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Leveraging Technology and Research to Shape Educational Policy

Jhonie Gumilao
Department of Education – Regional Office IX, Philippines
E-mail: jhonie.gumilao@deped.gov.ph RCID ID:https://orcid.org/0009-0006-9600-5683

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Abstract

Background and Aim: Research investigates how technology together with research affects policy formation in the educational domain at Department of Education Region IX. The research explores outcomes from planning officers together with senior education program specialists operating at eight Schools Division Offices (SDOs) and the Planning and Research Unit. This research investigates how technological instruments together with research programs create policy frameworks based on evidence and overcome management obstacles in education. The investigation studies these elements to explore knowledge transfer processes which lead to policy-making progress. In particular, the study aims to examine how educational stakeholders in DepEd Region IX utilize technology to inform and shape policies that address regional challenges and enhance educational outcomes. The study also analyzes the role of research in the formulation and implementation of educational policies, focusing on its impact on curriculum development, technology integration, and policy effectiveness. Lastly, it identifies the key barriers and opportunities in adopting technology-driven approaches to educational policymaking, with an emphasis on teacher development, digital literacy, and inclusive learning strategies.

Materials and Methods: The research used qualitative investigation methods while thematic analysis allowed the evaluation of technology and research influences on educational policy development. The study obtained information from planning officers and senior education program specialists who work in both the Schools Division Offices and the Planning and Research Unit. Different methods of data collection were used to fully understand how policies get made which included both interviews and focus groups and document examination. Thematic analysis methods were used to detect regular patterns as well as main themes in the data regarding technology implementation together with evidence-based policy creation and organizational barriers.

Results: Research shows technology has powerful positive impacts on making decisions through data while it optimizes policy development while making it easier to execute. Technology dramatically influences educational policy development through improved customization of instruction and wider student enrollment opportunities and advanced educational content development and trained instructor capabilities. Students can receive training that specifically caters to their needs, skills, and learning styles with the use of educational technology. Policymakers can create regulations that support differentiated education by using data analytics, AI-driven exams, and adaptive learning systems to gain insights into student performance. Several obstacles stand in the way of maximum technology use because they include insufficient technological foundations alongside minimal resources and poor digital aptitude across relevant groups. The research study uncovered four main aspects including digital tool integration through policy processes and capability enhancing programs as well as institutional blockages to technology research application and essential research frameworks needed for decision-making.

Conclusion: Advanced technologies combined with research continue to affect multiple educational outcomes and the practices of teaching and professional development at DepEd Region IX. Modern educational technology allows personalized instruction and improves education accessibility for all students and enables analysis-based policy adjustments that guide curriculum transformation processes. Educational research acts as the main force which guides policy development and enables multidirectional collaboration between educational stakeholders to address regional problems and improve curriculum development. Through technology-based professional development programs educators have access to educational tools to combine teaching techniques and they share research information with peers through collaborative platforms. By improving technology teachers can acquire essential skills to manage changes in the educational environment which leads to an education system that promotes both inclusivity and competitiveness. This study holds significance because it provides foundational facts to policymakers who need knowledge regarding how technology supports balanced educational access. Stakeholders can develop educational policies through technology by combining barrier resolution with enabling factor maximization to meet the requirements of teachers and students. Research and technological integration should continue as critical components for developing sustainable educational progress so the Philippine education system maintains adaptation to global competition.

Keywords: Educational Policy, Research-based Policy, Shaping Educational Policy, Technology-based Policy, Technology and Research

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Introduction

The education sector encounters intensified difficulties because of quick technological developments, so institutions must transform and introduce new approaches. Evidence-based policymaking stands as an essential instrument, according to the Philippine Department of Education (DepEd), to tackle educational challenges as well as enhance student performance outcomes. DepEd Region IX functions in a specific context involving different geographic areas and socioeconomic characteristics which drives its necessity for developing evidence-based strategic policies. The study investigates the integration methods of research and technology within educational policy development at DepEd Region IX through surveys of planning officers and senior education program specialists at eight Schools Division Offices.

Educational policies drive student learning improvement, teaching quality enhancement, and institutional output optimization. It serves as fundamental instruments for advancing student learning, teaching excellence, and institutional productivity standards (UNESCO, 2023). DepEd Region IX depends on researched-based data combined with regional technology systems as essential components for making policy decisions. There are multiple obstacles which prevent the efficient usage of research together with technology in policymaking procedures. The complete exploitation of data-driven methods by policymakers is hindered because they lack access to technology platforms, need better training, and encounter institutional obstacles. Effective solutions must be developed to overcome these hurdles because they enable better resource distribution along with enhanced curriculum creation and educational program management procedures.

This research examines regional policy formulation regarding technology and research integration whereas past studies focused on national educational changes together with generic technological school intake. The research technology and research with decision-making within DepEd Region IX to determine how evidence-based policy strengths in the Philippine education system can be developed.

Objectives

A minimal amount of empirical research exists to understand how technology and research functions within the governance structure of DepEd regional operations. The study fills this research gap through its analysis of Planning and Research Units' operations within DepEd Region IX and their systematic evaluation of technological and research utilization as an enhancement approach for educational policy development and implementation. The study aims to find answers to specific questions that include:

1. The educational stakeholders in DepEd Region IX utilize technology to transform regional policies by ensuring proper contextualization for addressing challenges with better educational results.
2. The formation process of educational policies in DepEd Region IX receives impact from research results which then merge into practical applications.
3. What stands as the main impediment alongside facilitators for employing technology-based educational policy creation approaches at DepEd Region IX?
4. What approaches enable research and technological capabilities to become more effective tools when developing professional learning and development program policies?

These research questions help expand the knowledge about technological governance in education. The results strive to present best practices which handle Region IX's specific obstacles while developing adaptable solutions that regional education offices with parallel complications can implement. The research exemplifies how technological advancements with research methods can form the basis of intelligent educational policies which respond to the needs of the twenty-first century.

Literature review

Academic research focuses on the combination of technology integration with educational policy and research approaches because of their critical role in present-day educational management frameworks. Various researchers have noted the powerful capability of technology to improve educational decision-making processes. According to Darling-Hammond et al. (2020) technology helps schools collect educational data which can be analyzed for decision making that leads to better results. The educational management information systems (EMIS) described by Anderson (2020) enable administrators and educators to monitor performance statistics which helps them locate weaknesses and

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guarantee that resources distribute equally. The successful application of technology in this domain requires stakeholders to have both capability and appropriate access to resources according to Levin et al. (2018).

Research integration supports policymaking by providing factual data that replaces personal observations of the problem (Brown & Zhang, 2021). The evidence-based strategy proves crucial for education because ongoing socio-economic transformations need flexible policy solutions (Nutley et al., 2013). Participatory research methods according to UNESCO (2019) bring stakeholders together to build trust between them and policy leaders during policy development activities. The research utilization process faces obstacles according to Nutley et al. (2007) through the combination of insufficient access to high-quality data and insufficient research capabilities and policy research mismatch.

The Philippine educational authority Department of Education (DepEd) acknowledges evidence-based policymaking significance in its Basic Education Research Agenda document (DepEd, 2016). The agenda highlights thar the research should occur locally, and policy implementation must suit specific regional needs. The work of Bernardo and Mendoza (2018) and Ocampo et al. (2020) shows that DepEd has started to embrace technology and research, but strong barriers continue in its path. The smooth implementation of digital policies faces barriers related to insufficient technology systems and limited training of staff together with departmental divisions that block policy cooperation. Alfonso (2020) explains that educational outcomes and resource allocation tracking become possible through Geographic Information Systems (GIS) and Learning Management Systems (LMS) tools.

The advancements have not fully resolved the current substantial difficulties. According to Torres and Lopez (2022) the main limitations to changing implementation include staff resistance and inadequate training along with deficient technological systems. The resolution of these challenges needs purposeful spending together with skill development initiatives together with innovation-driven cultural changes (Fullan & Langworthy, 2014). Wong et al. (2019) agrees with the need for leaders who ensure transparency along with stakeholder involvement while using evidence to support their decisions.

The present research takes place within this scholarly domain by examining the circumstances of DepEd Region IX. The research investigates the coordination of stakeholders between technology frameworks and research activities for education policy development alongside their response to digital foundation limitations and skill deficits and organizational operational issues. These elements receive systematic analysis through Braun and Clarke's (2006) thematic approach so they can drive enhanced educational results operating at regional and wider levels.

Conceptual Framework

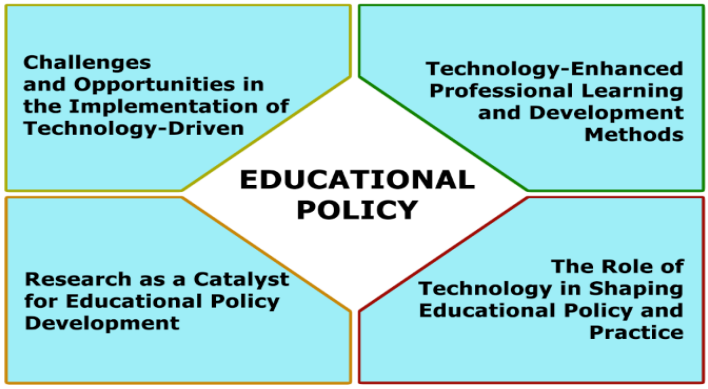

Figure 1: Conceptual Framework

Methodology

1. Research Design

The research adopted a qualitative method to investigate how technology and research resources influence policy development at DepEd Region IX. The research used thematic analysis to detect methodical patterns through which technology and research support policy development and handle integration problems while improving policy strategies. Qualitative research served as a suitable method to understand policy development constraints because it delivered a complete assessment of policy

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creation processes. This research methodology allowed researchers to gain important knowledge about the intricate educational governance practices in the region through participant feedback.

2. Research Setting

Eight Schools Division Offices (SDOs) from DepEd Region IX participated in the research project, which included examination sites in urban and rural locations. The Schools Division Offices function as vital institutions to carry out educational policies by adapting national directives according to local conditions and requirements. Each School Division Office possesses Planning and Research Units whose mandate includes two crucial duties: they integrate research into decision-making processes and ensure policies adapt to new technological developments. The location presented researchers with the chance to evaluate the methods by which regional offices use technology and research to create strategic educational plans along with executing educational policies.

3. Sampling

The research used purposive sampling to choose participants who possessed extensive expertise in policy localization together with research-based practices in DepEd Region IX. The research centered on Planning Officers together with Senior Education Program Specialists because they lead policy development and execution in their roles. The research studied sixteen respondents who came from different yet representative groups involving two representatives per SDO for a comprehensive assessment of policy integration aspects.

4. Data Collection

The digital-based system employed for data collection enabled efficient delivery to participants located throughout different sites. The study utilized:

4.1 The first phase of data collection used open-ended questionnaires on Google Forms to investigate technology and research impacts on policy development.

4.2 Our research combines unstructured casual interviews available on virtual meeting applications and personal interviews for participants to provide insights into their work using technology to enhance policy development strategies.

The collected data through multiple modes enabled researchers to resolve logistical difficulties and attain detailed participant statements.

Data Analysis. The research analysis adopted thematic analysis while executing Braun and Clarke's (2006) six-phase model which started with familiarization then proceeded to coding along with theme development and resulted in review steps followed by definition and finally reporting. The research process used multiple iterations to capture all complexities of participant experiences and both enabling and limiting factors that affect technological utilization and research-based policy development.

Ethical Considerations. The researcher obtained approval for ethical clearance from DepEd Region IX followed by participant consent where confidentiality and voluntary status were emphasized throughout the process. Confidential participant data underwent anonymization procedures that safeguarded identity privacy before being presented with findings to stakeholders for validation purposes.

Results

This research section presents findings regarding the use of technology and research for policy development in DepEd Region IX. The findings are discussed in relation to the four research questions that guided the study: 1) how educational stakeholders in DepEd Region IX utilize technology to inform and contextualize policies addressing regional challenges and enhancing educational outcomes; 2) the role of research in the formulation and implementation of educational policies, and how research findings are integrated into practice; 3) the key barriers and enabling factors influencing the adoption of technology-driven approaches in educational policymaking; and 4) how technology and research use for policy contextualization for the professional development programs. The evaluation generates a complete examination of technology research policy connections in the region which demonstrates important learning points about DepEd Region IX's hurdles and benefits during technology-driven educational governance and outcome development.

The thematic analysis produced four fundamental themes which gave complete solutions to the research questions. These four themes summarize the essential aspects of policy formation in education and technology deployment and research activity inside DepEd Region IX. Distinctive themes are:

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1. The Role of Technology in Shaping Educational Policy and Practice
2. Research as a Catalyst for Educational Policy Development
3. Challenges and Opportunities in the Implementation of Technology-Driven Educational Policies
4. Technology-Enhanced Professional Learning and Development Methods

Table 1 *Top Codes Across Themes*

Theme	Codes	Frequency
Theme 1	Technology influence	23
Theme 1	Access to education in remote areas	12
Theme 1	Technology-driven policies	12
Theme 1	Policy reforms	9
Theme 2	Research plays a crucial role	20
Theme 2	Research findings	14
Theme 2	Educational policy	12
Theme 2	Evidence-based decision-making	10
Theme 3: Challenges	Educational policies	13
Theme 3: Challenges	Technology in education	9
Theme 3: Challenges	Student motivation	9
Theme 3: Challenges	Evaluation and assessment	9
Theme 3: Opportunities	Educational policies	13
Theme 3: Opportunities	Technology in education	9
Theme 3: Opportunities	Technology integration	8
Theme 3: Opportunities	Digital learning tools	7
Theme 4	Technology in Education	13
Theme 4	Professional Development	9
Theme 4	Blended and Online Learning	8
Theme 4	Collaboration and Innovation	6
Theme 4	Policy and Initiatives	5
Theme 4	Curriculum and Instructional Integration	4

Discussion

Problem 1: How do educational stakeholders in DepEd Region IX utilize technology to inform and contextualize policies that address regional challenges and improve educational outcomes?

Theme 1: The Role of Technology in Shaping Educational Policy and Practice

1. Personalized Learning. Technology facilitates personalized instruction which reduces the amount of effort it takes to adapt educational activities to individual students' requirements. This personalization can lead to a higher level of comprehension and memory, particularly when the use of the newly developed interactive and multimedia tools is extremely successful to arouse students' attention and keep them focused on where and how to obtain new knowledge. Personalized learning leverages technology to tailor educational experiences to individual students' needs, thereby improving comprehension and retention (Pane et al., 2017).

2. Improved Access to Education. Technology has remarkably improved the standard of education for people living in distant areas. On the one hand, in recent years, more innovative ideas, including DepEd TV, etc., have become a program of great help in the remote areas and the students can get the materials that they need despite geographical limitations. Furthermore, Labesig (2021) stated that DepEd TV reached approximately 18 million viewers, with the majority being children aged two to 12 years old. This extensive reach underscores the program's potential in delivering educational content to a broad audience.

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3. Data-Driven Decision-Making. Education policies receive essential support from data analytics solutions such as Learner Information System or LIS due to their ability to provide immediate performance statistics about students and teachers and resource distribution information. These data systems help direct educational improvements through their capability of guiding how resources should be spent, and which teachers should be developed and what curricula to modify. LIS provides accurate and timely information, supporting various administrative activities and informing policy decisions aimed at enhancing educational outcomes (Lopez et al., 2023).

Problem 2: In what ways does research affect the formulation and implementation of educational policies in DepEd Region IX, and how are its findings integrated into practice?

Theme 2: Research as a Catalyst for Educational Policy Development

1. Impact on Educational Policies. Through continuous research multiple policies emerged from data-based evidence which tackle realistic challenges affecting education including low enrollment and digital access issues and literacy deficits. Research on educational needs has driven reforms that updated curriculum design to make it suitable for local and worldwide standards.

2. Collaborative Impact. Collaboration among stakeholders, including universities, government agencies, and the private sector, has strengthened the development of technology policies in education. These collaborations bring in a wide range of expertise, helping shape policies that are practical, sustainable, and directly responsive to the needs of Filipino students and teachers. Furthermore, the integration of technology has been identified as a key strategy to address educational challenges, with initiatives focusing on expanding access to basic education and improving its quality and relevance (UNESCO, 2023).

3. Digital Learning Platforms. Continuous research enables platform developers to enhance their products by fixing issues regarding language and accessibility together with infrastructure limitations. The data collected by researchers enables officials to create digitally inclusive tools that deliver equal learning opportunities to all students without any exclusions in poorly served regions. A study by Cerda (2024) highlights that the evolution of curriculum development in the Philippines has been significantly influenced by global standards, technological progress, and socio-cultural transformations, emphasizing the need for digital platforms to be inclusive and adaptable to diverse learner needs.

4. Curriculum Development. Research discoveries have become vital for finding how to enhance the Philippine curriculum system. The integration of research about effective teaching techniques and evaluation of learning results and international educational benchmarks enabled the creation of modern educational curricula which are both inclusive and related to current times. Furthermore, efforts to align the Philippine K to 12 assessment policies with international large-scale assessments demonstrate the country's dedication to meeting global educational benchmarks (Cortez et al., 2024)

Problem 3: What are the key barriers and enabling factors in adopting technology-driven approaches to educational policymaking in DepEd Region IX?

Theme 3: Challenges and Opportunities in the Implementation of Technology-Driven Educational Policies

1. Challenges. Student motivation stands as the first major barrier for implementing technology-driven educational policies because some learners do not naturally connect with digital educational tools. The availability of digital and internet access across the population becomes more challenging because poor infrastructure keeps specific communities without connectivity along with suitable hardware. Social and economic differences in the population lead to limited access for the majority to modern technology. Schools encounter difficulties regarding the preparation of their teaching staff and students mainly due to insufficient training for both groups to work efficiently with digital tools. The distribution of funds creates ongoing problems since educational institutions alongside government bodies must decide between investing in technology and satisfying other critical requirements. Data privacy concerns along with cybersecurity risks pose significant challenges because digital platforms use now exposes stakeholders to increased probabilities of sensitive information

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leakages which causes trust issues to arise. The path to technology integration success in education requires resolving all these related problems. A study highlighted that equity and access are among the highest challenges in technology integration within Philippine schools. (Celeste & Oasis, 2023)

2. Opportunities. Through technologically based educational policies institutions can achieve fundamental transformation in educational experiences and their corresponding results. Officials managing educational systems should integrate technology because they can use digital learning tools and adaptive learning systems with online platforms to deliver customized student-specific instruction. Government-sponsored investments in digital infrastructure along with internet access programs work to eliminate educational inequalities thereby providing identical learning possibilities to all students. The integration of technology in education serves to activate student interest and learning activity and enables teachers to strengthen their professional techniques through data comments. Digital literacy programs and educational reforms receive support through collaborative initiatives that train students for 21st-century competencies which create global business advantages. Educational technology benefits from survey and feedback data to adjust to changing obstacles which creates opportunities for innovative teaching approaches and eliminating technical barriers to long-term education prosperity worldwide. Adaptive learning systems provide individualized educational experiences by tailoring content to students' unique characteristics and abilities, enhancing engagement and comprehension (Dela Cruz, 2023).

Problem 4: How can research and technology effectively leverage in policymaking towards professional learning and development programs?

Theme 4: Technology-Enhanced Professional Learning and Development Methods

1. Impact of Technology on Teaching Practices. Educational technology brought transformative changes to Filipino educators who now teach through modern interactive approaches that make instruction more effective. Specially designed videos and animations together with learning management systems (LMS) now enhance the teaching practices of many educators.

2. Access to Digital Platforms and Tools for Continuous Professional Development (CPD). DepEd allows teachers in the Philippines access to professional growth tools that include DepEd Learning Management System (LMS) and NEAP platforms with supporting features of webinars and videos and online courses for flexible self-paced learning. The professional growth of teachers becomes possible through these platforms because they ensure teachers develop constantly.

3. Blended Learning and Technology Integration. Traditional classroom teaching with online study components and independent modules serves as the main educational approach in Philippine education. The model stands as a crucial adaptation during the pandemic and remains highly recommended for its ability to serve a wide range of students throughout the nation.

4. Collaborative Learning and Research. Through technology, online communities, research projects, and professional learning networks have made it possible for teachers to collaborate more than ever before. Sharing of best practices and the designing of effective teaching strategies are enabled by these platforms via real-time classroom feedback.

5. Policy Impact on Teacher Development. Hi-tech market will proudly unite Digital Rise Program and the Philippine Digital Strategy which stand as national achievements in the field of infrastructure and teacher training. These both are break-through projects that IT applied for educational purposes alongside with the training of teachers.

6. Teacher Training and Digital Literacy. Adding digital literacy to the K-12 curriculum was an essential step in making students and teachers ready to be successful in the digital world. Even so, it is of great importance that teachers, on the one hand, are researched through ongoing continuous educational programs which are also involved in classroom action research, on the other hand to keep up with the changing teaching strategies and technology.

Educational technology has transformed teaching methodologies in the Philippines. Teachers now employ interactive tools such as videos, animations, and Learning Management Systems (LMS) to enhance instructional effectiveness. This shift addresses the limitations of traditional teaching methods by incorporating technology-based tools that enrich the learning experience (Espinosa-Dublar,

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2023). Technological advancements have enabled Filipino educators to engage in online communities, research projects, and professional learning networks, facilitating unprecedented levels of collaboration. These platforms allow for the sharing of best practices and the development of effective teaching strategies, enhanced by real-time classroom feedback. For instance, a study conducted in Malaybalay City during the 2024–2025 school year examined the connection between students' critical thinking skills, collaborative teaching methods, and technology mindset, highlighting the positive impact of collaborative teaching practices on student outcomes (Aliazas & Fideli, 2024).

Knowledge Contribution

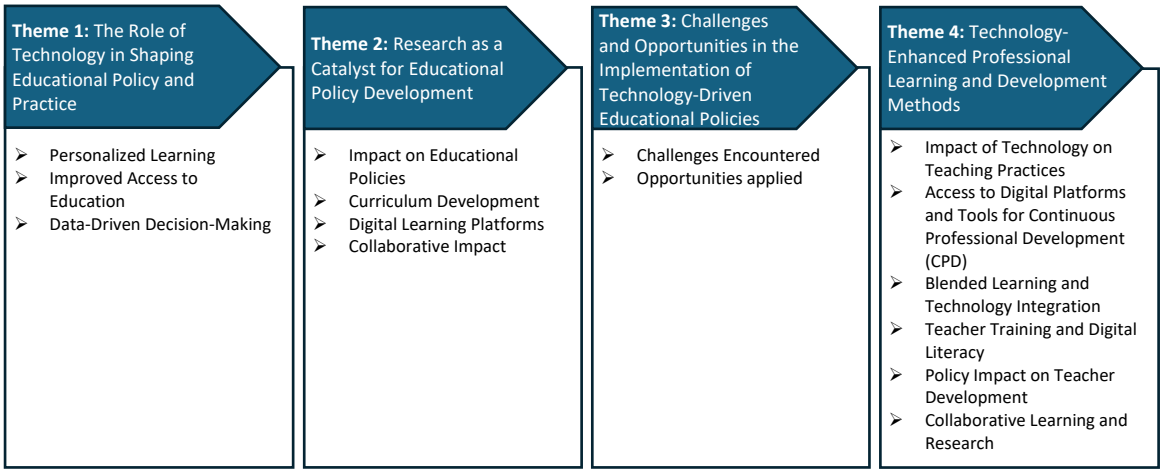

Figure 2: Research and Technology

Figure 2 illustrates the different factors that will shape educational policy. Personalized Learning Improved Access to Education and Data-Driven Decision-Making plays a vital role. Research as a Catalyst for Educational Policy Development has an impact on Educational Policies, Curriculum Development, Digital Learning Platforms, and Collaborative Impact. There are challenges and opportunities encountered in the implementation of technology-driven educational policies. Lastly, the Impact of Technology on Teaching Practices, Access to Digital Platforms and Tools for Continuous Professional Development (CPD), Blended Learning and Technology Integration, Teacher Training and Digital Literacy, Policy Impact on Teacher Development, and Collaborative Learning and Research enhanced Professional Learning and Development Methods.

Recommendation

In the years to come, scholars should revisit the subject of the long-term effects of these policies on student learning outcomes in remote areas, especially the evaluation of the strategies aimed at bridging the digital divide. What is more, it may include particular attention to the issue of the data privacy regulations, which operate as a system reference to maintain the credibility of the digital education field. DepEd Region IX should dedicate its funds to digital infrastructure development to establish constant internet availability and modern educational equipment in every educational facility, especially those located in remote areas. Improved partnerships between government agencies and private enterprises will help supply low-cost digital education materials to both students and their instructors to reduce technological education inequalities. Technology and research methods need to be applied to generate policies that effectively manage regional educational difficulties. The Learner Information System (LIS) requires optimization to monitor student performance together with resource assessment and curriculum guidance functions through real-time analytics systems.

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