality and accountability.

4.2.3.2. Community and Stakeholder Engagement
Schools A, B, and D stressed that engaging the community and stakeholders is key to sustaining ICT programmes, while Schools C, D, and F highlighted ICT literacy workshops for parents to close the digital gap and promote inclusivity. Encouraging innovation and collaboration strengthens program relevance and its long-term impact. These practices align with Prasastiningtyas, Kurniawan, Ruswandi, Gymnastiar, and Amin (2024); Baena-Navarro, Serrano-Ardila, and Carriazo-Regino (2024), who note the socio-economic benefits of forward-thinking ICT integration. However, Singo and D'Oliveira (2024) warned that environmental concerns such as energy use and e-waste must be addressed, calling for sustainable ICT practices.

4.2.3.3. Policy and Guidelines
Schools A, B, and D stressed the need for clear ICT policies to ensure a structured approach to technology use, while Schools C, D, E, and F emphasized regular monitoring and evaluation to track progress and improve the initiatives. These practices help manage resources efficiently, promote accountability, and drive improvements. This supports Horany (2024), who noted that ICT policies clarify roles and boost academic performance, and Lubis, Ramadhani, Salmanda, Fadlan, and Mukhlasin (2024), who highlighted their role in improving resource management and decision-making. Together, these strategies build a stronger and more sustainable ICT system for schools.

4.3. Proposed Action Plan
The proposed action plan for the DepEd Computerization Program (DCP) is designed to address current challenges and enhance the overall effectiveness of integrating Information and Communication Technology (ICT) in education. By focusing on four key areas–enhancing teaching and learning with ICT, supporting education and infrastructure, fostering collaboration and community engagement, and promoting ICT literacy and digital skills–the plan ensures a comprehensive approach to improving the ICT environment in schools. This plan is important because it aims to improve the quality of education and universality of access to ICT while ensuring the safety and sustainability of the program. Addressing infrastructure issues, providing continuous training for teachers, engaging various stakeholders, and nurturing community partnerships in the DCP will help create a more conducive and safer environment that facilitates better educational outcomes and prepares students for the digital world.

Table 8. Strategic plan for educational technology integration and stakeholder engagement

Strategies	Program	Activities	Task	Resources	Timeline
Integrating technology in the curriculum and promoting student-centered learning	Seminar workshop on Project CREATE: Cultivating Responsive Education through Advanced Technology and Engagement	• Develop lesson plans incorporating ICT and AI-powered tools. • Conduct workshops for teachers on ICT integration using AI and EdTech tools.	• Creation of digital resources and materials. • Train teachers to use ICT in teaching.	**Human**: Curriculum developers, ICT trainers, teachers **Materials**: Laptops, wifi connections, educational software applications **Financial**: 30,000.00	January 2025 – March 2025
Improving infrastructure and ensuring safety	Seminar workshop on Project INSPECT: Infrastructure Safety and Performance Enhancement through Comprehensive Technology	• Provide basic training on proper storage of equipment, safety inspections, proper inventory, and troubleshooting. • Establish a school inspectorate team and a monthly automated inspection checklist and inventory.	• Train staff in safety procedures • Conduct regular equipment inspections	**Human**: ICT Coordinators, ICT trainers, teachers **Materials**: Laptops, Wi-Fi connections, educational software applications **Financial**: 10,000.00	April 2025
Engaging stakeholders and establishing partnerships	Seminar workshop on Project CONNECT: Cultivating Opportunities through Networking and Engagement for Community and Technology	• Organize stakeholder meetings and workshops. • Establish partnerships with local businesses and NGOs.	• Plan and conduct community engagement events. • Develop partnership agreements with other organizations.	**Human**: Community officials, teachers, school head, partnership agencies **Materials**: Laptop, projectors **Financial**: 5,000.00	May 2025 – June 2025

Table 8 shows the strategic plan for the integration of educational technology and stakeholder engagement, outlining key strategies, programs, activities, tasks, required resources, and timelines. The plan highlights three main initiatives: Integrating technology in the curriculum and promoting student-centered learning, improving infrastructure and ensuring safety, and Engaging stakeholders and establishing partnerships. Each strategy is accompanied by specific programs, such as Project CREATE, Project INSPECT, and Project CONNECT, aimed at enhancing teaching through technology, improving infrastructure, and fostering community involvement. The table also details the

necessary resources, including human resources, materials, and financial costs, along with the proposed timelines for each activity, ensuring a structured approach for successful implementation.

5. Conclusions

5.1. Conclusion

The DepEd Computerization Program has enhanced the quality of education through the integration of ICT in teaching and learning, as rated as highly effective by both teachers and students. The program has improved the level of ICT literacy among learners, teachers, and school heads in terms of the necessary digital skills, such as proficiency in Microsoft Word and safe Internet usage. Despite these successes, challenges such as broken outlets and lack of ventilation pose safety risks and limit effectiveness. The sustainability of the program calls for strategic interventions in the form of action plans, such as providing skills on troubleshooting, continuous ICT training for teachers and students, and provision of training on how to include education technology tools in teaching and learning. The distribution of DCP packages has been effective, although logistical challenges need to be improved, such as the inspection of delivery boxes. Overall, the program's long-term educational objectives can only be achieved with continuous investment in ICT infrastructure, teacher training, and community engagement to ensure equitable access to technology.

5.2. Research Limitations

While this study provides valuable insights into the effectiveness of the DepEd Computerization Program, there are several limitations that should be acknowledged. First, the research primarily relied on secondary data collected from surveys and feedback from teachers and students, which may not fully capture the challenges and successes from the perspectives of other key stakeholders, such as school administrators and policymakers. The inclusion of these additional perspectives could offer a more comprehensive understanding of the program's impact. Additionally, the study focused on schools in specific regions, which may limit the generalizability of the findings to all schools across the country. Furthermore, while the study identified infrastructure challenges, such as broken outlets and poor ventilation, it did not directly assess the financial and logistical constraints that schools in various regions face, which can significantly impact the implementation and effectiveness of the program. Lastly, the study did not examine the long-term sustainability of the DCP, particularly in rural or underserved areas, which may experience different challenges in maintaining ICT infrastructure. Future research could address these limitations by incorporating a broader range of stakeholders, assessing the regional variations in program implementation, and exploring the long-term impact of the program.

5.3. Suggestions and Directions for Future Research

Based on the findings and limitations of this study, several suggestions and directions for future research are proposed. First, future research should include a wider range of stakeholders, such as school administrators, policymakers, and parents, to gain a more comprehensive understanding of the program's impact. By incorporating these perspectives, future studies can uncover additional challenges or successes that may not have been captured in this study. Second, it is recommended that longitudinal studies be conducted to assess the long-term sustainability of the DepEd Computerization Program. These studies would focus on tracking the evolving effectiveness of the program over multiple academic years and provide insights into how ICT integration in education can adapt to future educational needs and technological advancements.

Third, future research could delve deeper into the impact of ICT on teaching practices and student engagement, particularly in rural or underserved areas. This would involve exploring how the use of ICT tools influences pedagogy, teaching methods, and overall student learning outcomes. Fourth, research on the adequacy of infrastructure in schools implementing the DCP should be expanded, focusing on identifying regional differences in terms of available resources, technology access, and maintenance capacity. Understanding the specific needs of schools in different regions will enable more targeted recommendations to improve the program's effectiveness. Finally, future research could explore the role of community involvement and policy development in the successful implementation of ICT initiatives in schools. This research could examine how local governments, parents, and the

broader community support ICT integration and how national policies can ensure sustained funding and support for these initiatives.

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Author Contributions

N. S. C, contributed to the conceptualization of the study and the design of the research methodology. He was responsible for data collection, analysis, and the drafting of the manuscript. Additionally, he participated in the revision process, ensuring the clarity and accuracy of the research findings. He also supervised the final stages of the manuscript development and provided final approval for submission. J. D. M, played a key role in the conceptualization of the study and contributed to the study design. He assisted in data collection, providing support with data analysis, and helped in drafting the initial sections of the manuscript. J. D. Medrano was involved in the manuscript revision process, ensuring the quality of the content and offering suggestions for improvement. He also provided final approval for the manuscript before submission.

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