

From Research Results to Executing Real-World Change: Development, Evaluation and Utilization of 21st Century Project-Based Learning Package tool in Inquiries, Investigation and Immersion

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ABSTRACT

This study focused on the development, evaluation, and utilization of a 21st Century Project-Based Learning (PBL) Package tool for Grade 12 Humanities and Social Sciences (HUMSS) students in the subjects Inquiries, Investigation and Immersion (3 I's). Using a Sequential Explanatory mixed-method design with descriptive-developmental and phenomenological phases, the researchers followed the ADDIE model to create the PBL package. Expert validators evaluated the tool using Department of Education's LRMS standards, demonstrating strong psychometric properties with acceptable inter-rater agreement. Implementation integrated four subjects: 3 I's, Community Engagement (CSC), Trends and Critical Thinking, and Media and Information Literacy. Learner performance was consistently rated excellent across all domains. Thematic analysis of student experiences revealed key themes including collaboration with experts and peers,

tangible community changes, skill development through PBL, personal growth and motivation, community engagement realizations, and difficulties in time management. The validated PBL package effectively bridged theoretical research with practical community interventions, transforming curriculum limitations into authentic learning opportunities. The findings affirm PBL's potential to develop 21st-century competencies while fostering civic responsibility and postsecondary readiness.

Keywords: Project-Based Learning, 21st-century skills, instructional material development, ADDIE model, community engagement

INTRODUCTION

Project-based learning (PBL) represents a transformative instructional approach that shifts education from passive reception to active participation, converting students into engaged learners through experiential activities (Günzel & Brehm, 2024).

Building on this foundation, PBL emerges as a progressive educational framework where students tackle authentic challenges through creative product development and decision-making processes, thereby cultivating both motivation and advanced cognitive skills in supportive learning environments (Kusumawardani & Widayati, 2024).

Theoretical underpinnings of this approach reveal that PBL is firmly grounded in constructivist theory, facilitating knowledge construction through practical application and experimentation while enhancing collaborative capacities in team settings (Shen, 2024). Empirical evidence consistently demonstrates that PBL frameworks significantly improve learning outcomes and academic performance through interactive, cooperative projects that emphasize critical thinking, problem-solving, and innovative thought - distinguishing it markedly from traditional pedagogical methods (Zhao, 2024). Concrete examples of this effectiveness appear in vocational education, where PBL implementation in work attire production yielded an 84.3% effectiveness score, with 72.51% improvement in creative thinking and 82.94% positive student feedback (Sabila et al., 2024).

The growing scholarly attention on PBL highlights its benefits for collaborative learning, problem-solving, and practical skill development, with demonstrated improvements in literacy, academic achievement, and autonomous learning capabilities (Jiang, 2024). This academic interest is quantified by research tracking PBL model trends in natural sciences, identifying 33 Scopus-indexed papers and extensive Google Scholar results over two decades (Fitri et al., 2023). Particularly in STEM disciplines, PBL enhances student motivation and critical thinking by engaging learners with authentic challenges that apply scientific methods and engineering principles (Lestari et al., 2024).

While the benefits are clear, challenges persist in PBL implementation. Research

confirms that although PBL improves academic performance, engagement, and teamwork, difficulties with project design complexity and assessment standardization remain, underscoring the need for ongoing teacher professional development (Zhao, 2024). Subject-specific applications reveal similar patterns, as mathematics PBL cultivates higher-order thinking and practical skills through real-world projects (Serin, 2023), yet faces obstacles including insufficient research on influencing factors, teacher perceptions, and task authenticity that hinder optimal K-12 implementation (Nguyen et al., 2024). The School Monitoring, Evaluation, and Adjustment (SMEA) report identified a significant deficiency in curriculum covering for Grade 12 Humanities and Social Sciences (HUMSS) students in the second semester. The competing demands of Work Immersion resulted in incomplete delivery of core subjects: Inquiries, Investigation, and Immersion (3 I's) (75% coverage), Community Engagement, Solidarity, and Citizenship (CSC) (80%), Trends, Networks, and Critical Thinking in the 21st Century (70%), and Media and Information Literacy (68%). This incomplete coverage resulted in a superficial approach to performance tasks, which were originally designed to be community-responsive and to cultivate essential 21st-century skills such as critical thinking, collaboration, and problem-solving.

Considering that Grade 12 students are at a crucial juncture—preparing for further education, business, or vocational skills development, this gap presents a substantial issue. Inadequate mastery of these competencies may result in students lacking the practical skills necessary to succeed in their selected pathways. The existing limitations underscore the pressing necessity for a novel pedagogical approach that optimizes restricted class time while facilitating profound, competency-oriented learning. Thus, this study was conducted to develop, evaluate and utilize 21st Century Project-Based Learning Package tool in

Inquiries, Investigation and Immersion (3 I's) among Grade 12-Senior High School learners which transform limitations into opportunities, equipping students with the skills to navigate academic, professional, and societal challenges beyond the classroom.

Objectives of the Study

This study aimed to develop, evaluate and utilize 21st Century Project-Based Learning Package tool in Inquiries, Investigation and Immersion (3 I's) among Grade 12-Senior High School learners.

Specifically sought to:

1. Develop 21st Century Project-Based Learning Package tool in Inquiries, Investigation and Immersion (3 I's).
2. Evaluate the psychometric properties and the inter-rater agreement among validators of the developed 21st Century Project-Based Learning Package tool in Inquiries, Investigation and Immersion (3 I's) in terms of:
 - 2.1. Content Quality
 - 2.2. Instructional Quality
 - 2.3. Technical Quality
 - 2.4. Other Findings
3. Find out the performance of the learners after the utilization of the 21st Century Project-Based Learning Package in Inquiries, Investigation and Immersion (3 I's) including the subjects integrated.
4. Explore the experiences of the learners on accomplishing their performance tasks following the utilized 21st Century Project-Based Learning Package in Inquiries, Investigation and Immersion (3 I's).

LITERATURE REVIEW

This chapter discusses conceptual and empirical literature underpinning the study. It covers the theoretical foundations of Project-Based Learning, evidence of its effectiveness across disciplines, subject-specific applications, and implementation challenges. The review provides a framework for developing a PBL package

that addresses the unique learning context of Grade 12 HUMSS students.

Conceptual Foundations of PBL

Project-based learning (PBL) represents a paradigm shift in instructional approach, transforming students from passive recipients to active participants through experiential engagement (Günzel & Brehm, 2024). Building on this transformative potential, PBL emerges as a progressive framework where students address authentic challenges through product creation and decision-making, fostering both creativity and advanced cognitive skills (Kusumawardani & Widayati, 2024). Theoretical underpinnings of this approach reveal its grounding in constructivist theory, facilitating knowledge construction through practical application while enhancing collaborative learning (Shen, 2024).

Empirical Evidence of PBL Effectiveness

Research consistently demonstrates that PBL significantly improves learning outcomes through interactive projects that emphasize critical thinking and problem-solving (Zhao, 2024). Concrete examples of this effectiveness appear across disciplines: in vocational education, PBL implementation yielded 84.3% effectiveness with notable improvements in creative thinking (Sabila et al., 2024); in mathematics, experimental groups using PBL outperformed traditional instruction by 19.19 points (Murtiyasa & Budiningsih, 2022); and in elementary education, PBL enhanced both achievement in geometry and student creativity (Fitria et al., 2024). Longitudinal studies confirm PBL's growing scholarly attention, with 33 significant papers identified in natural sciences alone from 2003-2023 (Fitri et al., 2023).

Subject-Specific Applications

In STEM disciplines, PBL enhances motivation and critical thinking through authentic challenges that apply scientific methodologies (Lestari et al., 2024). Similarly in mathematics, PBL cultivates

higher-order thinking through real-world projects, though implementation challenges persist regarding task authenticity and teacher preparedness (Nguyen et al., 2024; Serin, 2023). The efficacy of PBL is particularly evident in language education, where it improves English writing proficiency through authentic tasks while developing 21st-century skills (Chen, 2025; Rahman, 2025). However, challenges including assessment methodologies and curriculum alignment require attention for optimal implementation (Shi, 2024; Sedubun & Nurhayati, 2024).

Implementation Challenges and Considerations

While meta-analyses confirm PBL's positive effects on academic achievement and affective outcomes, they also reveal significant moderating factors including subject area, group size, and implementation duration (Zhang & Ma, 2023). The approach particularly excels in enhancing student engagement through knowledge sharing and discussion (Almulla, 2020), yet requires comprehensive frameworks to guide teachers across different learning contexts (Almulla, 2020; Rohmah et al., 2024). Case studies illustrate PBL's transformative potential, with history classes showing participation improvements from 67% to 92% across cycles (Harahap, 2023), and mathematics classes achieving 66.7% competency from 18.5% baseline (Solehah, 2023).

Collectively, literature establishes PBL as an effective instructional approach across disciplines, particularly for developing higher-order thinking and practical skills. However, successful implementation requires addressing persistent challenges in teacher training, assessment design, and resource allocation. The current study builds on this foundation while addressing gaps in PBL application for 21st century skill development in HUMSS education.

MATERIALS & METHODS

Research Design

This study utilized Sequential Explanatory mixed-method design outlined from Cresswell and Cresswell (2023) in which it prioritizes first the gathering of quantitative data, then followed by qualitative collections which questions were based on the quantitative results. During the quantitative phase, this study employed a descriptive-developmental method. An instructional material, a 21st Century Project-Based Learning (PBL) Package, was developed and then evaluated by 18 experts, each assigned different assessment tasks. Following the evaluation, the material was implemented. After implementation, the qualitative phase was conducted using a phenomenological approach, where participants were interviewed about their experiences in their performance task through Project Based Learning with the PBL Package.

Research Locale

This study was conducted in an island province, one of the secondary public schools in the Division of Biliran, Eastern Visayas, Philippines. Specifically, situated in the Biliran District, a large-sized public school situated in the Biliran District. The institution has an expected enrollment of 1,000 students and a faculty of approximately 80 members. It provides programs for both junior and senior high school, with the senior high school offering an Academic Track and a Technical-Vocational-Livelihood (TVL) Track, focusing on Agri-Fishery Arts. This research is only focused on Grade 12 students within the Academic Track's Humanities and Social Sciences (HUMSS) strand, consisting of four sections and a total population of 120 students. The study exclusively examines HUMSS learners because to the substantial differences in their curriculum and topic offerings compared to the TVL track.

Research Participants

The participants of this study were the Grade 12 learners from the Academic Track

specifically Humanities and Social Sciences. Since the study developed 21st Century Project-based learning tool in Inquiries, Investigation and Immersion (3 I's) integrated with three disciplines within the same quarter specifically, Community Engagement, Solidarity, and Citizenship (CSC), Trends, Networks, and Critical Thinking in the 21st Century, and Media and Information Literacy.

Research Instrument

This study utilized two distinct instruments: one instrument for quantitative phase and one instrument for qualitative phase. During the quantitative phase employing descriptive-developmental method, the researchers thoroughly followed ADDIE Model to develop the 21st century Project-Based Learning package tool and evaluated through the standardized evaluation tool from Learning Resources Management and Development System (LRMDS) of the Department of Education (DepEd) for Print Resources. A total of 18 experts who validated the package tool and were divided into three groups: six experts for content quality, six experts for format, presentation and organization, and six experts for accuracy and up-to-datedness of information. Furthermore, the said package tool have met the desired criteria across all the domains, thus exhibiting a comprehensive and proficient learning tool. After the validation among experts, their responses underwent inter-rater reliability through Krippendorff's Alpha to ensure consistency among their evaluated tools, achieving ($\alpha=0.89$) interpreted as acceptable agreement. Meanwhile, for the qualitative phase, a researcher-made interview guide schedule was conducted and underwent validation of three experts: one from the external, one from master teacher and another from a language teacher. Concurrently, another inter-reliability test was conducted through Krippendorff's Alpha to seek consistency of agreement to the questions generated. In addition, the researchers initially conducted pilot testing

to check and verify relevance of the questions and possible changes to be made later in the interview process.

Statistical Analysis

Statistical Treatment of Data. This study used descriptive and inferential statistics. In analyzing the validation of the PBL learning tool the researchers simply used descriptive statistical tools such as frequency count, percent, mean and mean percent score. Meanwhile for the reliability assessments, inferential statistical tools were utilized specifically for inter-rater agreement through Krippendorff's Alpha.

Data Analysis. In analyzing and interpreting interview data, Creswell (2014) thematic analysis method was utilized. This analysis was suited for this study since the researchers decided to employ Sequential Explanatory mixed-method design outlined from Creswell and Creswell (2023) himself, so that consistency of method shall be adhered. The researcher begins by immersing themselves in the data (transcripts, field notes, or media) to gain familiarity. Next, initial codes are generated, marking significant features that may form potential themes. These codes are then organized into broader themes, which are reviewed for consistency and relevance. Creswell highlights the importance of reflexivity—researchers must critically assess their interpretations to minimize bias. The final step involves defining and presenting themes with supporting data extracts, ensuring transparency and credibility.

RESULT & DISCUSSION

Development of 21st Century Project-Based Learning Package tool in Inquiries, Investigation and Immersion (3 I's)

The development of the 21st Century Project-Based Learning Package tool in Inquiries, Investigation and Immersion (3 I's) followed and employed the ADDIE Model: Analyze, Design, Develop, Validation and Implement. Following this model provides researchers to

systematically design an instructional design tool ensuring the final output is data-driven, pedagogically grounded and learner-centered tasks.

Analysis phase. The researchers utilized the SMEA (School Monitoring, Evaluation, and Assessment) report from the previous school year (2023–2024) as their point of reference to design a thorough and evidence-based PBL (Project-Based Learning) for the school year 2024–2025. The SMEA report revealed that most subjects in Senior High School, particularly in Grade 12-Humanities and Social Sciences (HUMSS) during the second semester, did not fully cover all the learning competencies due to the complexity of the subjects and time constraints, as most days were allocated for Work Immersion. Statistically: Inquiries, Investigation, and Immersion covered only 75% of the learning competencies, Community Engagement, Solidarity, and Citizenship (CSC) covered 80%, Trends, Networks, and Critical Thinking in the 21st Century covered 70%, Media and Information Literacy covered 68%. This resulted in a surface-level approach to performance tasks, which were supposed to be community-responsive and foster 21st-century skills. Furthermore, Grade 12 learners must be equipped with the necessary skills as they exit through their chosen pathways—whether higher education, entrepreneurship, or middle-level skills development. According to Mayor (2024) students lose important knowledge and skills, especially in language proficiency and soft skills, when learning competencies are not adequately covered. Their readiness for postsecondary education and the changing need of the profession is eventually hampered by this lack of comprehensive education.

In addition, the researchers conducted a Performance task need analysis outlined from Jay Mctighe (2018) designed in analyzing the needs of performance tasks in enhancing project management and ensuring good results. The analysis revealed that performance activities with real-world

applications are highly preferred by 80% of students, highlighting the need for engaging, authentic learning opportunities. Furthermore, multidisciplinary projects were of interest to 70% of respondents, indicating a chance to close subject-specific ability gaps. With 75% of students having to enhance their critical thinking skills and 65% needing to improve their collaboration skills—areas that were noticeably undeveloped in traditional assessments—key skill gaps were found. These results are in direct agreement with the findings of partial competency coverage and shallow task performance in the SMEA report. The findings provide compelling evidence for the use of PBL since it fills these gaps by focusing on cross-subject integration, real-world problem-solving, and the development of 21st-century skills, which guarantees deeper learning and improved readiness for students' future paths. As supported by Sugiman et al. (2019) by identifying the gaps between present performance and intended results, needs analysis enables focused enhancements.

Design Phase. During this phase, the researchers developed a 21st-century Project-Based Learning (PBL) package tool, following the guidelines provided by the Department of Education. This PBL program focuses on the Inquiries, Investigation, and Immersion (3I) subject in the Grade 12 curriculum, where the culminating activity involves mixed-methods research and the creation of an intervention plan. Students will later execute this plan based on the scope of their study. The program integrates interdisciplinary subjects also taught in the second semester of Grade 12, including: Community Engagement, Solidarity, and Citizenship (CSC), Trends, Networks, and Critical Thinking in the 21st Century, and Media and Information Literacy. These subjects were selected to ensure a holistic, skills-aligned approach that reinforces 21st-century competencies.

This PBL program establishes a significant continuum between students' first semester

quantitative research (Practical Research 2), and their second semester applied work (Inquiries, Investigations, and Immersion). Commencing with rigorous quantitative investigations to uncover community issues, learners subsequently transition to mixed-methods research in their concluding 3Is subject, enhancing their comprehension through both statistics and qualitative insights. The program's unique aspect arises as students formulate and execute specific intervention strategies grounded in their research findings, whether pertaining to educational disparities, environmental issues, or societal challenges. These evidence-based solutions go from theoretical frameworks to practical application as students implement their strategies in authentic community settings. The educational experience encompasses three essential multidisciplinary disciplines: Community Engagement, Solidarity and Citizenship (CSC) establish the ethical foundation for community work; Trends, Networks and Critical Thinking fosters systems-level research, while Media and Information Literacy empower students to proficiently communicate their results. This PBL model integrates research technique with practical application and aligns with DepEd's competencies across all disciplines, transforming students from passive learners into active change-makers who exhibit measurable effect in their communities.

Validation Phase. The researchers invited 18 expert validators to evaluate the 21st century Project-based learning package tool. These experts were divided into three groups: six experts for content quality, six experts for format, presentation and organization, and six experts for accuracy and up-to-datedness of information. These validators used the standardized evaluation tool based on psychometric qualities adopted from the Learning Resources Management and Development System (LRMDS) of the Department of Education (DepEd). The six content validators assessed the project details and project tasks of the senior high school learners including

the suitability of the rubrics per subjects integrated. Meanwhile, six experts for format, presentation and organization, were also invited to assessed how the flow of the PBL were conducted and including the instructions of each subject especially the formats, and the organization of the PBL appropriate for their age. Finally, six experts looked at the Project-Based Learning (PBL) implementation to see how accurate and up-to-date the information was. They did this by looking at three main areas: (1) technological integration, which looked at how well digital tools and platforms worked; (2) feasibility, which checked to see if resources were available and the implementation was practical; and (3) standards compliance, which made sure that the implementation met current educational standards and accessibility requirements. Their strict validation process made sure that all the PBL parts fulfilled current educational and technology requirements and could be used in real-life classrooms.

Implementation Phase. The Grade 12 learners successfully presented their mixed-methods research outputs under the guidance of a panel of research experts from diverse fields. To ensure comprehensive feedback, the researchers invited the following panelists: A social sciences research specialist from the university, a statistician (also from the university), and three research coordinators from the Department of Education. This diverse panel provided varied perspectives and subject-specific insights, significantly contributing to the improvement of the students' research papers and to their designed intervention plans. After meticulously crafting intervention strategies based on expert consultations and empirical evidence, learners effectively executed their projects, guaranteeing relevance and practical significance. For example, certain individuals executed verification investigations to counteract misinformation, formulating advocacy efforts to enhance media literacy. Others participated in community-based research, including trash

segregation projects, where they partnered with local barangays, hosted educational lectures, and invited speakers from the Local Government Unit (LGU) to further their efforts. These varied projects, customized to their specific objectives, not only tackled urgent societal challenges but also converted research findings into significant, practical solutions.

Psychometric properties and the inter-rater agreement among validators of the developed 21st Century Project-Based Learning Package tool in Inquiries, Investigation and Immersion (3 I's)

Table presents the evaluation results of the developed 21st Century Project-Based Learning Package tool in Inquiries, Investigation and Immersion (3 I's). The said evaluation centered on the four key features with 18 experts were involved; Content, format, presentation and organization, and accuracy and up-to-datedness of information following the standardized evaluation tool of the DepEd which is the Learning Resources Management and Development System (LRMDS) for print resources.

Table 1. Result of Psychometric Quality Evaluation

	Content Quality	Interp.	Format	Interp.	Presentation and Organization	Interp.	Accuracy and Up-to-datedness of Information	Interp.
Project-Based Learning Package Tool	27	Met Criteria	70	Met Criteria	20	Met Criteria	24	Met Criteria

Note: A total of 18 expert validators participated, with 6 assigned to evaluate each factor.

The assessment utilized the subsequent acceptance criteria for each domain: Content Quality (≥ 25 points), Format (≥ 65 points), Presentation and Organization (≥ 18 points), and Accuracy/Up-to-datedness (≥ 22 points). These thresholds denote the minimal scores necessary to "Meet Criteria" as per LRMDS validation methods.

Table 1 illustrates that the PBL tool surpassed all minimum criteria: Content Quality (27/30, 90%), Format (70/75, 93%), Presentation and Organization (20/22, 91%), and Accuracy/Up-to-datedness (24/26, 92%). All domains attained "Met Criteria" status, demonstrating notably robust

performance in Format (70/75) and Content Quality (27/30). The uniform performance across domains indicates strong psychometric qualities, with all scores residing within the 90-93% range of their respective maximum values. The results demonstrate that the PBL package satisfies DepEd's rigorous quality criteria for instructional materials. The tool exhibits notable proficiency in formatting criteria (the highest absolute score) while concurrently demonstrating robust performance in content validity and information currency.

Table 2. Inter-rater Agreement among Validators the developed 21st Century Project-Based Learning Package tool

	Krippendorff's Alpha Values					Interpretation
	Content Quality	Format	Presentation and Organization	Accuracy and Up-to-datedness of Information	Overall	
Project-Based Learning Package Tool	0.8575	0.87	0.845	1.00	0.89	Acceptable Agreement

Legend: Krippendorff (2004): Less than 0.66: unacceptable agreement, Between 0.66 and 0.80: tentatively acceptable agreement, Between 0.81 and .99: acceptable agreement, 1: perfect agreement

As gleaned in table 2, the evaluation responses among expert validators undergone inter-rater reliability through Krippendorff's alpha and revealed acceptable agreement among domains. Content Quality ($\alpha = 0.8575$), Format ($\alpha = 0.87$), and Presentation and Organization ($\alpha = 0.845$), all fall within the "acceptable agreement" range ($\alpha \geq 0.81$). The overall agreement was particularly strong ($\alpha = 0.89$), further supporting the consistency of validator assessments. Notably, Accuracy and Up-to-datedness of Information achieved perfect agreement ($\alpha = 1.00$), suggesting unanimous expert consensus on this criterion. These results confirm that the PBL tool was evaluated with high reliability, minimizing subjectivity in the validation process.

Performance of the learners after the utilization of the 21st Century Project-Based Learning Package tool in Inquiries, Investigation and Immersion (3 I's) including the subjects integrated

This section presents the varied performance of the learners related to the subjects integrated into the PBL. The following subjects were rated through different standardized rubrics; Inquiries, Investigation and Immersion (3I's), Community Engagement, Solidarity, and Citizenship (CSC), Trends, Networks, and Critical Thinking in the 21st Century, and Media and Information Literacy.

Performances in Inquiries, Investigation and Immersion (3I's) Evaluated through standardized Rubrics

Table 3: Oral Defense Presentation in Inquiries, Investigation and Immersion (3I's)

Indicators	Mean (Highest score=4)	MPS (%)	Interpretation
Organization	3.80	95.00	Excellent
Presentation	3.50	87.50	Excellent
Public Q and A	3.30	82.50	Excellent
Interaction with material	3.70	92.50	Excellent
Response to Committee questions	3.40	85.00	Excellent
Overall	3.54	88.50	Excellent

Legend: 3.26 – 4.0 (Excellent), 2.51 – 3.25 (Very Good), 1.76 – 2.50 (Satisfactory), 1.0 – 1.75, (Unsatisfactory), n=20 groups

The oral defense presentations in Inquiries, Investigation, and Immersion (3I's) were assessed based on five criteria, each rated on a scale from 1.0 to 4.0. Table 3 indicates that all indicators received an "Excellent" rating, with mean scores between 3.30 and 3.80, and Mean Percentage Scores (MPS) ranging from 82.50% to 95.00%. Organization (M = 3.80, MPS = 95.00%)

and Interaction with Material (M = 3.70, MPS = 92.50%) attained the highest evaluations, signifying strong structural coherence and engagement with study topic. The Presentation (M = 3.50, MPS = 87.50%), Response to Committee Questions (M = 3.40, MPS = 85.00%), and Public Q&A (M = 3.30, MPS = 82.50%) exhibited commendable performance, although

marginally lower, indicating slight potential for enhancement in spontaneous communication. The overall performance (all means > 3.26) indicates uniformly high-quality presentations across the 20 groups, in accordance with the rubric's "Excellent" standard. These results highlight the learners' competence in presenting research findings and defending them before a panel.

According to Suliman (2022), research presentations are a crucial pedagogical instrument for the enhancement of students' academic and professional abilities. The results suggest that students' research skills, confidence, and capacity to articulate findings in a cohesive and original manner are substantially improved by face-to-face research presentations.

Table 4: Research Paper Presentation in Inquiries, Investigation and Immersion (3I's)

Indicators	Mean (Highest score=4)	MPS	Interpretation
Research Statement	3.32	83.00	Excellent
Literature Review	3.40	85.00	Excellent
Methodology	3.12	78.00	Very Good
Research Results	3.08	77.00	Very Good
Analysis	3.18	79.50	Very Good
Organization	3.10	77.50	Very Good
Writing Style	3.25	81.25	Very Good
Content	3.25	81.25	Very Good
Overall	3.21	80.31	Very Good

Legend: 3.26 – 4.0 (Excellent), 2.51 – 3.25 (Very Good), 1.76 – 2.50 (Satisfactory), 1.0 – 1.75, (Unsatisfactory), n=20 groups

The research paper presentations in Inquiries, Investigation, and Immersion (3I's) were assessed based on eight criteria, yielding mean scores between 3.08 and 3.40 (MPS: 77.00%–85.00%). Table 4 illustrates that two indicators—Research Statement (M = 3.32, MPS = 83.00%) and Literature Review (M = 3.40, MPS = 85.00%)—received an "Excellent" rating, indicating strong clarity in articulating the research's objectives and synthesizing previous literature. The remaining indicators (Methodology, Research Results, Analysis, Organization, Writing Style, and Content) received scores within the "Very Good" range (M = 3.08–3.25, MPS = 77.00%–81.25%), signifying commendable performance with slight opportunities for enhancement, especially in methodological rigor (lowest score: Research Results, M = 3.08) and structural coherence (Organization, M = 3.10). The comprehensive evaluation (M = 3.21, MPS

= 80.31%) affirms a "Very Good" level across all 20 groups, indicating uniform proficiency in research communication. The findings indicate that although learners perform well in core aspects (e.g., literature review), specific feedback on data presentation and organizational coherence could enhance quality further. Similar findings showed that Grade 12 students are generally considered competent in research and possess moderate science process skills, according to a study conducted in the area. However, this varies by district and A low but significant relationship exists between research competence and science process skills, indicating that the enhancement of these skills could potentially enhance research abilities (Salmeron, 2023).

Performance in Media and Information Literacy Evaluated through standardized Rubrics

Table 5. Performance of learners Creative PowerPoint Presentation

Indicators	Mean (Highest score=4)	MPS	Interpretation
Content & Understanding	4.60	92.00	Excellent
Creativity & Multimedia Use	4.34	86.80	Excellent

Organization & Structure	4.54	90.80	Excellent
Delivery & Communication	4.21	84.20	Excellent
Technical Execution	4.80	96.00	Excellent
Overall	4.50	89.96	Excellent

Legend: 4.20 – 5.00(Excellent) 3.40 – 4.19 (Proficient)2.60 – 3.39(Developing) 1.0 – 2.59(Needs Improvement)

Learners exhibited exceptional performance in all aspects of their Creative PowerPoint Presentations, as assessed by standardized rubrics (refer to Table 5). The mean scores were 4.21 to 4.80 (MPS: 84.20%–96.00%), with Technical Execution (M = 4.80, MPS = 96.00%) and Content & Understanding (M = 4.60, MPS = 92.00%) scoring the highest, indicating mastery of both technical skills and subject-matter comprehension. Creativity & Multimedia Use (M = 4.34, MPS = 86.80%) and Delivery & Communication (M = 4.21, MPS = 84.20%) were slightly lower, but they remained within the Excellent range. This suggests that there are minor opportunities for refinement in engaging presentation styles.

The consistent proficiency in media literacy is evident in the overall performance (all means > 4.20), which is consistent with research that underscores the efficacy of multimedia tools in improving learning outcomes (Smith et al., 2021). It is important to note that the high scores in Organization & Structure (M = 4.54) information literacy are essential in the information-rich environment of today, as it provides students with the ability to effectively locate, analyze, and employ information (Adhikari & Joshi, 2024).

Performance in Community Engagement, Solidarity, and Citizenship (CSC) Evaluated through standardized Rubrics

Table 6. Performance in the Community-Action Initiative conducted

Indicators	Mean	MPS	Interpretation
Understanding of Social Science Concepts	4.43	88.60	Excellent
Community Engagement & Collaboration	4.73	94.60	Excellent
Action Plan & Implementation	4.65	93.00	Excellent
Reflection & Synthesis of Learning	4.42	88.40	Excellent
Impact & Sustainability	4.70	94.00	Excellent
Overall	4.59	91.72	Excellent

Legend: 4.20 – 5.00(Excellent) 3.40 – 4.19 (Proficient)2.60 – 3.39(Developing) 1.0 – 2.59(Needs Improvement)

In all domains that were assessed, students exhibited exceptional performance in their Community-Action Initiative. The outcomes were consistently excellent, with mean scores ranging from 4.42 to 4.73 (MPS: 88.40%-94.60%). It is worth noting that Community Engagement & Collaboration (M = 4.73, MPS = 94.60%) and Impact & Sustainability (M = 4.70, MPS = 94.00%) were identified as specific strengths, indicating that students demonstrated exceptional proficiency in the practical application and long-term planning aspects of community work.

The scores in Action Plan & Implementation (M = 4.65, MPS = 93.00%)

suggest that the individual possesses strong project management skills. Conversely, the slightly lower (but still excellent) results in Reflection & Synthesis of Learning (M = 4.42, MPS = 88.40%) may indicate an opportunity to improve the metacognitive components of the initiative. These results are consistent to the study of Albanesi and Compare (2023) as structured service activities facilitate the acquisition of critical thinking, problem-solving, and interpersonal communication skills by students.

Performance in Trends, Networks, and Critical Thinking in the 21st Century Evaluated through standardized Rubrics

Table 7. Performance in Post-Activity Reflection Journal

Indicators	Mean	MPS	Interpretation
Identification & Analysis of Global Issue	4.60	92.00	Excellent
Use of ICT for Mobilization	4.76	95.20	Excellent
Event Planning & Organization	4.87	97.40	Excellent
Critical Thinking & Problem-Solving	4.53	90.60	Excellent
Impact & Sustainability	4.34	86.80	Excellent
Overall	4.62	92.40	Excellent

Legend: 4.20 – 5.00(Excellent) 3.40 – 4.19 (Proficient) 2.60 – 3.39(Developing) 1.0 – 2.59(Needs Improvement)

Students demonstrated exceptional success in all metrics of their 21st-century skills development, as indicated by their Post-Activity Reflection Journals (refer to Table 7). The findings revealed outstanding mean scores between 4.34 and 4.87 (MPS: 86.80%-97.40%), with notably high performance in Event Planning & Organization (M = 4.87, MPS = 97.40%) and Use of ICT for Mobilization (M = 4.76, MPS = 95.20%). The findings indicated that including digital literacy into school curricula is essential for preparing students with the requisite knowledge and abilities to meet the expectations of contemporary workplaces. The data indicate that digital literacy significantly enhances students' employability (Chanda et al., 2024).

The marginally lower, although still commendable, ratings in Impact & Sustainability (M = 4.34, MPS = 86.80%) and Critical Thinking & Problem-Solving (M = 4.53, MPS = 90.60%) may suggest

avenues for enhancing longitudinal planning and advanced cognitive abilities. These findings correspond with contemporary studies highlighting the significance of critical reflection in cultivating 21st-century competencies (Voogt & Roblin, 2012), while indicating possible avenues for curricular improvement.

Themes emerged on the experiences of the learners on accomplishing their performance tasks following the utilized 21st Century Project-Based Learning Package tool

After the interview among the learners, the data was transcribed and analyze through thematic analysis outlined from Creswell (2014) thematic analysis method. To ensure validity and trustworthiness of the data the researcher applied Lincoln and Guba's (1985) data validation including member checking and peer debriefing.

Table 8: Thematic Table on the experiences of the learners on accomplishing their performance tasks

Sample Verbatim Responses	Themes	Description
<i>Nalearn namon nga an pagtrabaho ha grupo nagpapasayon han amon research kay nagtutulay kami han ideas. (P1)</i> [We learned that working as a team made our research easier because we shared ideas.]	Collaboration with Experts and Peers	Learners' experiences in seeking guidance from panelists and working with teammates.
<i>Hiya hin dako nga bulig an feedback han mga eksperto kay nagtutudlo ini han amon mga sayop. (P3)</i> [The experts' feedback was a big help because it pointed out our mistakes.]		
<i>An panel discussion naghatag han amon research hin mas professional nga perspective.</i>		

(P7) [The panel discussion gave our research a more professional perspective.]		
<i>Nalipay kami kay an amon trash segregation project nagin effective ha barangay.</i> (P2) [We were happy because our trash segregation project became effective in the barangay.]	Tangible Changes in the Community	How their projects created tangible changes in the community.
<i>An amon media literacy campaign nagtudlo han mga tawo han pag-validate han news</i> (P6) [Our media literacy campaign taught people how to validate news]		
<i>Nakita namon an praktikal nga epekto han research kay nag-improve an community practices</i> (P11) [We saw the practical impact of research as community practices improved.]		
<i>Natutunan namon an importance han time management kay damo nga tasks an deadline</i> (P15) [We learned the importance of time management because of multiple deadlines.]	Skill Development Through PBL	Skills gained from the PBL process
<i>Nag-improve an amon communication skills kay nagpresent kami ha panelists</i> (P14) [Our communication skills improved because we presented to panelists.]		
<i>An PBL nagtudlo han amon nga an learning diri lang ha classroom nangyayari.</i> (P13) [PBL taught us that learning doesn't only happen in the classroom.]		
<i>Narealize namon nga an research makakabulig hin dako ha society.</i> (P7) [We realized that research can greatly help society.]	Personal Growth and Motivation	How the experience shaped their mindset and aspirations
<i>An pagka-success han amon project naghatag han amon hin motivation para magpadayon</i> (P2) [Our project's success motivated us to keep going.]		
<i>Nakita namon an amon potential bisan hini nga age pa kami</i> (P4)		

[We saw our potential even at this young age.]		
Nalipay kami kay an barangay nag-adopt han amon trash segregation plan (P3) [We were happy because the barangay adopted our trash segregation plan]	Community Realizations	Engagement Lessons from interacting with the community
An LGU nagexpect hin formal nga proposal, so natutunan namon an importance han professionalism (P6) [The LGU expected a formal proposal, teaching us professionalism]		
Diri pala basta-basta makukuha an trust han community kinahanglan hin patience hin pagpakita han sincerity (P8) [We realized community trust isn't earned easily—it requires patience and sincerity]		
Nagakariribok an schedule kay mayda group meetings ngan individual tasks (2) [Schedules became chaotic with group meetings and individual tasks]	Difficulties in Managing Time	Balancing PBL with other academic/personal responsibilities.
An pressure nagtudlo han amon magiging resilient bisan ha stress (P3) [Pressure taught us resilience despite stress]		
An deadlines nagin motivation namon nga mag-urugi hin maupay nga time management (P5) [Deadlines forced us to practice better time management]		

Summary of Findings

The study successfully developed and validated a 21st Century Project-Based Learning (PBL) Package for Grade 12 students, following the ADDIE model. Expert validators (n=18) evaluated the tool across four domains—Content Quality, Format, Presentation and Organization, and Accuracy and up-to-datedness of information—with all criteria rated as "Met Criteria". High inter-rater reliability (Krippendorff's $\alpha \geq 0.845$) confirmed agreement among experts. Implementation revealed that the PBL tool effectively bridged theoretical research with practical

community interventions aligning with DepEd learning competencies in Senior High School- Humanities and Social Sciences curriculum.

Learner performance across integrated subjects—Inquiries, Investigation, and Immersion (3I's), Media and Information Literacy, Community Engagement (CSC), and Trends/Critical Thinking—was consistently rated "Excellent". Strengths included technical execution, community collaboration and event planning. Qualitative themes highlighted and supported the result of the performance of the learners including skill development,

tangible Changes in the Community, and personal growth, though challenges like scheduling conflicts were reported. Thematic analysis of student experiences underscored the PBL's role in fostering collaboration, real-world problem-solving, and motivation. Participants valued expert feedback and panel discussions, which enhanced their research professionalism. Community partnerships demonstrated the tool's practical relevance, while struggles with workload management pointed to opportunities for scaffolded support.

CONCLUSION

In conclusion, the 21st Century PBL Package proved to be a robust, validated tool that enhances learner competencies and community engagement. By integrating interdisciplinary subjects with authentic tasks, it bridges classroom learning with societal needs, as evidenced by high performance metrics and qualitative feedback. Future iterations could refine time-management scaffolds and deepen metacognitive components, but the current model effectively prepares students for postsecondary challenges while fostering civic responsibility. This study affirms PBL's potential to transform education into a dynamic, impact-driven experience.

Recommendation

Based on the findings of this study, the following recommendations are proposed:

1. For Senior High School Teacher, they may adopt responsive 21st Century Project-Based Learning (PBL) Package in senior high school curricula, particularly for subjects like Inquiries, Investigation, and Immersion (3I's), to enhance interdisciplinary learning and real-world application.
2. School Administrators may provide teacher training on PBL facilitation to ensure effective implementation, emphasizing scaffolding for time management and metacognitive reflection.
3. Schools may allocate resources to support community partnerships, enabling students to execute projects with local stakeholders.
4. For future researchers they may investigate the long-term impact of PBL on postsecondary readiness by tracking alumni performance in higher education or careers.

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