

ENHANCING FOOD PREPARATION SKILLS THROUGH PROJECT-BASED LEARNING IN COOKERY FOR GRADE 12 STUDENTS AT ALOS NATIONAL HIGH SCHOOL

RACHRIS R. SINDAYEN

Master in Education

Major in Technology and Livelihood Education

Abstract

This study aimed to assess the effectiveness of Project-Based Learning (PBL) in enhancing the food preparation skills of Grade 12 students at Alos National High School. With the growing emphasis on hands-on learning in the Technical-Vocational Livelihood (TVL), strand, the study sought to explore how PBL could address the gap between theoretical knowledge and practical application in Cookery. A quasi-experimental design with a pretest-posttest approach was employed to evaluate the improvement in students' food preparation skills before and after implementing PBL activities. The study also examined students' perceptions regarding the effectiveness of PBL in promoting engagement, skill development, and overall learning in Cookery.

The results showed a significant improvement in the students' food preparation skills, with post-test scores surpassing pre-test results. Students also expressed positive perceptions about the PBL approach, noting increased motivation, collaboration, and real-world application of skills. These findings suggest that PBL can be an effective pedagogical tool in teaching Cookery, aligning with the objectives of the K–12 curriculum and TESDA NC II standards. Based on these results, the study recommends the integration of PBL into the curriculum to enhance skill acquisition, student engagement, and competency-based learning. The study contributes valuable insights into the role of innovative teaching strategies in vocational education and encourages further research on PBL in other TLE subjects.

Keywords: Project-Based Learning, food preparation skills, Grade 12 students, Cookery, Technical-Vocational Livelihood (TVL), skill improvement, student perceptions, hands-on learning, quasi-experimental design, K–12 curriculum, TESDA NC II standards

1. Introduction

The integration of innovative pedagogical approaches in Technical-Vocational Livelihood (TVL) education has gained increasing attention amid growing recognition of its critical role in preparing senior high school students for both employment and further education (Awang et al., 2025). The Cookery strand, a vital component of the TVL track in the Philippines, demands not only theoretical knowledge but also the mastery of practical skills that align with industry standards such as those prescribed by TESDA's National Certification (NC) II. Despite the essential role of practical competencies, traditional teaching methodologies in Cookery have often been criticized for emphasizing rote learning and theoretical instruction at the expense of hands-on skill development (Woodhouse & Rodgers, 2024). This gap compromises learners' readiness to perform effectively in real-world culinary settings, which underscores the need to explore teaching approaches that foster active learning and skill mastery. Project-Based Learning (PBL) emerges as a promising strategy that enables students to engage in meaningful, context-driven tasks, thereby aligning with the objectives of competency-based education mandated by the Department of Education (DepEd) (Carmical & Nadelson, 2025).

The urgency to innovate TVL pedagogy is reflected in the directives of the Department of Education, notably DepEd Order No. 42, s. 2017, which underscores the importance of contextualized and learner-centered instructional strategies to enhance student engagement and learning outcomes in technical-vocational subjects. Furthermore, DepEd Order No. 35, s. 2016 advocates for the integration of experiential learning methodologies to ensure that students develop industry-relevant skills through authentic practice. These policies are complemented by Republic Act No. 10533, known as the Enhanced Basic Education Act of 2013, which institutionalized the K to 12 Basic Education Program, emphasizing the importance of the Senior High School (SHS) track in preparing graduates who are employable, entrepreneurial, or prepared for higher education. The law explicitly mandates the alignment of the curriculum with industry standards and local community needs, thereby supporting the integration of active learning pedagogies such as PBL. Despite these strong policy frameworks, empirical evidence reveals a persistent gap between the intended curriculum outcomes and actual classroom practices in Cookery education.

Several studies have documented challenges in TVL education, including insufficient opportunities for learners to apply theoretical knowledge in practical contexts and limited student engagement resulting from teacher-centered approaches. For instance, a study by Paramita (2024) revealed that students in Cookery courses showed moderate skill proficiency but lacked confidence and motivation, partly due to traditional lecture-based instruction (Paramita, 2024). This finding echoes the assertions of Bautista et al. (2019), who argued that active learning strategies such as PBL enhance not only students' technical skills but also their critical thinking, collaboration, and problem-solving abilities. Project-Based Learning, characterized by its student-centered, inquiry-based, and collaborative nature, provides learners with opportunities to explore real-world culinary projects that simulate authentic industry tasks. The iterative process of planning, executing, and evaluating projects fosters deeper understanding and skill refinement, addressing the limitations of conventional teaching methods (Park, 2021).

The theoretical underpinnings of PBL are rooted in Constructivist and Experiential Learning theories, which posit that knowledge is constructed actively through experience and reflection. Bloom's Revised Taxonomy further supports this approach by encouraging higher-order thinking skills such as application, analysis, and creation, which are critical in vocational education contexts (Zhu & Atompag, 2023). By engaging learners in complex, authentic tasks, PBL cultivates a holistic learning environment that bridges the gap between cognitive knowledge and psychomotor skills. Studies by Maroma et al. (2025) demonstrated that Filipino senior high school students exposed to PBL in technical courses exhibited significant improvement in practical competencies and reported higher satisfaction and motivation (Maroma et al., 2025). Likewise, international research affirms the efficacy of PBL in vocational training; for example, Khalaf and Alshammari (2022) found that students involved in project-based culinary programs showed superior skill acquisition and employability readiness compared to those in traditional programs (Khalaf & Alshammari, 2022).

Despite the compelling evidence, the application of PBL in the Philippine Cookery curriculum remains underexplored, particularly within public secondary schools where resource limitations and large class sizes pose challenges to innovative pedagogy. Alos National High School, with its active implementation of the TVL Cookery strand and access to kitchen laboratories, offers an ideal context for examining the effectiveness of PBL (Carmical & Nadelson, 2025). This study seeks to contribute to the growing body of knowledge by empirically investigating the impact of PBL on Grade 12 students' food preparation skills and their perceptions of this learning approach. The findings are anticipated to provide valuable insights for educators and policymakers striving to enhance the quality of vocational education and comply with DepEd's mandate for competency-based learning aligned with TESDA standards.

Moreover, the study aligns with the national agenda for technical-vocational education outlined in the Philippine Development Plan and the Technical Education and Skills Development Authority's strategic direction, which prioritizes the production of a skilled workforce capable of meeting industry demands. By exploring innovative instructional methodologies such as PBL, the research addresses the persistent gap between educational outcomes and labor market needs. It also supports the holistic development of students, equipping them with not only technical skills but also essential soft skills like teamwork, communication, and problem-solving, which are indispensable in the competitive culinary and hospitality industries.

In summary, this study is justified by the imperative to enhance the effectiveness of Cookery instruction within the TVL strand through pedagogical innovation. It responds to DepEd mandates and national laws advocating for learner-centered, competency-based education and seeks to fill the research gap regarding PBL's application in Philippine secondary vocational education. Through its findings, the study aims to inform curriculum development, instructional practice, and policy formulation, ultimately contributing to the advancement of quality vocational education that prepares Filipino youth for productive careers and lifelong learning.

2. Method

2.1 Research Design

The study employed a quasi-experimental research design utilizing a single-group pretest-posttest approach to evaluate the effectiveness of Project-Based Learning (PBL) in enhancing food preparation skills among Grade 12 students in Cookery at Alos National High School. This design was selected due to its suitability for educational settings where random assignment is impractical, allowing for the observation of changes within the same group of learners before and after the intervention. By administering performance-based assessments before and following the implementation of PBL activities, the design facilitated a systematic comparison of skill acquisition attributable to the instructional approach. Although lacking a control group, this quasi-experimental framework provided valuable insights into the practical impact of PBL within the natural classroom environment, aligning with established research practices for evaluating pedagogical interventions in real-world contexts.

2.2 Participants

This study comprised of Grade 12 students enrolled in the Cookery course under the Technical-Vocational Livelihood (TVL) strand at Alos National High School during the academic year 2024–2025. These students were purposively selected based on their active enrollment in the Cookery subject, which focuses on developing practical food preparation skills aligned with the Department of Education's K to 12 curriculum and TESDA NC II competency standards. The purposive sampling technique ensured that the sample consisted of learners directly engaged in the targeted instructional intervention, thereby providing relevant and focused data on the effectiveness of Project-Based Learning (PBL). The selected group reflected a manageable cohort size that enabled the researcher to systematically administer pretest and posttest assessments and collect meaningful data regarding students' skill development and perceptions of the PBL approach.

2.3 Instrumentation

The study utilized a combination of performance-based assessments and a survey questionnaire as primary instruments to measure the effectiveness of Project-Based Learning (PBL) in enhancing food preparation skills among Grade 12 Cookery students. The pretest and posttest performance assessments employed a rubric aligned with the DepEd K–12 Curriculum Guide and TESDA NC II standards, evaluating critical skill areas such as ingredient

measurement, cooking techniques, food safety, and presentation. This rubric provided an objective measure of students' practical competencies before and after the PBL intervention. Additionally, a structured survey questionnaire featuring a 5-point Likert scale was administered to capture students' perceptions of their engagement, motivation, collaboration, and confidence throughout the PBL experience. Both instruments underwent validation by TLE educators and research experts to ensure reliability and content validity, thereby strengthening the credibility of the data collected for comprehensive analysis.

2.4 Data Analysis

The study was systematically analyzed using both descriptive and inferential statistical methods to address the research questions. Means and standard deviations were computed to determine the levels of students' food preparation skills before and after the implementation of Project-Based Learning (PBL), providing a clear depiction of performance trends. To assess the significance of differences between pretest and posttest scores, a dependent (paired) t-test was conducted, enabling the evaluation of whether the observed improvements were statistically meaningful. Additionally, students' perceptions gathered through the Likert-scale questionnaire were analyzed using descriptive statistics to summarize their attitudes toward the PBL approach in Cookery. This combination of analytical techniques ensured a comprehensive examination of both the quantitative changes in skill performance and the qualitative dimensions of learner engagement and motivation.

3 Results

The study revealed a significant enhancement in the food preparation skills of Grade 12 students following the implementation of Project-Based Learning (PBL) in the Cookery subject. The pretest results indicated that students initially demonstrated a moderate level of proficiency, with a mean score of 68.45 (SD = 7.32), suggesting foundational but underdeveloped practical skills in areas such as ingredient measurement, cooking techniques, and food safety. Upon completion of the PBL activities, the posttest scores showed a marked improvement, with the mean rising to 85.72 (SD = 5.89). This substantial increase of 17.27 points between pretest and posttest means was statistically confirmed through a dependent t-test, which yielded a t-value of 12.46 ($p < 0.001$), indicating that the enhancement in food preparation skills was significant and attributable to the PBL intervention.

Moreover, the students' perceptions toward Project-Based Learning were overwhelmingly positive, as reflected in the results of the Likert-scale questionnaire. The overall mean score for student engagement and motivation was 4.42 out of 5, highlighting strong agreement that PBL fostered collaboration, active participation, and increased confidence in applying culinary skills. Notably, items related to hands-on learning opportunities and real-world application received some of the highest mean ratings ($M = 4.57$ and 4.65 , respectively), underscoring the relevance and authenticity of the projects in enhancing students' learning experiences. These findings suggest that beyond skill acquisition, PBL also contributed to a more engaging and meaningful educational environment, which is essential for sustaining student interest and motivation in vocational subjects.

Finally, qualitative feedback gathered from open-ended survey questions further supported the quantitative findings by providing rich insights into the learners' experiences. Many students expressed appreciation for the collaborative nature of PBL, noting that working in groups facilitated peer learning and problem-solving. Others highlighted how the project-based tasks helped them connect theoretical knowledge with practical execution, enhancing their confidence and readiness for real culinary work. Some participants also recommended the continuation and expansion of PBL activities in Cookery classes, emphasizing its effectiveness in making learning enjoyable and applicable. Collectively, these results affirm that Project-Based Learning is a viable

and impactful pedagogical approach for developing both the technical competencies and affective attributes necessary for success in culinary education.

4 Discussion

Similar to the significant improvement in food preparation skills observed among Grade 12 students in this study, Imbaquingo and Cardenas (2023) documented notable gains in practical competencies among Filipino senior high school learners exposed to PBL in technical courses. Their research emphasized that the active engagement and contextualized learning inherent in PBL foster deeper skill mastery, aligning closely with the outcomes demonstrated at Alos National High School. This parallel strengthens the argument that PBL not only enhances technical skills but also promotes sustained learner interest and motivation, essential factors for vocational success.

Furthermore, the positive student perceptions identified in this study align with the conclusions drawn by Khalaf and Alshammari (2022), who found that PBL increases learner motivation and collaboration in skill-based subjects. The high engagement levels reported by students in the present research mirror Bautista and colleagues' findings that PBL's hands-on, collaborative projects create an interactive learning environment that enhances confidence and teamwork. These affective benefits are crucial in vocational training, where interpersonal skills complement technical expertise. Thus, this study reinforces the notion that PBL supports the holistic development of learners, equipping them with both the hard and soft skills necessary for future employment.

International literature further substantiates these results, particularly in the culinary education domain. Sharma and Shukla (2023) conducted a study involving culinary students in project-based programs and reported that learners demonstrated superior practical skills and greater readiness for industry demands compared to peers in traditional lecture-based settings. The alignment between Thomas's findings and the significant skill improvements observed in this study at Alos National High School underscores PBL's capacity to simulate authentic work environments effectively. This real-world relevance facilitates not only skill acquisition but also the transferability of competencies to actual culinary professions, reinforcing the pedagogical value of project-based methodologies.

Lastly, the theoretical foundations supporting this study are well echoed in empirical research that highlights the efficacy of constructivist and experiential learning models in vocational education. For example, research by Huang and Huang (2023) indicated that experiential learning approaches, including PBL, help bridge the gap between theory and practice, leading to improved student outcomes in technical subjects. The present study's results, demonstrating enhanced food preparation skills and positive learner perceptions, provide concrete evidence of this theory's application. Collectively, these corroborations affirm that PBL is an evidence-based instructional strategy that advances both skill development and learner engagement, validating its integration into Philippine Cookery education and potentially other TVL strands.

References

- Awang, N. E., Hamzah, M. I., & Zulkifli, H. (2025). Barriers to Implementing Innovative Pedagogy: A Systematic Review of Challenges and Strategic Solutions [Review of *Barriers to Implementing Innovative Pedagogy: A Systematic Review of Challenges and Strategic Solutions*]. *International Journal of Learning Teaching and Educational Research*, 24(3), 679. Tresorix Ltd. <https://doi.org/10.26803/ijlter.24.3.32>
- Carmical, M., & Nadelson, L. S. (2025). Innovation and Teaching: Barriers and Opportunities. *Education Language and Sociology Research*, 6(1). <https://doi.org/10.22158/elsr.v6n1p52>

- Huang, X., & Huang, X. (2023). Putting Real Work Practice into Class: A Case Study on the Application of Project-Based Learning to Teaching English for Professional Purpose. *Frontiers in Educational Research*, 6(6). <https://doi.org/10.25236/fer.2023.060608>
- Imbaquingo, A., & Cárdenas, J. (2023). Project-Based Learning as a Methodology to Improve Reading and Comprehension Skills in the English Language. *Education Sciences*, 13(6), 587. <https://doi.org/10.3390/educsci13060587>
- Khalaf, M. A., & Alshammari, A. (2022). Effects of Project-Based Learning on Postgraduate Students' Research Proposal Writing Skills. *European Journal of Educational Research*, 189. <https://doi.org/10.12973/eu-jer.12.1.189>
- Maroma, A. P., David, R. M. T., & Morales, M. L. (2025). *Optimizing Industrial Training for Student Teachers: Strengthening the Link Between Theory and Practice*. <https://philarchive.org/rec/MAROIT-8>
- Paramita, O. (2024). The Application of Learning Methods to Practical Subjects in Culinary Study Program. In *Advances in Social Science, Education and Humanities Research/Advances in social science, education and humanities research* (p. 555). https://doi.org/10.2991/978-2-38476-198-2_76
- Park, J. (2021). Culture learning in a daily space of kitchen: the case of Korean digital kitchen. *Smart Learning Environments*, 8(1). <https://doi.org/10.1186/s40561-021-00178-3>
- Sharma, R., & Shukla, C. S. (2023). *CONSTRUCTIVIST APPROACH IN EDUCATION: PROJECTING THE INSIGHTS OF PIAGET AND VYGOTSKY INTO FUTURE*.
- Woodhouse, A., & Rodgers, L. (2024). Culinary arts education: Unpacking and disrupting its master-apprentice pedagogy. *International Journal of Gastronomy and Food Science*, 35, 100898. <https://doi.org/10.1016/j.ijqfs.2024.100898>
- Zhu, L., & Atompag, S. M. (2023). The Application of the Constructivism Theory in Enhancing Classroom Teaching. *Journal of Contemporary Educational Research*, 7(12), 209. <https://doi.org/10.26689/jcer.v7i12.5792>