

Equipping Learner's with Critical Thinking Skills Development Through Project-Based Learning and Differentiated Instruction

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Publication history:

Received: September 24, 2026

Revised: October 20, 2026

Accepted: October 23, 2026

Published: October 24, 2026

International Journal of Sustainable and Integrated Studies, Vol. 1, No. 3, pp. 772–787, October 2026.

Abstract

This study examined teachers' implementation of Project-Based Learning (PBL) and Differentiated Instruction (DI) and their relationship with learners' critical thinking skills in selected public elementary schools in Dagohoy District, Schools Division of Bohol, during School Year 2026–2027. Anchored primarily in constructivist and social constructivist theories, differentiated instruction theory, and Bloom's Taxonomy, the study employed a quantitative descriptive-survey design with a correlational approach. The respondents comprised 58 school personnel, including three school heads and 55 teachers, selected through purposive and stratified random sampling procedures. Data were collected using an expert-validated, pilot-tested, modified questionnaire and analyzed through descriptive statistics, Pearson correlation, and Spearman rank-order correlation. Findings revealed that PBL (WM = 3.29) and DI (WM = 3.55) implementation were Highly Evident, with strengths in developing 21st-century skills and differentiating instructional content, respectively. Learners' critical thinking skills were assessed as Satisfactory (WM = 2.89), with remembering rated highest (WM = 3.55) and creating lowest (WM = 2.31). PBL implementation showed no statistically significant relationship with critical thinking ($p = -0.156$, $p = 0.256$), whereas DI demonstrated a statistically significant weak positive relationship ($r = 0.268$, $p = 0.048$). The study recommends strengthening differentiated learning experiences, authentic projects, higher-order thinking activities, and sustained teacher professional development through the proposed Project DI-THINK Learning and Development Program. The study supports Sustainable Development Goal 4 (Quality Education) and SDG 10 (Reduced Inequalities) by emphasizing inclusive instruction and equitable learning opportunities. Its potential sustainability impact includes improved instructional quality, continuous professional development, institutional capacity building, and community-responsive educational practices.

Keywords: Critical Thinking Skills, Differentiated Instruction, Educational Sustainability, Inclusive Education, Learner-Centered Instruction, Learning and Development Program, Project-Based Learning, Sustainable Development Goals, Teacher Professional Development

1. Introduction

The development of learners' critical thinking skills is a fundamental objective of contemporary education, particularly as educational institutions respond to increasing demands for analytical reasoning, problem-solving, collaboration, creativity, and adaptability. Critical thinking enables learners to evaluate information, formulate reasoned judgments, and apply knowledge to complex situations (Thornhill-Miller et al., 2023). Project-Based

Learning (PBL) and Differentiated Instruction (DI) are learner-centered approaches that provide opportunities to develop these competencies through authentic learning experiences, collaborative inquiry, and instructional practices responsive to individual differences. This study examines teachers' implementation of Project-Based Learning and Differentiated Instruction and their relationship with learners' critical thinking skills in selected public elementary schools in Dagohoy District, Schools Division of Bohol, during School Year 2026–2027. It seeks to establish an empirical basis for an enhanced Learning and Development (L&D) program that strengthens instructional practices, supports inclusive education, and contributes to sustainable educational improvement.

Contemporary education emphasizes the development of higher-order thinking skills through active, meaningful, and learner-centered instruction. Developing critical thinking requires educational approaches that encourage learners to investigate problems, evaluate evidence, construct knowledge, and apply understanding to real-world situations (Le and Nguyen (2024, June)). Among these approaches, Project-Based Learning and Differentiated Instruction have gained recognition for promoting deeper cognitive engagement and meaningful learning. Project-Based Learning involves learners in authentic investigations and collaborative projects that require problem identification, information analysis, decision-making, and solution development. Through sustained inquiry and practical applications, learners develop critical thinking, creativity, communication, and collaboration while connecting classroom knowledge with real-life experiences (Zhang and Ma, 2023). Differentiated Instruction, meanwhile, recognizes differences in learners' abilities, interests, readiness levels, and learning needs. It enables teachers to modify instructional content, learning processes, materials, assessments, and expected outputs to provide equitable opportunities for participation and academic success (Goyibova et al., 2025). The effectiveness of these approaches depends considerably on teachers' instructional competence, preparedness, and consistency of implementation. Ab Hajis and Othman (2024) emphasized that implementing Differentiated Instruction presents challenges that require appropriate instructional strategies and continuous adaptation to learners' diverse needs. Addressing these challenges is essential to ensuring that differentiated teaching practices remain responsive, inclusive, and effective across different classroom contexts. Teachers facilitate inquiry, provide appropriate learning support, and design activities that encourage reflection and higher-order thinking. However, differences in instructional practices may influence the extent to which PBL and DI contribute to learners' critical thinking development (Milakis, 2025). Within the Philippine education system, learner-centered instruction is promoted through curriculum reforms emphasizing 21st-century competencies (Funa, 2023). Nevertheless, resource limitations, large class sizes, varying teacher preparedness, and diverse learner needs continue to challenge the consistent implementation of innovative instructional strategies (Mendoza, 2024). Similarly, Syahdia et al. (2024) identified several challenges in implementing Project-Based Learning across secondary school contexts, including limitations in instructional time management, inadequate infrastructure, and insufficient teacher competencies. These challenges underscore the importance of instructional preparedness, resource availability, and continuous professional development in supporting effective PBL implementation. In Dagohoy District, Division of Bohol, assessing these practices is essential for identifying instructional needs and informing professional development, supervision, and resource allocation (Del Valle, 2023). Accordingly, the present study evaluates teachers' implementation of PBL and DI and determines their relationship with learners' critical thinking skills. Its findings will serve as a basis for an enhanced teacher Learning and Development program responsive to identified instructional needs.

The literature identifies Project-Based Learning and Differentiated Instruction as complementary approaches that support learner engagement, inclusive instruction, and higher-order cognitive development. PBL emphasizes authentic problem-solving and knowledge application, while DI adjusts instructional experiences according to learners' readiness, abilities, interests, and needs (Adeoye, Prastikawati & Abimbowo, 2024). Project-Based Learning develops critical thinking by engaging learners in investigating questions, analyzing information, evaluating alternatives, and presenting evidence-based solutions (Williamson, 2023). It also supports knowledge retention, collaboration, and practical problem-solving through meaningful learning activities (Atmojo et al., 2025). Authentic projects involving environmental concerns, community development, and interdisciplinary challenges provide opportunities to connect academic concepts with complex real-world issues (Sah, Sasikirana, and Pujiani, 2024). Carella and Colombo (2024) presented a practical case study involving the application of Project-Based Learning through collaboration between a university course and a company. Their work illustrates the relevance of authentic projects in connecting academic instruction with practical experiences beyond the classroom. Collaborative activities further strengthen communication, teamwork, task management, and shared decision-making (Dacumos and Silva, 2023). Kavita (2024) examined senior high school English as a Foreign Language students' perspectives on collaborative learning. This work provides additional context for understanding learner perspectives on collaborative activities, which constitute an important component of learner-centered instructional approaches such as Project-Based Learning. Project-Based Learning also provides opportunities to strengthen academic performance, critical thinking, and learners' ability to address challenging tasks through meaningful learning experiences. Beyond cognitive outcomes, collaborative projects contribute to social-emotional development by strengthening empathy, cooperation, leadership, and interpersonal communication (Dacumos & Silva, 2023). Differentiated Instruction complements these outcomes by providing appropriate instructional challenges and support. Teachers may modify learning content, processes, products, and

environments while maintaining common learning objectives (Yanti, Wardana and Khamis, 2026). Strategies such as scaffolding, flexible grouping, varied learning materials, and differentiated assessments promote participation and meaningful learning among students with different readiness levels (Gyawali, 2023). Hatmanto and Rahmawati (2023) discussed the design of differentiated lesson plans for teaching reading skills in the Philippine educational context. Their work highlights the relevance of incorporating differentiated approaches into instructional planning to accommodate variations in learners' needs and abilities. DI also supports learner motivation, confidence, and academic achievement by aligning instruction with individual strengths and learning needs (Gyawali, 2023). Norman and Zoncita (2023) explored integrative and inclusive mainstream learning experiences involving special education, English as a Second Language, and regular students in STEM education. Their work provides a relevant perspective on inclusive learning environments that accommodate students with diverse educational backgrounds and learning needs. Flexible grouping and targeted instruction enable teachers to address learning difficulties while maintaining supportive classroom interactions (Özgüler, 2024). Similarly, responsive lesson design and varied instructional activities promote engagement and inclusivity (Cagape et al., 2023). Differentiated content promotes accessibility by providing alternative instructional formats and learning materials, while varied assessment outputs support learners' communication and demonstration of understanding (Aquino & De Guzman, 2021). Instructional support aligned with learners' developmental readiness further promotes confidence and academic growth (Labordo Jr, 2024). The integration of PBL and DI combines authentic learning experiences with flexible instructional support. Differentiation allows learners to participate meaningfully in projects according to their abilities while engaging in inquiry, analysis, and problem-solving (Fidiasih, Triwahyuni and Emyus, 2025). Effective integration requires purposeful instructional planning, higher-order questioning, formative assessment, collaboration, feedback, reflection, and continuous teacher development. Agusdianita et al. (2024) examined the integration of problem-based learning materials with differentiated approaches to enhance elementary school students' learning outcomes. Their study provides relevant literature for combining problem-centered learning activities with instructional differentiation to address diverse learner needs. Critical thinking involves interconnected cognitive processes that enable learners to interpret information, evaluate evidence, solve problems, and make informed decisions. Evaluation strengthens learners' ability to assess information and formulate reasoned judgments (Viado, 2023), while creation encourages innovative solutions to authentic challenges (Viado, 2023). Remembering provides the foundational knowledge necessary for higher-order cognition (Lopez et al., 2023), whereas understanding enables learners to interpret concepts and connect information across contexts (Enecillo-Cabacang, 2023). Collectively, these findings indicate that PBL and DI can support critical thinking when teachers provide authentic tasks, responsive instruction, collaborative opportunities, and appropriate learning support.

International research provides substantial evidence supporting learner-centered approaches, although their effectiveness varies across instructional contexts. A systematic review found generally positive effects of problem-based and project-based learning on critical and higher-order thinking, particularly when learners engaged in authentic inquiry, collaboration, and knowledge application. However, differences in the measurement of critical thinking highlighted the need for more rigorous investigations (Loyens et al., 2023). In Indonesia, the implementation of PBL among high school learners improved critical thinking and encouraged positive participation in project activities (Huda et al., 2024). Similarly, a Portuguese study involving first-year business students found improvements in critical-thinking difficulties and transferable competencies following PBL exposure (Dias-Oliveira et al., 2024). A meta-analysis likewise identified significant improvements in critical thinking and collaborative learning compared with traditional instruction (Zhang and Ma, 2023). These findings suggest that Project-Based Learning can provide meaningful opportunities for improving learners' cognitive engagement and higher-order thinking skills when supported by appropriate instructional strategies. Online PBL supported by scaffolding also improved critical thinking among engineering students, with greater gains observed when additional collaborative support was provided (Zhang and Ma, 2023). Research on DI similarly demonstrates positive outcomes. STEM-based differentiated instruction improved elementary learners' critical thinking through readiness-based tasks and flexible learning activities (Kristyowening et al., 2025). The integration of guided inquiry and differentiation also supported analytical thinking and problem-solving among junior high school learners (Ningsih et al., 2025). Within the Philippine educational context, Project-Based Learning remains relevant as a learner-centered instructional approach that encourages inquiry, active participation, and the development of higher-order thinking skills. Differentiated Instruction improved analytical thinking performance among Grade 7 Araling Panlipunan learners, although learners' perceptions of DI were not significantly related to their analytical thinking skills (Emralino, 2023). Contextualized problem-based learning materials also improved learners' performance in Earth and Space Science (Layawon, 2024), while DI produced favorable academic outcomes and learning attitudes among Grade 9 Filipino learners (Pinaranda and Sario, 2024). Additional Philippine studies demonstrated the contribution of authentic problem-solving to learners' analytical reasoning, evaluation, creativity, and decision-making (Banzon et al., 2025). PBL also supported learner engagement, self-direction, and collaboration, although implementation depended on teacher facilitation and instructional resources (Dacumos and Silva, 2023). Research involving B'laan learners identified socioeconomic and cultural challenges affecting participation in project-based activities (Aguhayon, Tingson, and Pentang, 2023). Meanwhile, differentiated mathematics instruction increased motivation and accessibility but required careful

planning to address diverse learning needs (Aguhayon, Tingson, and Pentang, 2023). Evidence supporting the integration of both approaches was provided by Putri, Rachmadiarti, and Kuntjoro (2023), who found that PBL combined with differentiation significantly improved Grade 7 learners' critical thinking through authentic projects adapted to individual characteristics. Nevertheless, research findings are not uniformly positive. A meta-analysis involving medical students found no significant difference between PBL and conventional instruction in critical-thinking and knowledge outcomes (Manuaba, No, and Wu, 2022). Other investigations emphasized that PBL effectiveness depends on instructional design, facilitation, assessment, and educational context (Lu, Mustakim, and Muhamad, 2025). These findings establish the importance of examining actual classroom implementation rather than assuming that learner-centered strategies automatically improve critical thinking. Within Dagohoy District, such investigation can provide localized evidence to guide teacher development and instructional improvement.

The study is primarily anchored in Piaget's Constructivist Theory (1981), which explains that learners actively construct knowledge through experiences, interactions, and reflection rather than passive information reception (Galang, 2024). This perspective supports PBL through authentic inquiry and DI through learning experiences responsive to individual abilities and prior knowledge. Meaningful tasks and authentic assessments further encourage knowledge construction and critical thinking (Saldivar, 2025). Vygotsky's Social Constructivist Theory (1987) emphasizes the development of knowledge through communication, collaboration, and social interaction (Galang, 2024). This perspective supports collaborative projects, peer discussions, and teacher-facilitated learning that enable learners to examine perspectives, evaluate arguments, and construct shared understanding (Bagay et al., 2023; Pimentel, 2024). Tomlinson's Differentiated Instruction Theory (1999) emphasizes adapting instructional content, processes, products, and learning environments to accommodate learner diversity (Bunga, Olano, and Morga, 2025). Flexible instructional pathways enable learners with different abilities and readiness levels to achieve common learning objectives (Labordo Jr., 2024). Bloom's Taxonomy (1956) provides the cognitive framework for assessing learners' critical thinking through remembering, understanding, applying, analyzing, evaluating, and creating (Asuncion, Lorenzo, and Aguillon, 2026). PBL encourages higher-order cognitive processes through authentic problem-solving, while DI provides appropriate support for learners progressing toward more complex thinking. Kolb's (2007) Experiential Learning Theory explains learning through experience, reflection, conceptualization, and application (Caramay and Cruz, 2023). PBL operationalizes these processes through practical projects, while DI provides flexible learning experiences suited to individual needs (Caramay & Cruz, 2023; Ardizzone, 2023). Dewey's (1974) Inquiry-Based Learning Theory emphasizes questioning, investigation, evidence gathering, and conclusion development (Calara, Gabriel, and Mendoza, 2024). Guided inquiry and differentiated support promote analytical reasoning, intellectual independence, and deeper understanding (Presnillo & Aliasas, 2023; Bogador et al., 2024). Vygotsky's (2011) Zone of Proximal Development explains how learners progress through guidance and scaffolding appropriate to their current capabilities (Lundgren, 2023). This principle supports differentiated learning tasks, teacher assistance, and collaborative activities that gradually develop independent problem-solving (Montano & Banlasan, 2023). Barrows' (1986) Problem-Based Learning Theory emphasizes learning through investigating authentic and complex problems (Franco and Caballes, 2024). Its focus on evidence evaluation, decision-making, and solution development reinforces the critical-thinking processes promoted through project-based activities (Dacumos & Silva, 2023; Bagay et al., 2023). These instructional approaches also support the development of transferable competencies needed in contemporary education (Thornhill-Miller et al., 2023; Adeoye et al., 2024). The study is further supported by international and Philippine educational policies. The UNESCO Convention Against Discrimination in Education promotes equitable educational opportunities and inclusive participation (Daskou & Tzokas, 2020), consistent with broader efforts to provide quality education for underserved learners (Placanica and Sgambelluri, 2024). Article XIV, Sections 1 and 2 of the 1987 Philippine Constitution establishes the State's responsibility to provide accessible and quality education (Uy & Ocampo, 2023). Its provisions also support comprehensive, community-responsive, and practical learning opportunities (Manalastas, 2025). Republic Act No. 10533, or the Enhanced Basic Education Act of 2013, promotes learner-centered, inclusive, contextualized, and developmentally appropriate instruction (Violon & Violon, 2024). Its emphasis on curriculum flexibility and teacher development supports innovative instructional practices (Navarro et al., 2024). Republic Act No. 9155, or the Governance of Basic Education Act of 2001, strengthens school-level decision-making and instructional responsiveness to community needs (Uy & Ocampo, 2023). School-based management and shared governance also support localized instructional improvement (Navarro et al., 2024). DepEd Order No. 21, s. 2019 promotes inclusive, flexible, and contextualized K to 12 instruction aligned with 21st-century competencies (Barrot, 2023). Its provisions on instructional support, teacher training, and authentic learning reinforce the implementation of learner-centered strategies (Barrot, 2023). Collectively, these theoretical and policy foundations support examining PBL and DI as instructional practices associated with learners' critical thinking development.

Existing literature generally supports the contribution of Project-Based Learning and Differentiated Instruction to learner engagement, academic performance, collaboration, and critical thinking. However, research also indicates that their effectiveness varies according to instructional design, teacher competence, learner characteristics,

resources, and educational context. Although several studies investigated PBL or DI independently, fewer examined their complementary implementation in relation to multiple dimensions of critical thinking. Evidence on integrated instruction suggests favorable outcomes (Putri, Rachmadiarti, and Kuntjoro, 2023), while inconsistent findings regarding PBL emphasize the need for context-specific assessment (Manuaba, No, and Wu, 2022; Lu, Mustakim, and Muhamad, 2025). The present study addresses this gap by examining teachers' implementation of PBL in terms of enhanced engagement, improved knowledge and retention, development of 21st-century skills, real-world application, and social-emotional learning. DI implementation is assessed through lesson design and implementation, content, procedures, communication, and learning. Learners' critical thinking skills are evaluated through remembering, understanding, applying, analyzing, evaluating, and creating. The study also considers the demographic and professional profiles of school heads and teachers, including educational attainment, professional experience, position, and relevant training. It determines whether a statistically significant relationship exists between teachers' implementation of PBL and DI and learners' critical thinking skills. The null hypothesis states that there is no statistically significant relationship between the implementation of Project-Based Learning and Differentiated Instruction and learners' critical thinking skills. By focusing on selected public elementary schools in Dagohoy District during School Year 2026–2027, the study seeks to provide localized empirical evidence that can inform an enhanced Learning and Development program for teachers.

The study is principally aligned with Sustainable Development Goal 4 (Quality Education), which emphasizes inclusive, equitable, and quality education and lifelong learning opportunities. Its focus on Project-Based Learning, Differentiated Instruction, and critical thinking directly supports the development of meaningful learning experiences responsive to diverse learner needs. PBL contributes to quality education by engaging learners in authentic inquiry, collaboration, and practical problem-solving, while DI promotes equitable participation through instructional adjustments based on individual readiness and learning needs. Together, these approaches support educational inclusion and the development of competencies necessary for continued learning. The study particularly relates to SDG 4.7 through its emphasis on critical thinking, informed decision-making, and the application of knowledge to real-world and community concerns. Its proposed enhanced Learning and Development program also supports the broader objective of strengthening teacher competencies and instructional quality. The study has a secondary connection to SDG 10 (Reduced Inequalities) through differentiated instructional practices that address disparities in learning opportunities among students with different abilities, socioeconomic circumstances, and educational needs. This connection is consistent with the study's emphasis on inclusive instruction and equitable learner participation. These alignments reflect the study's contribution to improving educational access, instructional responsiveness, and the quality of learning within the public elementary school context.

The study contributes primarily to educational sustainability by examining instructional practices that strengthen critical thinking, learner engagement, and meaningful knowledge application. Its findings may support continuous improvement in teaching quality and the development of learners capable of addressing academic and practical challenges. From a social sustainability perspective, Differentiated Instruction promotes inclusion by accommodating differences in readiness, abilities, and learning needs. Project-Based Learning complements this approach by developing collaboration, communication, shared responsibility, and problem-solving competencies that support constructive participation in communities. The study also contributes to institutional and policy sustainability by providing evidence that may guide educational policymakers, DepEd officials, curriculum developers, and school heads in improving instructional programs, teacher professional development, resource allocation, and school-based educational planning. The proposed enhanced Learning and Development program provides a practical mechanism for translating research findings into sustained instructional improvement. At the community level, authentic project-based activities encourage learners to connect classroom knowledge with local concerns and participate in meaningful problem-solving. These experiences may strengthen school-community relationships and promote the application of academic competencies beyond the classroom. The study further supports professional sustainability by identifying areas in which teachers may require additional training, instructional guidance, and professional support. Strengthening teachers' capacity to implement learner-centered approaches can contribute to more responsive and inclusive educational practices. Ultimately, the study seeks to advance educational, social, community, and institutional sustainability by examining how Project-Based Learning and Differentiated Instruction relate to learners' critical thinking skills. Its findings are intended to inform an enhanced teacher Learning and Development program that promotes instructional quality, equitable learning opportunities, and the continuous improvement of public elementary education in Dagohoy District, Schools Division of Bohol.

2. Material and methods

2.1 Research Design

The study utilized a quantitative descriptive-survey research design with a correlational approach to determine the extent of teachers' implementation of Project-Based Learning and Differentiated Instruction and examine their relationship with learners' critical thinking skills. The descriptive component assessed existing instructional

practices and learner outcomes without manipulating the study variables, while the correlational component examined the direction, strength, and statistical significance of the relationships among these variables. The research was guided by the Input-Process-Output Model. The inputs included the demographic and professional profiles of school heads and teachers, the perceived implementation of PBL and DI, and the assessed level of learners' critical thinking skills. The process involved instrument validation, securing research permissions, administering questionnaires, organizing responses, and conducting statistical analyses. The expected output was a proposed Learning and Development Program designed to strengthen teachers' instructional competencies and improve learner outcomes.

2.2 Locale of the Study

The study was conducted in Dagohoy District, Schools Division of Bohol, located in the Municipality of Dagohoy, Province of Bohol, approximately 72 kilometers from Tagbilaran City. The municipality is predominantly rural, with agriculture serving as a primary livelihood. Its public schools provide educational services to learners from different barangays and implement instructional programs responsive to diverse educational needs. Three public elementary schools representing different school-size classifications were selected: Dagohoy Central Elementary School in Barangay Poblacion, representing large schools; San Miguel Elementary School in Barangay San Miguel, representing medium-sized schools; and La Esperanza Elementary School in Barangay La Esperanza, representing small schools. Dagohoy Central Elementary School is situated in the municipality's administrative and commercial center, while San Miguel and La Esperanza Elementary Schools serve predominantly agricultural communities. The selection of these schools provided varied educational settings characterized by differences in learner populations, instructional resources, class sizes, and teacher-learner interactions. Their inclusion allowed the researcher to examine PBL and DI implementation across different school contexts and generate findings relevant to instructional improvement and teacher professional development within the district.

2.3 Respondents of the Study

The study involved 58 respondents comprising three school heads and 55 teachers from the selected public elementary schools in Dagohoy District. Dagohoy Central Elementary School contributed one school head and 25 teachers, totaling 26 respondents or approximately 45% of the sample. San Miguel Elementary School contributed one school head and 20 teachers, totaling 21 respondents or approximately 36%, while La Esperanza Elementary School contributed one school head and 10 teachers, totaling 11 respondents or approximately 19%. School heads were included because of their responsibilities in instructional supervision, program monitoring, and professional support. Teachers were selected as the primary implementers of PBL and DI and as sources of information regarding instructional practices and learners' critical thinking skills. Their participation provided perspectives on the implementation of learner-centered instruction across different school environments. Learners were the subjects of the critical thinking assessment, which was based on the perceptions and observations of the participating school personnel.

2.4 Sample and Sampling Procedure

The study employed purposive sampling in identifying the participating schools and respondents with relevant knowledge and experience concerning PBL, DI, and learners' critical thinking skills. Three public elementary schools were selected to represent large, medium, and small school categories within Dagohoy District. This selection considered differences in instructional conditions, available resources, and learner populations. For teacher selection, the study utilized stratified random sampling, with the participating schools serving as strata. Teachers were grouped according to their respective schools, and the required number of respondents was determined for each group. Qualified teachers were then randomly selected within their respective strata to provide equal opportunities for participation. The sample comprised 25 teachers from Dagohoy Central Elementary School, 20 from San Miguel Elementary School, and 10 from La Esperanza Elementary School. All three school heads were included, resulting in 58 respondents. This sampling procedure was intended to obtain relevant information from school personnel across different school-size classifications while ensuring representation of the selected educational settings.

2.5 Research Instrument

The study utilized a modified survey questionnaire consisting of four described parts designed to gather information on respondents' demographic characteristics, teachers' implementation of PBL and DI, and learners' critical thinking skills. The first part was a researcher-developed questionnaire covering the demographic and professional profiles of school heads and teachers, including age, gender, highest educational attainment, length of school leadership or teaching experience, current position or rank, and number of professional development trainings attended. The second part consisted of 50 researcher-developed items assessing the perceived implementation of Project-Based Learning across five dimensions: enhanced engagement, improved knowledge and retention, development of 21st-century skills, real-world application, and social-emotional learning. The checklist was answered by school heads and teachers. The third part contained 50 items measuring teachers' implementation of Differentiated Instruction in terms of lesson design and implementation, content, procedures, communication, and learning. This section was adapted and modified from James (2009) and employed a four-

point Likert scale answered by school heads and teachers. The fourth part comprised 36 items assessing learners' critical thinking skills across six cognitive dimensions: analyzing, evaluating, creating, remembering, understanding, and applying. The instrument was adapted and modified from Kobylarek et al. (2022) and used a four-point Likert scale to obtain respondents' assessments of learners' cognitive competencies. The questionnaire underwent expert validation to establish content relevance, clarity, comprehensiveness, organization, and appropriateness. Experts in educational research, instructional supervision, and curriculum implementation evaluated the instrument, and necessary revisions were incorporated. Following validation, pilot testing was conducted among five school heads and 10 teachers from Carmen III District who possessed characteristics comparable to the intended respondents. The pilot test assessed the instrument's clarity, practicality, and reliability while identifying items requiring revision. Cronbach's Alpha Coefficient was employed to determine internal consistency, with a coefficient of 0.70 or higher considered an acceptable reliability threshold. The results of expert validation and pilot testing guided the refinement of the final questionnaire.

2.6 Data Gathering Procedure

Data collection followed three sequential phases involving preliminary preparation, questionnaire administration, and post-data-gathering activities. During the preliminary phase, the researcher consulted the research adviser to review the study objectives, methodology, and research design. After incorporating the recommendations, an endorsement was secured from the Dean of the Graduate School. Formal permission requests were subsequently submitted to the Schools Division Superintendent of Bohol, relevant district officials, the Public Schools District Supervisor of Dagohoy District, and the school heads of the participating institutions. The validated questionnaire and sampling procedures were finalized before data collection. During the data-gathering phase, the researcher coordinated with participating school heads to establish schedules that accommodated respondents' availability and minimized disruptions to school operations. Before administering the questionnaires, respondents were oriented on the study's objectives, significance, procedures, and instructions. They were informed of the voluntary nature of participation and assured of confidentiality and anonymity. The questionnaires were then distributed, with sufficient time provided for completion. The researcher clarified instructions when necessary without influencing respondents' answers. Completed questionnaires were retrieved and initially examined for completeness and consistency. During the post-data-gathering phase, accomplished questionnaires were reviewed for accuracy, legibility, completeness, and suitability for analysis. Responses were coded, classified, encoded, and organized for statistical processing. The collected data were analyzed and interpreted according to the research objectives, and the findings served as the basis for conclusions, recommendations, and the proposed Learning and Development Program for teachers.

2.7 Data Analysis Techniques

The study employed descriptive and inferential statistical techniques to analyze respondents' demographic characteristics, the implementation of PBL and DI, and learners' critical thinking skills. Frequency counts and percentages were used to describe respondents according to age, gender, educational attainment, length of leadership or teaching experience, current position or rank, and professional development training attended. Weighted means were computed to determine the perceived levels of PBL and DI implementation and learners' critical thinking skills using a four-point Likert scale. For PBL and DI, mean scores ranging from 3.25 to 4.00 were interpreted as Highly Evident, 2.50 to 3.24 as Moderately Evident, 1.75 to 2.49 as Less Evident, and 1.00 to 1.74 as Not Evident. For learners' critical thinking skills, corresponding ranges were interpreted as Very Satisfactory, Satisfactory, Fair, and Poor, respectively. Standard deviation was also computed to determine the variability and consistency of respondents' ratings. Before conducting correlational analysis, composite scores were examined for normality and compliance with the assumptions of parametric testing. Pearson Product-Moment Correlation Coefficient (r) was employed to determine the direction, strength, and statistical significance of the relationships between teachers' implementation of PBL and DI and learners' critical thinking skills when parametric assumptions were satisfied. When the data were ordinal or did not satisfy the assumptions for Pearson correlation, Spearman Rank-Order Correlation Coefficient (ρ) was utilized as a nonparametric alternative. Both correlation techniques were intended to determine whether statistically significant associations existed between instructional implementation and learners' critical thinking skills. The results provided the empirical basis for addressing the research hypothesis and formulating recommendations for instructional improvement.

2.8 Ethical Considerations

The study observed ethical principles governing educational research, particularly voluntary participation, informed consent, confidentiality, anonymity, and the protection of respondents' rights and welfare. Necessary administrative permissions were secured before data collection, and respondents were informed of the research purpose, procedures, and their role in providing information. Respondents were assured that their identities would remain anonymous and that all collected information would be treated confidentially and used exclusively for academic and research purposes. Data were not disclosed to unauthorized individuals or institutions. The researcher also ensured that questionnaire administration was conducted without coercion or interference with respondents' regular professional responsibilities. These ethical safeguards were intended to protect participants, encourage honest responses, and maintain the integrity and credibility of the research process.

3. Results and Discussion

3.1 Demographic and Professional Profiles of Respondents

3.1.1 Age of Respondents

The findings revealed that most respondents were aged 41–50 years, comprising 31 individuals (53.45%), including two school heads and 29 teachers. This was followed by respondents aged 31–40 years (22.41%), 51–60 years (17.24%), and 21–30 years (6.90%). No respondent was aged 61 years or above. The results indicate that the participating schools were predominantly staffed by middle-aged education professionals. This age distribution suggests that most respondents had accumulated considerable professional experience relevant to instructional planning, classroom management, and school leadership. The findings are consistent with Pinaranda and Sario (2024), who emphasized that middle-aged educators generally demonstrate professional maturity, instructional confidence, adaptability, and sustained commitment to professional development.

3.1.2 Gender of Respondents

Female respondents accounted for 52 individuals (89.66%), comprising two school heads and 50 teachers. Male respondents represented six individuals (10.34%), consisting of one school head and five teachers. The findings demonstrate the predominance of female educators in the participating schools. This distribution reflects the substantial participation of women in elementary education and school leadership. Dacumos and Silva (2023) similarly observed that Philippine public elementary schools are predominantly staffed by female educators who perform important responsibilities in instruction, school management, learner support, and educational improvement.

3.1.3 Highest Educational Attainment

The largest group of respondents had earned units toward a master's degree (34.48%), followed by master's degree graduates (25.86%), bachelor's degree holders (24.14%), respondents with doctoral units (12.07%), and doctorate degree graduates (3.45%). Among the school heads, one held a doctorate degree, one had doctoral units, and one had master's degree units. Among teachers, the largest group consisted of 19 respondents with master's degree units. These findings indicate considerable participation in graduate-level education and continuing professional advancement. Zhang and Ma (2023) emphasized that academic and professional development strengthens educators' instructional knowledge and exposure to research-based teaching approaches. Such preparation is relevant to implementing PBL and DI, which require appropriate instructional planning and responsiveness to diverse learning needs.

3.1.4 Years of Professional Experience

Most respondents had 11–20 years of professional experience (41.38%), followed by those with 21–30 years (31.03%), 10 years or less (25.86%), and at least 31 years (1.72%). Among school heads, two had 21–30 years of experience, while one had 11–20 years. Among teachers, the largest group consisted of 23 respondents with 11–20 years of teaching experience. The findings suggest that the participating schools had an experienced workforce with substantial exposure to instructional and administrative responsibilities. Zhang and Ma (2023) emphasized that professional experience contributes to instructional effectiveness, classroom management, decision-making, and responsiveness to learners' needs. Experienced educators may also strengthen school improvement through mentoring and professional collaboration.

3.1.5 Current Position or Rank

Most respondents occupied the Head Teacher II/Teacher III category, comprising 43 individuals (74.14%). Seven respondents (12.07%) belonged to the OIC/TIC/SIC/Teacher I category, while the remaining respondents occupied other teaching and administrative ranks. Among the school heads, two served in officer-in-charge, teacher-in-charge, or school-in-charge capacities, while one held the Principal I position. The findings indicate that the participating schools relied substantially on experienced classroom teachers and designated school leaders. Enecillo-Cabacang (2023) emphasized that professional rank reflects career progression, instructional responsibilities, leadership capacity, and organizational conditions in public schools. The predominance of Teacher III respondents highlights their important roles in curriculum implementation, mentoring, and instructional improvement.

3.1.6 Professional Development Training

The findings showed that 26 respondents (44.83%) had attended four to five professional development trainings, 16 (27.59%) had attended two to three, nine (15.52%) had attended six to seven, and seven (12.07%) had attended eight or more. All three school heads had participated in at least eight trainings, while the largest group of teachers had attended four to five. No respondent reported attending only zero to one training. These results indicate active participation in continuing professional development. Lopez et al. (2023) emphasized that sustained professional training strengthens instructional competence, leadership effectiveness, and educators' capacity to implement educational innovations. Such participation provides opportunities to improve pedagogical knowledge, instructional strategies, and responsiveness to changing educational demands.

3.2 Teachers' Implementation of Project-Based Learning

3.2.1 Enhanced Learner Engagement

PBL implementation in terms of enhanced engagement obtained an overall weighted mean (WM) of 3.18 and standard deviation (SD) of 0.592, interpreted as Moderately Evident. School heads rated this dimension Highly Evident (WM = 3.30, SD = 0.546), while teachers rated it Moderately Evident (WM = 3.06, SD = 0.638). Learner autonomy received the highest combined rating (WM = 3.54), whereas establishing teamwork norms and communication support obtained the lowest (WM = 2.91). The findings indicate that teachers frequently encouraged learner independence but demonstrated less consistent implementation of collaborative structures. Nayak, Satpathy, and Jain (2024) emphasized that meaningful tasks, learner autonomy, collaboration, and continuous feedback are essential to effective PBL. The results therefore highlight learner autonomy as a strength and teamwork and communication as areas requiring further instructional attention.

3.2.2 Improved Knowledge Retention

The implementation of PBL in improving knowledge retention obtained an overall weighted mean of 3.24 and standard deviation of 0.577, interpreted as Moderately Evident. School heads rated the dimension Highly Evident (WM = 3.47), while teachers rated it Moderately Evident (WM = 3.01). Hands-on activities, group discussions, and problem-solving exercises received the highest combined rating (WM = 3.53), followed by continuous feedback (WM = 3.46). Encouraging deeper engagement with learning materials received the lowest rating (WM = 2.94). These findings demonstrate the frequent use of active learning and feedback to reinforce understanding. Sah, Sasikirana, and Pujani (2024) emphasized that authentic, collaborative, and inquiry-based activities strengthen knowledge acquisition and retention. However, the comparatively lower rating for deeper engagement indicates the need to strengthen learners' sustained interaction with instructional content.

3.2.3 Development of 21st-Century Skills

PBL implementation in developing 21st-century skills was Highly Evident, with an overall weighted mean of 3.45 and standard deviation of 0.509. School heads recorded a weighted mean of 3.53, while teachers obtained 3.36. Designing open-ended projects requiring critical thinking and communicating findings through multimedia or written reports received the highest combined ratings (WM = 3.65 each). Creative problem-solving obtained the lowest combined rating (WM = 3.29), although it remained Highly Evident. The findings demonstrate strong emphasis on critical thinking, communication, and practical problem-solving. These findings suggest that Project-Based Learning provides opportunities to develop essential 21st-century competencies through authentic, collaborative, and inquiry-based learning experiences. The comparatively lower rating for creative problem-solving suggests opportunities to strengthen learners' ability to generate original ideas and explore alternative solutions.

3.2.4 Real-World Application

PBL implementation in terms of real-world application obtained an overall weighted mean of 3.26 and standard deviation of 0.567, interpreted as Highly Evident. School heads recorded a weighted mean of 3.33, while teachers obtained 3.18. Projects addressing environmental sustainability, local history, or public health received the highest combined rating (WM = 3.46), whereas hands-on prototyping obtained the lowest (WM = 3.10). The findings indicate that teachers frequently connected classroom activities with authentic community concerns but provided fewer opportunities for learners to develop practical prototypes. Dacumos and Silva (2023) emphasized that contextualized projects strengthen the relevance of learning by connecting academic knowledge with real-world situations. Additional opportunities to design, test, and refine solutions may strengthen this dimension of PBL implementation.

3.2.5 Social-Emotional Learning

PBL implementation in terms of social-emotional learning was Highly Evident, with an overall weighted mean of 3.34 and standard deviation of 0.637. School heads recorded a weighted mean of 3.43, while teachers obtained 3.24. Encouraging respect for cultural differences and learning from others' backgrounds received the highest combined rating (WM = 3.47). Group collaboration and socially relevant projects also received high assessments. These findings indicate that PBL activities incorporated cooperation, cultural awareness, and social responsibility. Dacumos and Silva (2023) emphasized that collaborative learning experiences support interpersonal development and shared responsibility. The results suggest that project activities provide opportunities to strengthen empathy, teamwork, and constructive interaction among learners.

3.2.6 Overall Implementation of Project-Based Learning

The overall implementation of PBL was Highly Evident, with a weighted mean of 3.29 and standard deviation of 0.6074. School heads recorded a higher assessment (WM = 3.41) than teachers (WM = 3.17). Development of 21st-century skills received the highest combined rating (WM = 3.45), followed by social-emotional learning (3.34), real-world application (3.26), knowledge retention (3.24), and enhanced engagement (3.18). The findings demonstrate that PBL was generally implemented across the participating schools, particularly in developing 21st-

century competencies. Atmojo et al. (2025) characterized PBL as an instructional approach that supports cognitive, social, emotional, and practical learning through meaningful activities. Nevertheless, the moderate assessments of learner engagement and knowledge retention identify areas for further improvement.

3.3 Teachers' Implementation of Differentiated Instruction

3.3.1 Lesson Design and Implementation

DI implementation in lesson design and implementation was Highly Evident, with an overall weighted mean of 3.56 and standard deviation of 0.485. School heads recorded a weighted mean of 3.73, while teachers obtained 3.39. Varied learning activities, multisensory approaches, and the use of learner achievement data received high assessments, indicating frequent application of flexible instructional strategies. These findings demonstrate teachers' attention to differences in learners' readiness, abilities, and learning needs. Gyawali (2023) emphasized that effective differentiated lesson planning considers learners' readiness, interests, and learning profiles. The high implementation rating suggests that teachers generally employed learner-responsive approaches in planning and delivering instruction.

3.3.2 Differentiation of Instructional Content

Differentiation of instructional content received an overall weighted mean of 3.63 and standard deviation of 0.455, interpreted as Highly Evident. School heads recorded a weighted mean of 3.73, while teachers obtained 3.53. Content differentiation received the highest overall assessment among the five DI dimensions. The findings indicate that adapting instructional content was a prominent differentiated teaching practice. Gyawali (2023) emphasized that effective content differentiation involves adjusting learning materials and instructional presentations according to learners' readiness, interests, and abilities. Such adaptations support accessibility and meaningful understanding among learners with diverse educational needs.

3.3.3 Differentiation of Instructional Procedures

Differentiated instructional procedures obtained an overall weighted mean of 3.56 and standard deviation of 0.486. School heads recorded a weighted mean of 3.64, while teachers obtained 3.47. Both respondent groups rated this dimension Highly Evident. The source's consolidated summary, however, described the combined assessment as Moderately Evident despite its numerical score. The findings indicate frequent use of varied instructional procedures to address differences in learning pace and ability. Özgüler (2024) emphasized that effective differentiation requires flexible teaching strategies, appropriate learning support, and responsiveness to individual differences. Such practices allow teachers to adjust instructional processes while maintaining meaningful learner participation.

3.3.4 Differentiated Communication

Differentiated communication obtained an overall weighted mean of 3.61 and standard deviation of 0.457, interpreted as Highly Evident. School heads recorded a weighted mean of 3.83, while teachers obtained 3.39. Communication ranked second among the five DI dimensions. These results suggest that teachers frequently employed communication practices supporting interaction, participation, and instructional responsiveness. Cagape et al. (2023) emphasized that effective classroom communication contributes to inclusive learning environments by strengthening understanding, feedback, and learner engagement.

3.3.5 Differentiation of Learning Experiences

Differentiation of learning experiences obtained an overall weighted mean of 3.38 and standard deviation of 0.485, interpreted as Highly Evident. School heads recorded a weighted mean of 3.33, while teachers obtained 3.43. Although this dimension received the lowest combined assessment among the five DI components, its implementation remained Highly Evident. The findings indicate that teachers generally provided learning experiences responsive to learners' abilities and readiness. These findings suggest that differentiated learning experiences are strengthened when instructional activities and learning support are aligned with learners' individual abilities, readiness levels, and educational needs. The comparatively lower assessment identifies differentiated learning experiences as an area for continued instructional development.

3.3.6 Overall Implementation of Differentiated Instruction

The overall implementation of DI was Highly Evident, with a weighted mean of 3.55 and standard deviation of 0.474. School heads recorded a weighted mean of 3.65, while teachers obtained 3.44. Content received the highest rating (WM = 3.63), followed by communication (3.61), lesson design and implementation (3.56), procedures (3.56), and learning (3.38). These findings demonstrate that DI was consistently implemented across its major dimensions. Gyawali (2023) emphasized that differentiated teaching promotes learner-responsive instruction through flexible lesson planning, content adaptation, instructional processes, communication, and assessment. The results indicate strong implementation, particularly in content and communication, while differentiated learning experiences remain an area for improvement.

3.4 Assessment of Learners' Critical Thinking Skills

3.4.1 Creating Skills

Learners' creating skills obtained an overall weighted mean of 2.31 and standard deviation of 0.538, interpreted as Fair. School heads recorded a weighted mean of 2.17, while teachers obtained 2.45. Discussing new meanings in familiar texts received the highest combined rating (WM = 2.72), whereas developing prototypes or models of solutions received the lowest (WM = 1.97). The findings indicate limited performance in generating original ideas and producing innovative solutions. Creating represents a higher-order cognitive process that involves synthesizing information, generating original ideas, and developing meaningful outputs. The findings suggest that learners require additional opportunities to engage in creative problem-solving and produce innovative solutions. The results highlight the need for learning activities that engage learners in creative problem-solving, project development, and solution generation.

3.4.2 Evaluating Skills

Learners' evaluating skills obtained an overall weighted mean of 2.58 and standard deviation of 0.704, interpreted as Satisfactory. School heads rated this dimension Fair (WM = 2.39), while teachers rated it Satisfactory (WM = 2.76). The findings indicate developing abilities to examine information, assess ideas, and formulate judgments. These results suggest that learners possessed foundational evaluative thinking skills but required further development in evidence-based reasoning. Viado (2023) emphasized that evaluating involves examining the credibility, accuracy, and relevance of information before reaching conclusions. Strengthening opportunities to assess evidence and justify judgments may support further development of this competency.

3.4.3 Analyzing Skills

Learners' analyzing skills obtained an overall weighted mean of 2.61 and standard deviation of 0.519, interpreted as Satisfactory. School heads recorded a weighted mean of 2.50, while teachers obtained 2.72. The results indicate that learners demonstrated developing abilities to examine information, identify relationships, and interpret relevant details. The findings suggest that learners possessed basic analytical competencies that could be strengthened through more demanding cognitive activities. Viado (2023) emphasized that analytical thinking develops through inquiry-based, collaborative, and reflective learning experiences. Activities involving information comparison, evidence examination, and identification of relationships may further support analytical development.

3.4.4 Applying Skills

Learners' applying skills obtained an overall weighted mean of 3.04 and standard deviation of 0.732, interpreted as Satisfactory. School heads rated this dimension Very Satisfactory (WM = 3.33), while teachers rated it Satisfactory (WM = 2.75). The results indicate that learners generally demonstrated the ability to use acquired knowledge in practical learning situations. The findings reflect learners' developing capacity to transfer classroom knowledge to meaningful tasks. Lopez et al. (2023) emphasized that authentic and learner-centered activities strengthen knowledge application by connecting instruction with real-life situations. Continued use of contextualized learning experiences may support more independent application and problem-solving.

3.4.5 Understanding Skills

Learners' understanding skills obtained an overall weighted mean of 3.24 and standard deviation of 0.716, interpreted as Satisfactory. School heads recorded a weighted mean of 3.44, interpreted as Very Satisfactory, while teachers obtained 3.03, interpreted as Satisfactory. Understanding ranked second among the six assessed cognitive dimensions. The findings indicate that learners generally demonstrated competence in interpreting information and explaining concepts. Enecillo-Cabacang (2023) emphasized that understanding develops through active participation, collaborative interaction, and meaningful knowledge construction. These foundational competencies provide support for more complex cognitive processes, including analysis and evaluation.

3.4.6 Remembering Skills

Remembering received the highest assessment among the six cognitive dimensions, with an overall weighted mean of 3.55 and standard deviation of 0.372, interpreted as Very Satisfactory. School heads recorded a weighted mean of 3.89, while teachers obtained 3.20. The findings indicate strong learner performance in recalling, recognizing, and retrieving previously learned information. The results demonstrate that remembering was the most developed assessed cognitive competency. Remembering serves as a foundational cognitive process that supports the development of more complex thinking skills, including understanding, applying, analyzing, evaluating, and creating. However, strong knowledge recall does not necessarily indicate equivalent proficiency in more complex thinking processes.

3.4.7 Overall Assessment of Critical Thinking Skills

Learners' overall critical thinking skills were assessed as Satisfactory, with a weighted mean of 2.89 and standard deviation of 0.597. School heads recorded a weighted mean of 2.95, while teachers obtained 2.82. Remembering received the highest combined rating (WM = 3.55), followed by understanding (3.24), applying (3.04), analyzing

(2.61), evaluating (2.58), and creating (2.31). Creating was the only dimension assessed as Fair. The findings reveal stronger performance in foundational cognitive processes than in higher-order thinking, particularly creating. Zhang and Ma (2023) emphasized that critical thinking develops through learning experiences requiring progressively more complex cognitive engagement. The results highlight the importance of activities that strengthen analysis, evaluation, independent reasoning, and the generation of original solutions.

3.5 Relationships Between Instructional Practices and Learners' Critical Thinking Skills

3.5.1 Relationship Between Project-Based Learning and Critical Thinking Skills

Spearman's rank-order correlation was used because PBL scores did not satisfy the normality assumption. The analysis yielded a correlation coefficient of $\rho = -0.156$ and a p-value of 0.256. Since the p-value exceeded the 0.05 significance level, the relationship was not statistically significant, and the null hypothesis was not rejected. The coefficient indicates a very weak negative association between reported PBL implementation and learners' critical thinking skills. The non-significant relationship does not establish that PBL is ineffective but indicates that its reported implementation was not significantly associated with critical thinking in the study sample. Zhang and Ma (2023) emphasized the importance of scaffolding, collaboration, and feedback in maximizing PBL outcomes. Similarly, Manuaba, No, and Wu (2022) found no statistically significant difference between PBL and conventional instruction in critical-thinking and knowledge assessments. Lu, Mustakim, and Muhamad (2025) highlighted the influence of instructional context and implementation quality on cognitive development. Although Zhang and Ma (2023) reported generally positive effects of PBL on learning outcomes, these effects varied according to instructional conditions and learner characteristics. Lu, Mustakim, and Muhamad (2025) likewise identified differences in PBL outcomes across educational settings. These findings indicate that critical-thinking development may depend on the quality of project design, instructional guidance, learner readiness, and opportunities for higher-order reasoning rather than the extent of PBL implementation alone.

3.5.2 Relationship Between Differentiated Instruction and Critical Thinking Skills

Pearson Product-Moment Correlation was used because DI and critical thinking scores approximately satisfied the normality assumption. The analysis yielded a correlation coefficient of $r = 0.268$ and a p-value of 0.048. Since the p-value was below the 0.05 significance level, the relationship was statistically significant, resulting in the rejection of the null hypothesis. The coefficient indicates a weak positive association between DI implementation and learners' critical thinking skills. The findings suggest that greater implementation of differentiated teaching practices tended to accompany higher assessments of critical thinking. Aguhayon, Tingson, and Pentang (2023) emphasized that DI addresses differences in learner readiness, interests, abilities, and learning profiles through flexible teaching strategies and appropriate instructional support. Although the observed relationship was weak, its statistical significance supports the relevance of differentiated instructional practices in promoting learners' cognitive development.

3.6 Implications for Instructional Improvement

3.6.1 Strengthening Project-Based Learning and Higher-Order Thinking

The findings demonstrated that PBL implementation was Highly Evident (WM = 3.29), while learners' critical thinking skills were Satisfactory (WM = 2.89). Creating skills received a Fair assessment (WM = 2.31), and the relationship between PBL implementation and critical thinking was not statistically significant ($\rho = -0.156$, $p = 0.256$). These results identify a difference between the reported extent of PBL implementation and learners' performance in higher-order cognitive processes. The findings provide a basis for strengthening PBL through authentic projects, collaborative inquiry, higher-order questioning, structured reflection, and formative assessment. Greater emphasis on analyzing information, evaluating alternatives, justifying decisions, and developing original solutions may help address the weaker cognitive dimensions identified in the study.

3.6.2 Strengthening Differentiated Instruction and Professional Development

DI implementation was Highly Evident (WM = 3.55) and demonstrated a statistically significant weak positive relationship with learners' critical thinking skills ($r = 0.268$, $p = 0.048$). Content differentiation received the highest assessment (WM = 3.63), while differentiation of learning experiences received the lowest (WM = 3.38). These results identify differentiated learning experiences as an area for continued professional development. The findings provide an empirical basis for strengthening teachers' competencies in differentiated lesson planning, scaffolding, flexible grouping, varied learning activities, authentic assessment, and instructional feedback. Sustained mentoring, coaching, collaborative planning, and professional learning activities may support more consistent implementation of learner-responsive instruction.

3.7 Proposed Learning and Development Program

3.7.1 Project DI-THINK

Based on the findings, the study proposed Project DI-THINK, a district-wide Learning and Development (L&D) Program intended to strengthen instructional leadership, improve teachers' implementation of PBL and DI, and develop learners' critical thinking skills. The proposed program includes Learning Action Cell sessions, training workshops, mentoring and coaching, classroom observations, demonstration teaching, collaborative lesson

planning, and action research. It is designed for implementation over one school year through preparation, capability building, school-based implementation, monitoring and technical assistance, and program evaluation and sustainability. The program responds to the satisfactory overall assessment of learners' critical thinking skills, particularly the weaker performance in analyzing, evaluating, and creating, and the significant positive relationship between DI implementation and critical thinking. Its proposed monitoring and evaluation activities include classroom observations, training outputs, lesson plans, learner performance records, teacher reflections, and instructional supervision reports. These measures are intended to guide instructional improvement, provide technical assistance, and sustain professional development across Dagohoy District, Schools Division of Bohol.

4. Conclusion & Recommendations

The study concluded that teachers in Dagohoy District, Schools Division of Bohol, demonstrated a high level of implementation of Project-Based Learning (PBL) and Differentiated Instruction (DI), reflecting the integration of learner-centered instructional approaches. PBL was particularly evident in developing learners' 21st-century skills, while DI was strongest in adapting instructional content and communication to address diverse learning needs. Learners' critical thinking skills were generally satisfactory, with stronger performance in remembering and understanding than in higher-order cognitive processes, particularly analyzing, evaluating, and creating. The implementation of PBL showed no statistically significant relationship with learners' critical thinking skills, whereas DI demonstrated a significant positive relationship. These findings highlight the importance of strengthening differentiated instructional practices and refining PBL implementation to support learners' higher-order thinking and cognitive development.

Education policymakers and curriculum developers are encouraged to strengthen policies, learning competencies, instructional materials, and assessment practices that integrate PBL, DI, and higher-order thinking skills. DepEd officials and school heads should provide sustained professional development, instructional resources, technical assistance, classroom monitoring, mentoring, coaching, collaborative lesson planning, and Learning Action Cell sessions to improve instructional implementation. Teachers should enhance differentiated learning experiences, authentic performance-based assessments, collaborative inquiry, structured reflection, and problem-solving activities that develop learners' abilities to analyze, evaluate, and create. Learners should be encouraged to participate actively in meaningful, inquiry-based, and collaborative activities that strengthen independent thinking and creativity. The proposed Learning and Development Program, Project DI-THINK, may serve as a framework for continuous instructional improvement. Future researchers are encouraged to conduct studies involving larger and more diverse samples, examine additional factors affecting critical thinking, employ experimental or quasi-experimental designs, investigate the combined implementation of PBL and DI, and evaluate instructional interventions and teacher development programs.

The study was conducted in three selected public elementary schools in Dagohoy District, Schools Division of Bohol, involving 58 school heads and teachers, which limits the extent to which the findings may be generalized to other educational settings. The investigation employed a quantitative descriptive-survey design with a correlational approach and relied on respondents' questionnaire-based assessments of instructional implementation and learners' critical thinking skills. Consequently, the findings establish statistical associations rather than causal relationships. The study focused on PBL and DI and did not directly examine other potentially relevant factors, such as teacher competence, learner motivation, classroom environment, parental support, technology integration, assessment practices, and school climate. These considerations provide a basis for future investigations involving broader samples, additional variables, and experimental or quasi-experimental research designs.

5. Compliance with ethical standards

The study adhered to ethical principles governing educational research, including voluntary participation, informed consent, confidentiality, anonymity, and the protection of respondents' rights and welfare. Necessary administrative permissions were secured from the appropriate educational authorities before data collection. Respondents were informed of the study's purpose, procedures, and their roles, and were assured that their identities and responses would remain confidential. Participation was conducted without coercion or disruption of professional responsibilities. All collected information was used exclusively for academic and research purposes and protected against unauthorized disclosure to uphold the integrity and credibility of the research.

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