INTERNATIONAL JOURNAL OF RESEARCH AND REVIEWS IN SOCIAL AND APPLIED SCIENCES

ISSN: 3121 – 6765 | www.ijois.com/ijrrsas/index.php | VOLUME 5, ISSUE 1. (SEPTEMBER, 2026)

# Contextualized Project-Based Learning in Grade 6 EPP/TLE: Changes in Seedling-Propagation Skills and Learning Engagement

**RONALYN RIMANDO BUANSE**
Rufino Alawas Elementary School, Cattubo, Atok, Benguet, Philippines, 2612
Doctor of Philosophy (Ph.D.)
Northeastern College, Santiago City, Isabela, Philippines, 3311
**Email:** ronalyn.buanse@deped.gov.ph

**ARTICLE INFORMATION**

**Received:** 30th July, 2026
**Accepted:** 31st August, 2026
**Published:** 29th Sept., 2026

**KEYWORDS:** contextualized project-based learning; Grade 6 EPP/TLE; seedling propagation; practical performance; learning engagement

**D.O.I.:**
**https://doi.org/10.5281/zenodo.23672171**

**© Copyright** 2026 BUANSE
Distributed under Creative Commons CC-BY 4.0

**How to cite this article:** Buanse, R.R. (2026). Contextualized Project-Based Learning in Grade 6 EPP/TLE: Changes in Seedling-Propagation Skills and Learning Engagement. International Journal of Research and Reviews in Social and Applied Sciences, 5(1), 100-99. https://doi.org/10.5281/zenodo.23672171

**ABSTRACT**

*Real-world tasks can turn classroom concepts into usable skills. This manuscript explored how contextualized project-based learning could be examined in Grade 6 Edukasyong Pantahanan at Pangkabuhayan/Technology and Livelihood Education at Rufino Alawas Elementary School, Atok, Benguet. The proposed four-week intervention focused on planning, safely conducting, and evaluating seedling-propagation activities using locally appropriate materials. A quantitative one-group pretest–posttest framework was modeled using 30 synthetic learner records. Practical performance was represented by a 20-point analytic rubric measuring project planning, tool safety, propagation procedures, and seedling-care decisions. Learning engagement was represented by a 10-item questionnaire scored from 10 to 50. All learner scores were; no school participants were assessed. In this dataset, mean practical performance rose from 10.10 to 13.80, and engagement rose from 30.60 to 35.87. Paired-samples tests indicated differences within the synthetic records (both $p < .001$). These calculations illustrate transparent analysis and reporting; they do not demonstrate real intervention effectiveness. The proposed approach emphasizes meaningful local tasks, teacher scaffolding, clear performance criteria, and responsible assessment. Future field implementation requires institutional permissions, parental consent, learner assent, validated instruments, and preferably a comparison group to evaluate educational impact with stronger evidence. This approach also foregrounds practical assessment over recall-based testing.*

ISSN: 3121 – 6765 | www.ijois.com/ijrrsas/index.php | VOLUME 5, ISSUE 1. (SEPTEMBER, 2026)

## INTRODUCTION

Edukasyong Pantahanan at Pangkabuhayan (EPP) and Technology and Livelihood Education (TLE) provide opportunities for elementary learners to move beyond recalling information toward planning, handling materials safely, and completing useful tasks. In Grade 6 agriculture, the Department of Education (2016) identifies learning competencies associated with propagating trees and fruit-bearing trees, selecting suitable tools, observing safety, and caring for seedlings. Such competencies require observable performance as well as conceptual understanding. Accordingly, effective instruction needs to connect demonstrations and discussion with purposeful practice, feedback, and opportunities to apply skills in a realistic setting. In this context, a project may serve not merely as an output for grading but as a structured environment for developing practical competence.

In many performance-oriented subjects, however, a central instructional challenge is ensuring that learners can perform the procedures they have been taught. A pupil may identify a propagation tool correctly on paper yet struggle to choose it, handle it safely, or explain the sequence of a task. This distinction matters in EPP/TLE because written quizzes alone cannot fully document skill mastery. The wider literature has also shown that school gardens and practical outdoor learning can support curriculum-linked learning, although outcomes are mixed and study quality varies (Blair, 2009; Williams & Dixon, 2013). No baseline assessment data from Rufino Alawas Elementary School were provided for this manuscript; therefore, difficulties among its Grade 6 learners cannot be asserted as an established local finding. Instead, they constitute a relevant educational question that requires direct assessment.

Contextualized project-based learning offers one instructional option. Students can investigate which propagation materials are available locally, plan a simple seedling project, demonstrate procedures under supervision, maintain brief observation notes, and explain decisions based on safety and plant-care principles. Project-based learning emphasizes inquiry into meaningful problems, learner involvement in producing an observable outcome, and sustained teacher support (Blumenfeld et al., 1991; Kokotsaki et al., 2016). Research syntheses suggest benefits for academic learning and motivation in several contexts, but such findings do not automatically establish effects in elementary agricultural skills or in a particular school (Wijnia et al., 2024; Zhang & Ma, 2023). This distinction supports a locally targeted investigation rather than an assumption of success.

The proposed intervention was designed around a four-week seedling-propagation project appropriate to Grade 6 agricultural competencies. Learners would connect discussions of planting conditions, tools, safety, propagation techniques, and care requirements with supervised tasks using suitable, locally available materials. Individual performance could be assessed through an analytic rubric, while learning engagement could be examined separately through age-appropriate, comprehensible items. Engagement was treated as a multidimensional educational construct rather than a proxy for competence, consistent with Fredricks et al. (2004). The design prioritizes teacher demonstration, manageable group tasks, formative checkpoints, and comparable individual pretest and posttest demonstrations.

ISSN: 3121 – 6765 | www.ijois.com/ijrrsas/index.php | VOLUME 5, ISSUE 1. (SEPTEMBER, 2026)

The study was framed to examine two research questions: (1) how did the modeled Grade 6 learners' seedling-propagation performance, overall and across four skill domains, differ between pretest and posttest; and (2) how did their reported engagement scores differ over the same period? The corresponding null hypotheses were that the paired mean differences in performance and engagement would each equal zero at the .05 significance level. The broader purpose was to develop an assessable, curriculum-aligned framework for testing contextualized project-based learning at Rufino Alawas Elementary School, Cattubo, Atok, Benguet. As no actual dataset was supplied, the present manuscript uses transparently observations to demonstrate the proposed analysis rather than to report findings about real learners.

## LITERATURE REVIEW

### Project-Based Learning

Project-based learning organizes instruction around a meaningful task in which learners pose questions, make decisions, create an output, and reflect on their work. Blumenfeld et al. (1991) argued that sustained projects can connect students' motivation with purposeful intellectual activity when the tasks and guidance are designed carefully. Bell (2010) similarly described how inquiry, collaboration, and the production of authentic outputs can provide opportunities for communication and problem-solving. Krajcik and Blumenfeld (2006) situated project-based learning within the learning sciences, emphasizing the connection of driving questions, investigations, artifacts, and instructional support. Together, these perspectives support the use of seedling propagation as a coherent learning process, provided that the project includes explicit agricultural learning goals rather than simply asking learners to produce seedlings.

The evidence base provides reasons for cautious optimism. Reviewing implementation research, Condliffe et al. (2017) reported that project-based learning requires attention to curriculum alignment, assessment, teacher preparation, and implementation conditions. Kokotsaki et al. (2016) highlighted effective scaffolding, group processes, and assessment as conditions that can facilitate successful projects across schooling levels. Zhang and Ma's (2023) meta-analysis found overall positive effects on learning outcomes, whereas Wijnia et al. (2024) found a small-to-moderate positive average effect of problem-, project-, and case-based learning approaches on motivation, with substantial variation across settings. Lazonder and Harmsen (2016) further demonstrated in inquiry-based learning research that guidance matters for learning success. Collectively, these sources justify teacher-supported projects while warning against treating the instructional label itself as a guarantee of improvement.

### Agricultural Skills and Engagement

The agricultural component of the present study was grounded in the Grade 6 EPP/TLE curriculum, which includes identifying propagation tools, demonstrating suitable methods, observing safety, and caring for tree seedlings (Department of Education, 2016). Garden-based learning is a plausible context for translating these expectations into visible activities. Berezowitz et al. (2015) reviewed evidence that school gardens may support academic and dietary outcomes, while stressing the need for stronger studies. In an evaluative review, Blair (2009) identified

ISSN: 3121 – 6765 | www.ijois.com/ijrrsas/index.php | VOLUME 5, ISSUE 1. (SEPTEMBER, 2026)

encouraging learning-related outcomes from school gardening but noted methodological weaknesses and inconsistent effects in some nonacademic domains. Williams and Dixon (2013), synthesizing school garden studies, found that positive academic outcomes were common, especially in science. Kuo et al. (2019) reviewed converging evidence that learning experiences involving nature can support attention, interest, and educational development. These studies support practical outdoor tasks as a learning context, though they do not measure the exact seedling-propagation rubric or Grade 6 population proposed here.

The proposed outcome of engagement was distinguished from practical skill proficiency. Fredricks et al. (2004) described behavioral, emotional, and cognitive aspects of school engagement, providing a framework for observing participation, interest, and learning effort without assuming these are interchangeable. Ratcliffe et al. (2011) reported changes in children's food-related knowledge and attitudes following school garden experiences, illustrating that garden activities can be associated with outcomes beyond academic tests. However, Ohly et al. (2016), in a systematic review of school gardening's health and well-being impacts, emphasized limitations in the available evidence and the need for stronger evaluation. These mixed findings informed the decision to measure practical performance and engagement separately, interpret pretest–posttest change cautiously, and recommend later validation using real learners and a comparison group.

## METHODOLOGY

The study was formulated as a quantitative one-group pretest–posttest methodological demonstration focused on Grade 6 EPP/TLE agriculture at Rufino Alawas Elementary School, Cattubo, Atok, Benguet. A cohort of 30 matched learner records was modeled solely to illustrate the proposed design; the number did not represent verified school enrollment, and no pupils were recruited, tested, or observed. A four-week intervention sequence was specified: baseline individual demonstrations and engagement responses; teacher-guided inquiry and planning; supervised selection of tools and seedling-propagation practice; and formative feedback, seedling-care documentation, equivalent individual posttest demonstrations, and follow-up engagement responses. The activities were aligned to Grade 6 propagation, safe tool use, and seedling-care competencies described in the Department of Education (2016) curriculum. An analytic performance rubric assigned 0–5 points each to project planning, safe tool handling, correct propagation procedure, and seedling-care decisions, yielding an overall range of 0–20. A separate 10-item, five-point engagement instrument yielded total scores of 10–50 and covered behavioral, emotional, and cognitive engagement. Instruments were treated as proposed measures rather than as independently validated school instruments. School authorization, ethical review when applicable, informed parental consent, learner assent, privacy safeguards, rater training, and pilot testing were identified as prerequisites for actual implementation.

Thirty reproducible synthetic pretest–posttest score pairs were generated for each outcome, and each overall practical-performance score was calculated as the sum of its four domain scores. Descriptive statistics included the sample size, arithmetic mean, sample standard deviation (SD), score as a percentage of the 20-point maximum for performance, and mean paired gain. For each outcome, a paired-samples t test compared posttest and pretest scores at $\alpha = .05$; the paired mean difference, its 95% confidence interval, the t statistic with 29 degrees of freedom, the two-sided p

ISSN: 3121 – 6765 | www.ijois.com/ijrrsas/index.php | VOLUME 5, ISSUE 1. (SEPTEMBER, 2026)

value, and the standardized paired effect size (Cohen's d_z = mean difference/SD of differences) were computed directly from the synthetic paired records. These analyses presupposed that the distribution of paired differences was reasonably compatible with a t-test; any field dataset would have required assumption checks, investigation of outliers, and a Wilcoxon signed-rank alternative when warranted.

## RESULTS AND DISCUSSIONS

**Table 1. Pretest and Posttest Seedling-Propagation Performance**

| Assessment | Mean / 20 | SD | % of Maximum |
|---|---|---|---|
| **Pretest** | 10.10 | 1.35 | 50.50% |
| **Posttest** | 13.80 | 2.34 | 69.00% |
| **Paired gain** | +3.70 | 2.26 | +18.50 points |

Table 1 summarizes the rubric performance of 30 matched records. The mean increased from 10.10 (SD = 1.35) before the modeled intervention to 13.80 (SD = 2.34) afterward. On a 20-point scale, these means corresponded to 50.50% and 69.00% of possible points, respectively, an increase of 18.50 percentage points. The paired mean gain was 3.70 points (SD of individual gains = 2.26), which was calculated using each record's posttest score minus its corresponding pretest score. These tables describe a deliberately generated dataset, not performance recorded at Rufino Alawas Elementary School. The pattern is educationally plausible because the intervention combined demonstration, guided practice, and a meaningful output, mechanisms discussed by Blumenfeld et al. (1991) and Kokotsaki et al. (2016). Nevertheless, the higher posttest average should not be interpreted as an observed effect of project-based learning.

**Table 2. Skill-Domain Means and Gains**

| Rubric domain | Pretest M | Posttest M | Mean gain |
|---|---|---|---|
| **Project planning** | 2.53 | 3.47 | +0.93 |
| **Tool safety** | 2.70 | 3.77 | +1.07 |
| **Propagation procedure** | 2.37 | 3.17 | +0.80 |
| **Seedling-care decisions** | 2.50 | 3.40 | +0.90 |
| **Overall (20-point total)** | 10.10 | 13.80 | +3.70 |

ISSN: 3121 – 6765 | www.ijois.com/ijrrsas/index.php | VOLUME 5, ISSUE 1. (SEPTEMBER, 2026)

Table 2 separates the overall 20-point practical rubric into four equally weighted dimensions. The largest mean gain occurred in safe tool handling (1.07 points), followed by project planning (0.93), seedling-care decisions (0.90), and propagation procedure (0.80). Each domain had a maximum of five points, and the four unrounded domain means summed exactly to the overall mean values in Table 1. Thus, the domain analysis was arithmetically consistent with the overall scores and did not introduce a second, incompatible set of results. Despite the overall gains, the modeled posttest mean for propagation procedure (3.17/5) remained below the respective means for planning and safety, indicating a potential priority area under this pattern. The difference across skill areas highlights why broad project completion should not replace direct assessment of specific competencies. The Department of Education (2016) specifies both scientific propagation procedures and safety requirements, and Krajcik and Blumenfeld (2006) emphasized linking project artifacts to identifiable learning objectives.

**Table 3. Engagement Scores**

| Assessment | Total score M | SD | Mean / item |
|---|---|---|---|
| **Pretest** | 30.60 | 4.19 | 3.06 |
| **Posttest** | 35.87 | 5.06 | 3.59 |
| **Paired gain** | +5.27 | 2.75 | +0.53 |

Table 3 displays the modeled engagement totals from a 10-item, five-point questionnaire. The pretest mean was 30.60 (SD = 4.19), and the posttest mean was 35.87 (SD = 5.06), for a paired gain of 5.27 points (SD of gains = 2.75). Dividing total means by 10 produced average item responses of 3.06 and 3.59 on the five-point response scale. In the synthetic sample, 28 records increased, one was unchanged, and one decreased. This distribution and the higher posttest average were consistent with an upward shift in self-reported engagement but did not show whether actual Grade 6 learners were more engaged. Engagement was analyzed separately from observed performance because an enthusiastic response did not necessarily demonstrate procedural competence. Fredricks et al. (2004) described engagement as multidimensional, and Wijnia et al. (2024) documented substantial heterogeneity in motivation outcomes across student-centered learning approaches. Social desirability, teacher expectations, and response-shift bias could also affect real self-report outcomes.

**Table 4. Paired-Samples t Tests**

| Outcome | Mean gain | t(29) | p | 95% CI for gain | d_z |
|---|---|---|---|---|---|
| **Practical skills** | 3.70 | 8.96 | < .001 | [2.86, 4.54] | 1.64 |
| **Engagement** | 5.27 | 10.48 | < .001 | [4.24, 6.29] | 1.91 |

ISSN: 3121 – 6765 | www.ijois.com/ijrrsas/index.php | VOLUME 5, ISSUE 1. (SEPTEMBER, 2026)

Table 4 reports the paired-samples comparisons based on the 30 matched synthetic records. For practical performance, the mean difference was 3.70 points, 95% CI [2.86, 4.54], $t(29) = 8.96$, $p < .001$, with Cohen's $d_z = 1.64$. For engagement, the mean difference was 5.27 points, 95% CI [4.24, 6.29], $t(29) = 10.48$, $p < .001$, with $d_z = 1.91$. Both intervals excluded zero, and both tests lead to rejection of the stated null hypotheses at $\alpha = .05$. The calculated confidence intervals represented uncertainty under the statistical model for these observations. Large standardized gains in these modeled numbers reflected how the demonstration dataset was constructed. Existing meta-analyses report average benefits of project-based or related student-centered approaches while stressing variations among designs, settings, and outcomes (Wijnia et al., 2024; Zhang & Ma, 2023).

## CONCLUSION AND RECOMMENDATION

The study established a curriculum-aligned framework for examining contextualized project-based learning in Grade 6 EPP/TLE agriculture at Rufino Alawas Elementary School. Using 30 synthetic paired records, the manuscript showed an increase in mean seedling-propagation performance from 10.10 to 13.80 of 20 possible points and an increase in mean engagement from 30.60 to 35.87 of 50 possible points. Both paired tests were statistically significant. The objective, however, demonstrate how performance domains, engagement scores, transparent computations, and literature-based interpretation form a coherent research report. For implementation, the researcher and school may first verify Grade 6 enrollment and current curriculum requirements, secure the necessary permissions and family consent, and pilot a four-week locally relevant propagation project using safe, age-appropriate tools and available materials. Teachers may establish common rubric anchors, document demonstrations, conduct double-scored performance assessments when feasible, and provide targeted feedback on procedural accuracy and tool safety. The engagement instrument should undergo expert review and reliability testing before administration. Evaluation should include real pretest and posttest records, consistent assessment conditions, and ideally a comparable group receiving usual instruction.

## FURTHER STUDY

Future research should implement the study with documented ethical approvals, authentic records, standardized task difficulty, trained independent raters, and measured inter-rater agreement. A quasi-experimental comparison-group design, larger multi-school sample, and delayed follow-up assessment could strengthen the evidence. Additional outcomes could include learner explanations of propagation decisions, practical safety incidents, quality of maintenance logs, and the sustainability of seedlings over time. Qualitative teacher and pupil feedback could help explain which features of localized projects supported—or complicated—learning.

## ACKNOWLEDGEMENT

The author gratefully acknowledges the guidance of educators and academic mentors whose expertise may support the refinement of this proposed study. Appreciation is extended to Northeastern College and the school community identified in the research context. This manuscript was developed as a research-writing and statistical-reporting demonstration. AI-assisted drafting

ISSN: 3121 – 6765 | www.ijois.com/ijrrsas/index.php | VOLUME 5, ISSUE 1. (SEPTEMBER, 2026)

and synthetic data generation were used; no claims of school participation, collected learner responses, formal institutional endorsement, or publication were made.

## REFERENCES

Bell, S. (2010). Project-based learning for the 21st century: Skills for the future. *The Clearing House: A Journal of Educational Strategies, Issues and Ideas, 83*(2), 39–43. https://doi.org/10.1080/00098650903505415

Berezowitz, C. K., Bontrager Yoder, A. B., & Schoeller, D. A. (2015). School gardens enhance academic performance and dietary outcomes in children. *Journal of School Health, 85*(8), 508–518. https://doi.org/10.1111/josh.12278

Blair, D. (2009). The child in the garden: An evaluative review of the benefits of school gardening. *The Journal of Environmental Education, 40*(2), 15–38. https://doi.org/10.3200/JOEE.40.2.15-38

Blumenfeld, P. C., Soloway, E., Marx, R. W., Krajcik, J. S., Guzdial, M., & Palincsar, A. (1991). Motivating project-based learning: Sustaining the doing, supporting the learning. *Educational Psychologist, 26*(3–4), 369–398. https://doi.org/10.1080/00461520.1991.9653139

Condliffe, B., Quint, J., Visher, M. G., Bangser, M., Drohojowska, S., Saco, L., & Nelson, E. (2017). *Project-based learning: A literature review* [Working paper]. MDRC. https://www.mdrc.org/work/publications/project-based-learning

Department of Education. (2016). *K to 12 curriculum guide: Edukasyong Pantahanan at Pangkabuhayan and Technology and Livelihood Education*. https://www.deped.gov.ph/wp-content/uploads/2019/01/EPP-CG.pdf

Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School engagement: Potential of the concept, state of the evidence. *Review of Educational Research, 74*(1), 59–109. https://doi.org/10.3102/00346543074001059

Kokotsaki, D., Menzies, V., & Wiggins, A. (2016). Project-based learning: A review of the literature. *Improving Schools, 19*(3), 267–277. https://doi.org/10.1177/1365480216659733

Krajcik, J. S., & Blumenfeld, P. C. (2006). Project-based learning. In R. K. Sawyer (Ed.), *The Cambridge handbook of the learning sciences* (pp. 317–334). Cambridge University Press.

Kuo, M., Barnes, M., & Jordan, C. (2019). Do experiences with nature promote learning? Converging evidence of a cause-and-effect relationship. *Frontiers in Psychology, 10*, Article 305. https://doi.org/10.3389/fpsyg.2019.00305

ISSN: 3121 – 6765 | www.ijois.com/ijrrsas/index.php | VOLUME 5, ISSUE 1. (SEPTEMBER, 2026)

Lazonder, A. W., & Harmsen, R. (2016). Meta-analysis of inquiry-based learning: Effects of guidance. *Review of Educational Research, 86*(3), 681–718. https://doi.org/10.3102/0034654315627366

Ohly, H., Gentry, S., Wigglesworth, R., Bethel, A., Lovell, R., & Garside, R. (2016). A systematic review of the health and well-being impacts of school gardening: Synthesis of quantitative and qualitative evidence. *BMC Public Health, 16*, Article 286. https://doi.org/10.1186/s12889-016-2941-0

Ratcliffe, M. M., Merrigan, K. A., Rogers, B. L., & Goldberg, J. P. (2011). The effects of school garden experiences on middle school-aged students' knowledge, attitudes, and behaviors associated with vegetable consumption. *Health Promotion Practice, 12*(1), 36–43. https://doi.org/10.1177/1524839909349182

Wijnia, L., Noordzij, G., Arends, L. R., Rikers, R. M. J. P., & Loyens, S. M. M. (2024). The effects of problem-based, project-based, and case-based learning on students' motivation: A meta-analysis. *Educational Psychology Review, 36*, Article 29. https://doi.org/10.1007/s10648-024-09864-3

Williams, D. R., & Dixon, P. S. (2013). Impact of garden-based learning on academic outcomes in schools: Synthesis of research between 1990 and 2010. *Review of Educational Research, 83*(2), 211–235. https://doi.org/10.3102/0034654313475824

Zhang, L., & Ma, Y. (2023). A study of the impact of project-based learning on student learning effects: A meta-analysis study. *Frontiers in Psychology, 14*, Article 1202728. https://doi.org/10.3389/fpsyg.2023.1202728